

Chapter Five

Thomas Stevenson 1818-1887 - Investigator of natural phenomena and innovator

Family recollections

Even if he had done nothing else of importance in his life, the fact that he produced a son called Robert Louis Stevenson would have assured Thomas a place in history. In many ways father and son were like each other, but in far more ways they were not! Their childhood circumstances were different as Thomas was brought up with considerable parental assumption that he would amount to something and his father, Robert, with great persuasion, patience and authority stuck into the project until he had achieved his aim. Thomas as a child drifted aimlessly from Mr Brown, his tutor, to the Edinburgh High School, and he appeared to have no aims or ambitions regarding the outcome of his life.

Charles remembered this family episode, told him by his father David:

'This story was told me by my father David about an incident he remembered from Baxter Place when he and Tom were still children. Tom was reported 'to be lying in bed and won't get up'. So brother Bob, who afterwards was a surgeon in the Army, was told off to examine him and as usual found it was again a case of shamming illness to escape classes at school. On completion of his examination Bob left the room and returned furnished with a pickled gherkin which he pushed up one of Tom's nostrils and then he left the room. The result was an immediate success ...'

Possibly Robert's patience held out so long with him because he was the youngest, and as both his elder brothers were well settled into engineering and endowed with obvious gifts to bring to the profession, Thomas was free to choose virtually any career he wanted. The trouble was he didn't really wish to do anything

except write visionary stories, visit antique bookshops, study natural science and sleep as long as he liked in the morning! In 1834 a year after leaving school Thomas tried printing. An interest in bookselling followed, and finally a job in the publishing house of Patrick Neill. Here he stuck until complete boredom drove him to ask his father for an apprenticeship in the family firm. This meant enrolling at Edinburgh University, office work, site work in the holidays and an endless bombardment of advice from Robert.

'From the Craven Hotel, London

I dined yesterday where I heard on first rate authority that Walker rises at 4 o'clock every morning and has his fire and candles going all in apple pie order for business! ...

Edinburgh 13th May. My own room, Sunday 9. p.m.

You need not look to David as a correspondent at present. He does not trust himself to rise in the morning but sits until one or two o'clock overnight besides the day's work. Never speaks to David about rising. If he does not sit at night, he generally gets called at 6 and rises as you do. How perfectly absurd it was to hear you formerly saying 'I cannot rise, it quite knocks me up.' See where it is now! Never allow yourself as a young man to think or speak or act in this style either about rising, or sitting, or standing, or wading a water carrying a burthen, or eating this, that or t'other thing. *All trash.* Set your mind and your shoulders to the world and press onwards.'

But by 21 years old life was changing for Thomas. He had shown innovative ability by designing a new set of surveying instruments. He had also supervised the erection of a lighthouse on Little Ross.

It was Alan who gave Thomas his first real break and handed over the completion of his own brain-child, Skerryvore, to him. Thomas thoroughly understood Fresnel lamps and Skerryvore still needed its lantern. His brother's confidence paid off and as Alan was ill it was Tom who saw the lamp first shine out on 1st February 1844.

Robert retired from the family firm in 1846 and Thomas was made a partner with some real money to jingle in his pocket. Time now to think of marriage. The girl of his choice was the fair haired, very elegant, tall daughter of the Colinton manse, Margaret Isabella Balfour. He met her on a railway journey to Glasgow in 1847 in the charge of an uncle and aunt. She was 18 years old and shortly after he proposed to her on a walk on the Pentlands. It was real love on both sides and Thomas was devoted to her for the rest of his life. They were married on 8th August 1848 and moved at once into their own house at 8 Howard Place. On 13th November their only child came safely into the world. He was plump, fit and well, without illness of any sort until he was 18 months old. Possibly if anyone had measured his rib cage they might have found that it was unusually narrow. All the Victorian ailments hit him hard and he scarcely had time to recover from one before he was hit by another. His mother too was considered 'delicate' and ordered to stay in bed until noon. Here Thomas showed one of the best sides of his character. He held the view that no sacrifice on the part of a man was too much to make for a woman and he cherished his wife with tender care. With Louis' nurse Cummy probably asleep on her feet after getting him alive through another night, Thomas would arrive to sit by the nursery door and hold imaginary conversations with unseen bodies in an effort to get his son to relax.

When Louis was 2 years old they moved across the road to what was then No. 1 Inverleith Terrace. The house still stands, but is No. 9 today. Like Howard Place it was found too cold and damp and the family moved again when Louis was 7 years old to 17 Heriot Row. Thomas probably bought this house with the legacy left him after the death of his brother, Dr Robert, M.D., Surgeon to the Buffs.

In 1867 Thomas leased Swanston Cottage on the northern slopes of the Pentland Hills, about five miles distant from Heriot Row. This house was a wonderful summer retreat. Louis was now 17 years old and often walked out to it, even in mid-winter. He could escape there with personal friends, away from his ever anxious parents. When Thomas was in residence a phaeton was driven into town twice daily. Thomas had flair and he lived in style wherever he went. He had long forsaken his lazy ways and he was accepted as a very successful Edinburgh citizen by the time his father died in 1850. He worked extremely hard, but his leisure hours were still spent with friends or going on long walks speaking to and feeding every dog he met, convinced that they had souls. His views on the education of children were light years away from his contemporaries. He thought that children only learnt what they wanted to learn at the time they were ready for it. It had been so for himself ... Louis in his essay on his father writes:

'Latin he happily re-taught himself after he had left school, where he was a mere consistent idler; happily I say, for Lactantius, Vossius, and cardinal Bona were his chief authors. The first he must have read for twenty years uninterruptedly, keeping it near him in his study, and carrying it in his bag on journeys.'⁵⁷

Fate certainly dictated that Louis was to have a very erratic education, but Thomas got expert, divergent and sometimes inspired help for his son's tuition wherever they were in the world. Louis' natural mental gifts flourished like beanstalks. Thomas and his son shared a talent that was really a love of words and they were often great sparring partners both in public and private. Louis writes:

'His talk compounded of so much sterling sense and so much freakish humour, and clothed in language so apt, droll and emphatic, was a perpetual delight to all who knew him ... His affections and emotions were liable to passionate ups and downs, found the most eloquent expression both in words and gestures. Love, anger, and indignation shone through him and broke forth in imagery.'⁵⁷

Louis recognised in his father the depressive state that was mutual to them both. He also knew that, for his father, hard work and the constant need for travel in the Lighthouse Board offered an escape from what Louis called 'Troublesome humours.'



[67] Thomas, Margaret and family after the return from California in 1880 of Louis with Fanny and Lloyd.

The devout belief in Christianity inherited from the previous generation was a strength that he could always call upon. When Louis declared on the last day of January 1873 that he was no longer a Christian it was a terrible blow to his father and mother.

Thomas had always given much time and money to the Church of Scotland, serving on many of their committees. He had founded a Magdalene Mission in Edinburgh, and had written and published a work on the defence of Christianity. Like many devout Christians it was impossible for him to have any insight into Louis' spiritual dilemma and equally difficult for his mother. The little family just had to ride out the storm and it blew them all into immediate illness. Eventually help came because Louis' young life was moving forward all the time, and right ahead was to be his first meeting with Sydney Colvin and Frances Sitwell. The whole world changed colour for him the day he walked into Cockfield, Suffolk, near Bury St Edmunds—he was falling in love! The letters he wrote to Fanny for the next few years of his life, most of which are published in Ernest Meheew's *Letters of Robert Louis Stevenson*, show us today the tremendous depth of a very remarkable soul. [67]

Another blow to Thomas was the final realisation that Louis was definitely not able or willing to follow him into the engineering world. The alternative, that he would qualify for the Scottish Bar, had to satisfy them both for the moment. Thomas wrote to David on the 19th of April 1872:

'For as my only son has, from causes to which I shall not advert, abandoned Engineering all connection between me & the business ceases at my death. Moreover Louis' fees as an Advocate are I understand about £500 & after he has passed he must expect to be a briefless Barrister for a number of years, whereas you know very well how soon your son can get a fair allowance in our profession.'

A bribe of £1,000 was to be paid over on his qualification and Thomas duly paid up. Louis gave at least threequarters of it away to his friends.

Thomas and Maggie also had to face the departure of their son to America without informing them of his intention. He went to marry a divorcee, ten years older than himself with three children, one still dependent on her and only twelve years old. The very conventional Edinburgh society of their day assumed that Louis' 'unsuitable' marriage was another disaster his 'black sheep' of a son had inflicted on him. In the event when the couple arrived in Heriot Row for their extended honeymoon, Fanny Van de Grift Osbourne's charm and talents completely won over Thomas and Maggie. Both of them enjoyed and spoilt their daughter-in-law and their Stevenson relatives 'closed ranks' and put on a good face to outsiders regarding Louis' behaviour.

Thomas worked hard for his political beliefs as well as his Church. He was a Tory and every year paid into the party funds every year until the one before his death when he forgot, and

this omission probably cost him the knighthood that he coveted, and that friends were trying to negotiate for him. He had become ambitious for worldly honours and it was a bitter blow to him.

Thomas was very hard with his brother David and also his two nephews, David and Charles, regarding financial questions.

In spite of a very close successful working relationship with his brother David raised the subject of the partnership the year after Elizabeth's death and wrote this letter to Thomas:

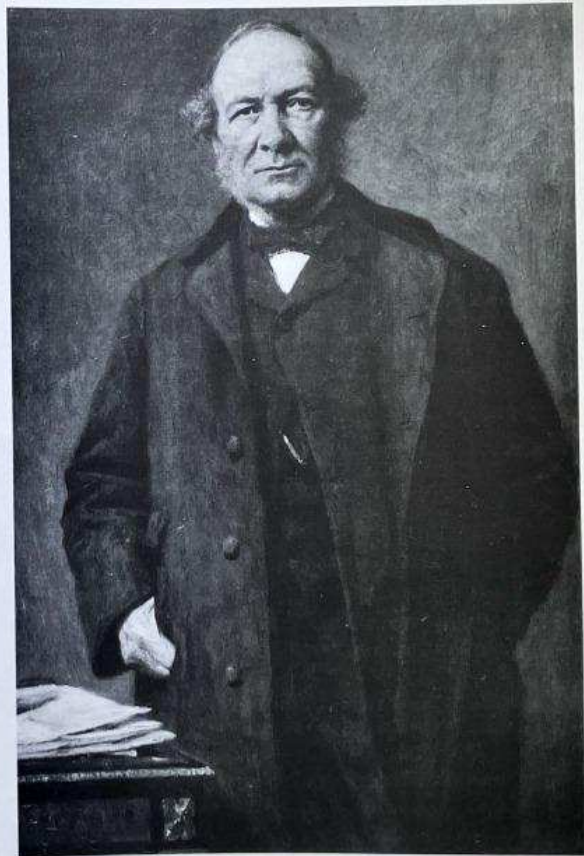
'North Berwick 13 April 1872

My Dear Tom

I have been so much engaged with my book that I have not had time to write on business matters. I have not my letters with me but I think in my last (of which I think however I kept no copy) I said that rather than incur the *family* breakdown of a separation of the engineering firm now going on for a century old, I would acquiesce in any redivision of the future profits of the business which you proposed. After that [I] got your letter proposing that the profits in future should be *equally* divided in which proposal in terms of my letters I now acquiesce. You say that you hope our differences may *now* be ended, I hope so too; but I should not wish my *acquiescence* to be held as implying *approval* for my opinion remains unaltered. An equal division of the future profits is in my opinion carrying an *abstract principle* (the soundness of which when viewed *merely* as an abstract principle no body can dispute) to an extent which (viewing the *which circumstances* of our case as fully set forth some years ago in the first letter I wrote to you on this subject) is neither *natural* nor *just*. But having in order to avoid misconception

stated that my views as there I expressed are unchanged no more need be said on that point, as I have under the circumstances above stated given my acquiescence to the arrangement, for the commencement of which I presume some *definite* date must be fixed and I suppose the first of January last may most conveniently be named.

You say something about providing for one or other of the boys entering the business but really I dont know that there is much use in doing so. If it be requested as any equivalent for which I may give up in the division of future business profits I do not see how it can in any way be so regarded or accepted by me. I think I mentioned already in some letter that my boys are really only entering on their studies and that it seems impossible under any circumstances that Davie, for example, could take a part in the business for 6 years at least (he was 17 last birthday). No one knows what the business may then be and still less perhaps is it possible to tell whether either of them may then desire to enter it. But this we know, that both of them are entered on an expensive course of education to fit them for what even may be their profession. Besides, I confess I do not like the notion of contemplating the possibility that under any circumstances the door of our office could ever be shut against them or opened in preference to a stranger provided either of them was fitted to take a place in the business and express a desire to do so. Neither on the other hand do I see any propriety in placing you under a legal obligation to assume as a partner a person who may have no turn for general business and still less for Engineering. It is not at all a business which is carried on even to the *smallest* extent by Capital, it is entirely *head* work (the only analogous professions I know being painters &



[68] Thomas Stevenson, PRSE.

advocates) which cannot be bought & sold like stock in trade, but if anything were necessary on the subject a single letter builds enough credit.

I am My Dr Tom
Your afft. brother
David Stevenson

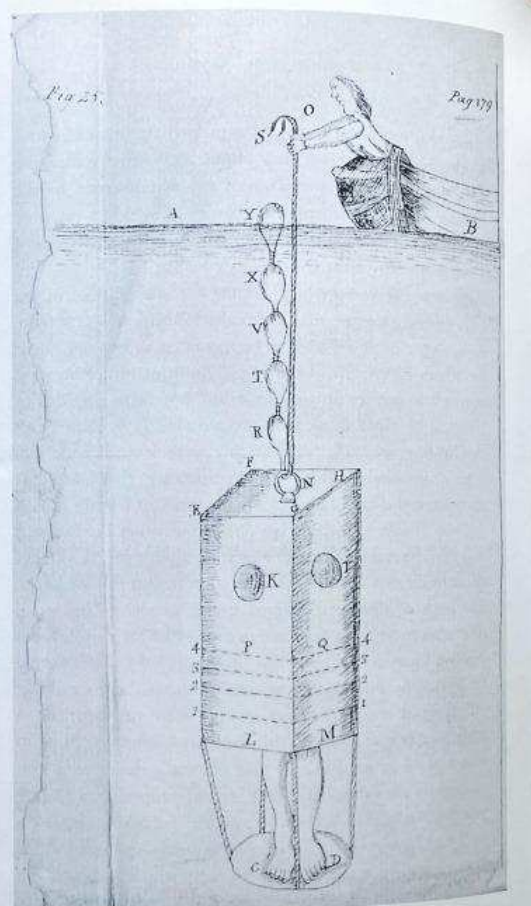
I have no paper with me here.'⁵

Thomas was a very handsome man—he was five feet ten inches tall, broad shouldered, regular features, expressive eyes, and a slightly florid complexion. With an excellent speaking voice he commanded attention wherever he went. [68] At 84 George Street, however, they recognised David as the better engineer who gave far more attention to the business than Thomas.

All the Stevensons fought against approaching death and, except for Louis, never liked to acknowledge that it might be 'just round the corner.' Thomas was no exception and 'the reaper' caught him at a favourable moment at his own house in Heriot Row. As Louis wrote in his famous article on his father, 'He had upon the whole a happy life; nor was he less fortunate in his death, which at the last came to him unaware.' His death certificate gives the cause of death as 'Enlarged liver, 2 years. Jaundice, 2 months.' He joined his father in the vault at the New Calton Cemetery with his wife Maggie. A flat stone records the death of their only son, R.L.S., and his wife Fanny, who are both buried on the summit of Mount Vaea in Samoa.

A professional aspect

Thomas' initial reluctance to embark on a civil engineering career has been referred to already. To Robert's consternation he even indulged his interest in writing fiction after having decided



[69] Thomas' restoration of defective plate in Sinclair's *Hydrostatics* 1672.

Thomas Stevenson
1839

CIVIL ENGINEER

AND

ARCHITECT'S

JOURNAL.

132, 158, 173, 224, 331, 371, 378, 406; Bury
Edmund's, 331, 371, 406; Cardiff, 61; Ire
378; Oxford, 378; drawings, exhibition of,
Concrete, patent, 120.
Cotton gins, experiments on, 313.
Curtis's railway truck, 5.
Cycloidal paddle-wheel, 35.
Dagenham breach, stopping of, 106. *T.S.*
Dock—Bute, 167; Chatham, 120; Liverpool, 2
Woolwich, 27, 37, 120, 362, 363.

[70] *Civil Engineer & Architect's Journal with Thomas's annotations of
authorship 1839.*

on an engineering career, no doubt to provide some relief from the relentless rigour of his apprenticeship. Robert however considered this distraction of his nineteen-year-old son sufficiently unwelcome to put pen to paper and urge him *to give up such nonsense and mind your business.*⁶⁸

Thomas complied, and managed this situation by combining his interests in natural history, natural philosophy, writing and old books, even to restoring them, with civil engineering. [69] Fortunately, he had both the ability and, through his work, the opportunity. He was studious by nature, proficient at mathematics, although not arithmetical calculation, and eventually produced more publications than any other member of the family. Through these and his practice he made significant contributions to the development of lighthouse illumination and harbour engineering, producing valuable reference works.

Thomas's earliest known published combinations of his writing and engineering talents were anonymous articles in the leading engineering periodical of its day *The Civil Engineer and Architect's Journal* from December 1837 to 1841. Holograph annotations of his own copies [70] attest to his authorship of articles and correspondence on such diverse subjects as the method of removal of a 40-50 ton stone from the River Tay near Perth during river deepening, descriptions of three 17th century suspension bridges over the River Charente, the use of blasting to demolish ruinous buildings, restoring rather than replacing ruinous historic buildings, river bank profiles and the repair of breaches, and an improved levelling staff and 'quick-set' level made to his specification.

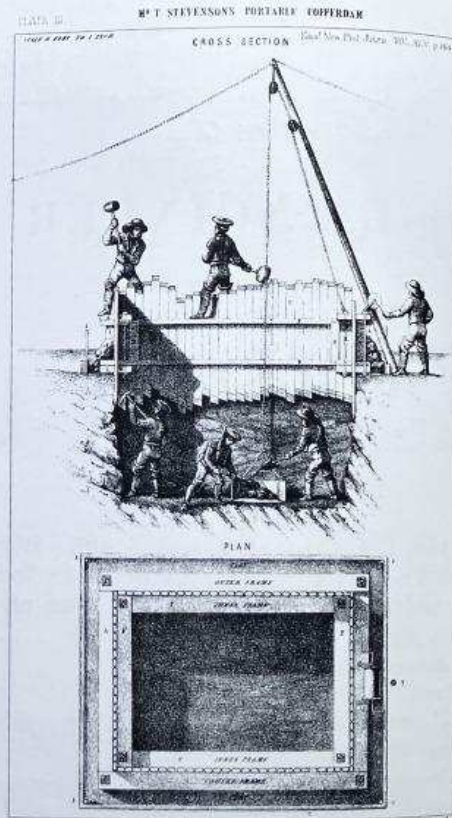
To what extent his father knew and approved of these writings is not known but, more than a century later, the family's

historian D. Alan shed some light on their relationship at about this time:

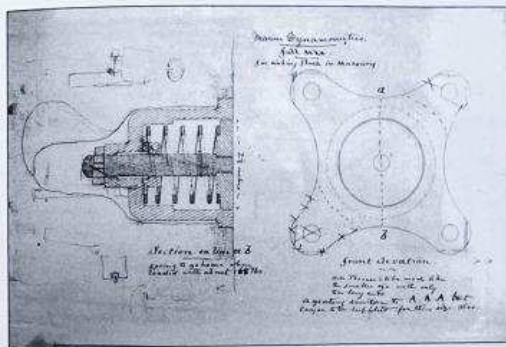
From time to time Robert sent him [Thomas] copies of professional papers and in October 1837 he suggested that Thomas should write a description of Cardiff harbour works [where he had been sent to gain experience]. Thomas however fobbed him off with a letter saying that such a detailed account 'would weary both you and me'. Instead he described the arrangement of several notebooks which he was keeping. 'When I mention that each entry contained perhaps on the average 20 or 30 pieces of information on the subject, you will readily admit that my book will in good time be a perfect digest of engineering knowledge. . . . I keep another book which I call my office book of rules, formulae, &c. and another book in which all operations of machinery are drawn. Then I have a book fit for the pocket bound in vellum - a digest of all my other books is entered here. I hope it will be of vast use to me in after life.'

*He mentioned that as he wrote he was occupied making notes from a report of a House of Commons enquiry for providing drinking water throughout the London area. In conclusion he said that a newspaper had reported that Lord Hopetoun was objecting to a proposed [Edinburgh to] Glasgow railway for which the Stevensons were the engineers and commented - 'I think it would be of great consequence that Alan or you call on Hope the agent at 31 Moray Place [Edinburgh] and explain the advantages of our line. It is possible he might support it.' Thomas expected that these descriptions of his notebooks would please his father greatly, but it is doubtful if Robert welcomed the advice from his nineteen year old son on how to deal with the Earl's solicitor.'*⁷²

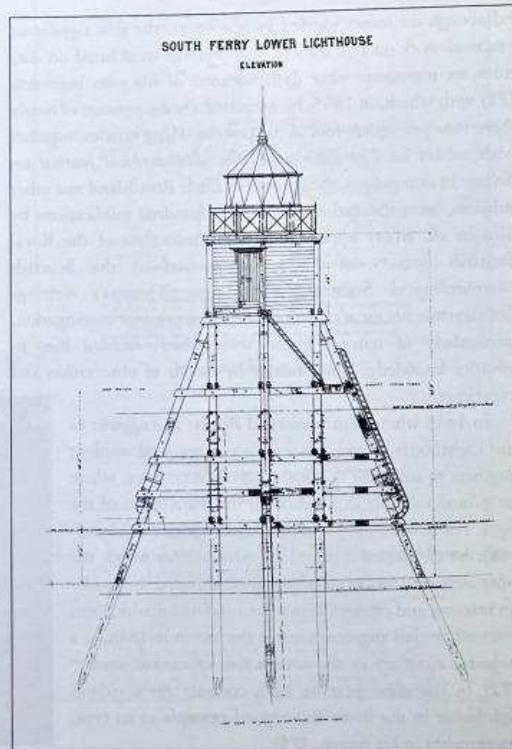
In 1845 Thomas furnished the *Civil Engineer & Architect's Journal* with an abstract of his paper to the Royal Society of



[72] Portable cofferdam, 1848. From Thomas's article in *Edin. New Phil. J.* 1848. XLV



[71] Wave dynamometer. Drawing annotated by Thomas.



[73] Tay South Ferry lower lighthouse [off Tayport], 1848. Drawing signed by Thomas.

Edinburgh on forces exerted by sea-waves, the first significant practical work on this subject. His findings were based on data from an ingenious wave dynamometer of his own invention [71] with which, in 1845, he measured a wave pressure of nearly three tons per square foot at Skerryvore. These articles, together with others in *The Edinburgh New Philosophical Journal* on defects in rain gauges, the geology of Little Ross Island and other subjects, were the earliest of about a hundred publications by him in all. Many appeared in the *Transactions* of the Royal Scottish Society of Arts, the *Journal* of the Scottish Meteorological Society and *Nature*. Thomas's writings demonstrate his innate faculty for the quantitative investigation, particularly of natural phenomena, which enabled him to advance knowledge and practice by means of observation and experiment.

In 1843 when Alan succeeded Robert as Engineer to the Lighthouse Board, Thomas was appointed resident engineer to conclude the operations at Skerryvore, where he gained valuable experience on the installation of the light. For constructing a sloping masonry wall at Hynish [48], he developed a portable cofferdam, in which the piles were retained in place and guided during driving by an internal and external frame, an innovation which was assessed by civil engineer George Buchanan in 1848, as a *valuable auxiliary in the construction of marine works*.¹⁶ [72] In the same year he let a contract for a timber lighthouse in the River Tay, a good example of its type, presumably to his design. [73]

On his father's retirement in 1846, Thomas became the firm's junior partner, which enabled him to engage

[74] Lybster Harbour - Where throughout 1852 Thomas kept a register of wave heights which varied from a maximum of a few feet in summer to over 13 ft. in winter.

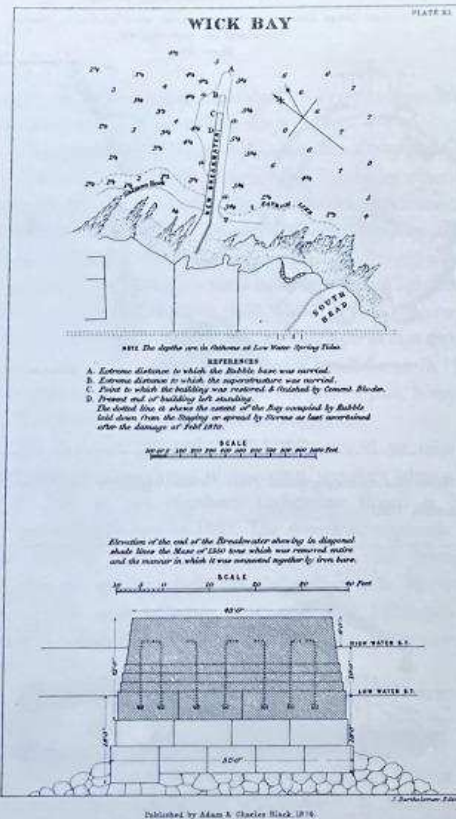


[75] Anstruther Harbour 1991. D. & T. Stevenson were engineers for building the caisson pier, against which the North Carr Light Vessel can be seen

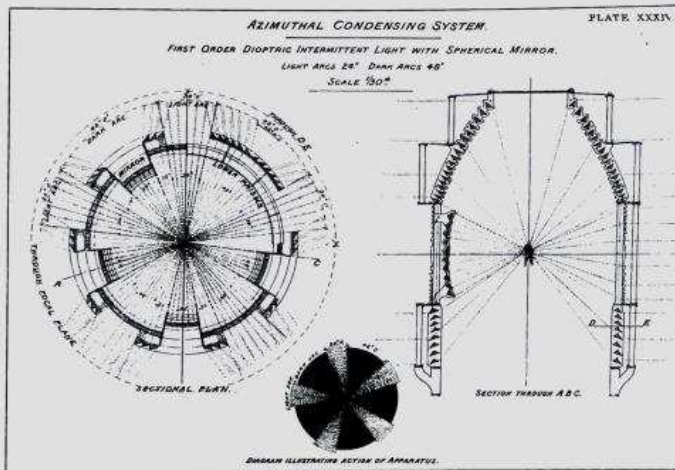
effectively in research and development for many years. The fact that this work did not at first produce much income may have been a factor in David's delaying until 1872 the implementation an equal division of the firm's profits between them.

From 1855-84 Thomas, at David's instigation, acted jointly with him as Engineer to the Northern Lighthouse Board as part of the firm's business. Together they designed about 28 beacons and 30 lighthouses, including works of great difficulty on isolated rocks at Muckle Flugga 1857, Dhu Heartach 1872 and Chicken Rock, Isle of Man 1875. In 1881, when he took over the day-to-day management of the firm because of David's ill-health, Thomas found this duty taxing, combined with his existing work-load, and his health deteriorated. In 1885 David Alan was appointed with him as joint engineer to the Lighthouse Board, and increasingly carried out the lighthouse duties until Thomas's death.

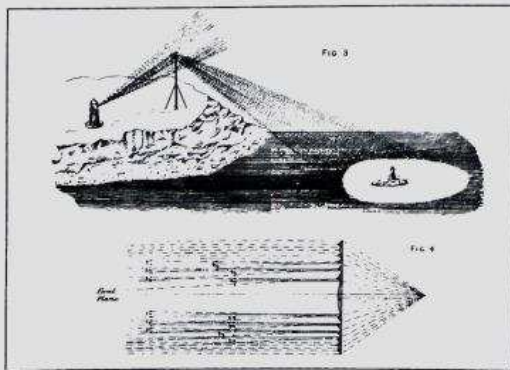
Harbour work at Hynish, Lybster [74], Anstruther [75], Wick, Londonderry and elsewhere provided Thomas with opportunities to continue his practical investigations into the generation and force of waves. By 1852 he had formulated a tentative empirical relationship between the height and fetch [distance of open sea behind] of waves, which later became the formula, H (feet) = $1.5 F$ (miles).⁶¹ The formula was still being used as an approximation by maritime engineers after the second world war. Other experiments led to formulae which enabled the effect of harbours and breakwaters in reducing the height of waves to be calculated. Thomas's valuable work in this field became widely known through his *Encyclopædia Britannica* article 'Harbour', separately published and enlarged as *Design and Construction of Harbours* in 1864, 1874 and 1886.



[76] Wick breakwater plan and cross-section. Note the pierres perdues (rubble foundation) visited by Louis when diving. From Thomas's *Design and construction of harbours*, 1886.



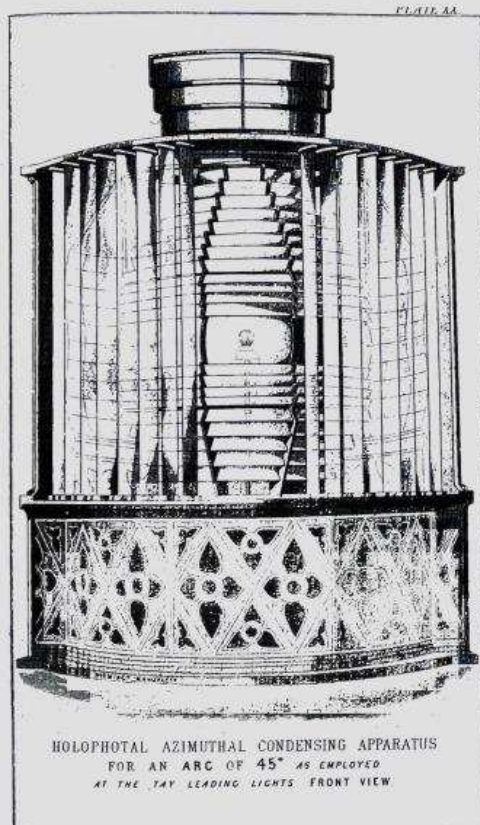
[77] Azimuthal condensing system. From Thomas's *Lighthouse construction and illumination*, 1881



[78] Indirect illumination and reflection at Stornoway. From Thomas's *Lighthouse construction and illumination*, 1881.

The firm's harbour work was almost invariably successful, except for Wick breakwater for the British Fisheries Society which, as its construction progressed from 1863 into deeper water, by 1868 reaching out over 1,000 feet to a depth of 30 feet below low water, frequently experienced storm damage from waves up to 40 feet high. A major disaster occurred in 1870 when waves destroyed about one-third of the length of the breakwater. It was repaired but succumbed to destruction again in 1872 and yet again in 1877, when a composite mass of rubble concrete weighing about 2,600 tons was carried away by the sea. [76] Following this disaster the project was abandoned as a costly, but most instructive failure. Meeting its expense was a factor in the demise of the Society by 1893.

A factor in the failure at Wick was that Thomas's formula under-estimated the height of the waves by at least 50 per cent because the conditions there were exceptionally beyond those upon which the formula was derived. In a modern evaluation Townson suggests that at Wick, because the fetch was more than 300 miles and the wind speed far above the 30 miles per hour at which the formula is now considered to provide a good approximation, its use would have indicated a wave height of 26 feet, only one-third to one-half of that now known to occur in the North Sea. In drawing attention to the failure in detail in his publications Thomas can be considered to have obviated similar situations occurring elsewhere. Townson commented that Thomas's advances in meteorology were particularly frequent in the years following the Wick project and that he was the first to compare wind speed with barometric gradient. Not only does his



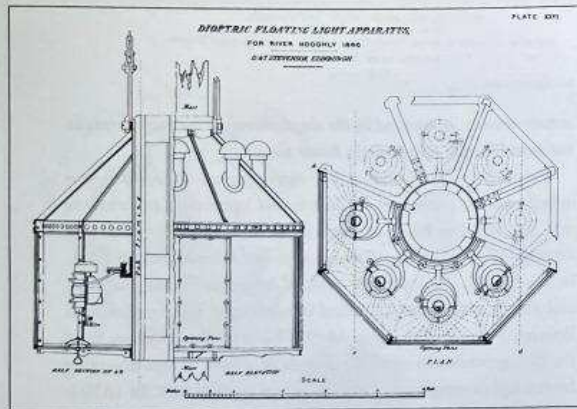
[79] Holophotal azimuthal condensing apparatus for Tay lights. From Thomas's *Lighthouse construction and illumination*, 1881.

stature remain unimpaired by the shortcomings of his wave formula, but paradoxically science is the better for it.⁶¹

Fortunately for Thomas his international reputation was broadly based. Details of his influential lighthouse practice are fully described in his *Lighthouse Illumination*, 1859 which was expanded into *Lighthouse Construction and Illumination* in 1881. In this field he developed the work of Augustin Fresnel and Alan and installed a catadioptric fixed holophote in the lighthouse at Peterhead North Harbour in 1849. This is believed to have been the first apparatus to combine the whole sphere of rays diverging from a light source into a single beam of parallel rays. In 1850 it was followed by the installation of the first dioptric holophotal revolving light at Horsburgh Rock, Singapore.

The holophotal system, which represented an important development in lighthouse illumination, was then adopted on a larger scale by the Northern Lighthouse Board at North Ronaldsay Lighthouse in 1851. The system subsequently came into universal use. Thomas also developed the concept of creating an *apparent* light on dangerous reefs by indirect illumination and reflection from a parent lighthouse and installed a *beautiful and ingenious contrivance* at Stornoway in 1851.⁶² [77]

Thomas's crowning achievement was his azimuthal condensing system which reduced the available light in some sectors of azimuth and optimised it in others. [78,79] The system was introduced at Isle Oronsay lighthouse, Skye in 1857 to service Sleet Sound. He was assisted in some of the calculations required for his optical refinements by his cousin and life-long friend Professor W. Swan (1818-86) and Professor P. G. Tait (1831-1901). Abroad, his work included a dioptric floating light for the River Hoogly. [80]



[80] Dioptric floating light apparatus for River Hooghly, India. From *Thomas's Lighthouse construction and illumination*, 1881.

Thomas was elected a Fellow of the Royal Society of Edinburgh in 1848 and became its President in November 1884. Unfortunately, because of ill-health, he was unable to complete his term of office and he resigned in September 1886. In 1864, sponsored by Thomas Bouch, later of Tay Bridge disaster notoriety, Thomas was elected a Member of the Institution of Civil Engineers in 1864. He was also a Fellow of the Geological Society of London from 1874-1887.

In furtherance of his profound interest in the weather and its effects Thomas became a founder member of the Scottish Meteorological Society in 1855 and its honorary secretary in 1871. Among the many and permanent contributions which he made to meteorology in addition to those already mentioned were, the Stevenson screen for the protection of thermometers, designed in c.1864 and which came into in universal use [81]; the introduction of the term 'barometric gradient'; and the

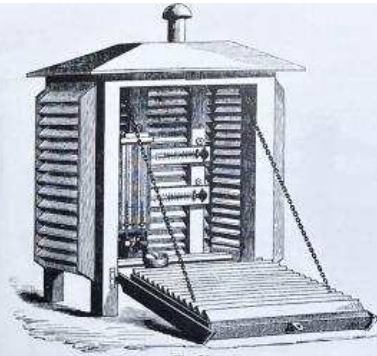


Fig. 13.

the louver-boarded box for thermometers, constructed by Thomas Stevenson, C.E., Edinburgh, and now extensively used by the observers of the Scottish Meteorological Society, and other meteorologists. A figure of the box, fig. 13, is here given, with the

[81] Thomas's extensively used thermometer screen. The corner posts to be of sufficient length that the maximum thermometer was exactly 4ft. from the ground.

means of ascertaining, by high and low level observations at Ben Nevis and elsewhere, the vertical gradients for atmospheric pressure, temperature and humidity.

Thomas is best remembered today for his innovative development of maritime engineering and meteorology. Louis expressed this more narrowly and with filial pride in his dedication to *Familiar studies of men and books*:

To
 Thomas Stevenson
 Civil Engineer
 By whose devices the great sea lights in every quarter
 of the world now shine more brightly
 this volume is in love and gratitude
 dedicated by his son
 the author.