

# THE UNDULATING RAILWAY

by Alan Bednall

The 1830s was, for all practical purposes, the first decade of rail travel and a period of rapid growth in the spread of this form of transport nationally. It was the period too, which established George Stephenson and his son Robert as the foremost railway engineers not only in Great Britain but also in the World. Their genius and perseverance enabled them to overcome the very considerable doubts which were expressed concerning the viability of railways.

The success of the Liverpool to Manchester line created a considerable enthusiasm for new railway projects all of which required the services of engineers, not only to survey and plan the lines but also to take charge of the construction and commissioning of the line when Parliamentary approval had been obtained and the necessary finance found. The Stephensons, Brunel and other established engineers were thus in great demand, but they alone could not carry out all the projects and the high fees and salaries offered attracted new " railway engineers".

Samuel Smiles describes how these engineers became leaders of the battle when two or more rival lines were planned between the same points. Such battles were trials of individual ambition as well as professional skill and considerable personal feeling was involved. According to Smiles "many new men laboured to mature and bring out railway projects more striking and original than anything heretofore proposed" and amongst this group of "fast engineers" he identified Isambard Kingdom Brunel, Dr Lardner and a certain "Mr Badnell".

Both Lardner and Badnall were, according to Smiles, proponents of railways constructed with "rising and falling gradients" with Mr Badnall claiming that "an undulating railway was much better than a level one for the purposes of working".

## **Richard Badnall, Railway Engineer.**

The "Mr Badnell" referred to by Smiles was Richard Badnall of Cotton Hall in Staffordshire . Richard Badnall, a Staffordshire man by birth, was the eldest son of Richard Badnall of Highfield, a Leek, silk manufacturer, banker and dyer.

Richard Junior, was a well educated man, a poet, author and inventor who played the flute and whose romantic disposition is evident in his writings and in his choice of home. His book *The Legend of St. Kilda, Zelinda: a Persian tale*, and his poem *The Pirate* illustrate his Byronic, romantic, view of the past and the Staffordshire homes he chose for himself - Ashenhurst, Woodseaves and Cotton Hall - give further clues to his nature.

His sister Mary Elizabeth Cruso, described him on one occasion as "as usual full of schemes " and of "talking up and down the town (Leek) of his plans for enriching himself and his family". In 1837, after hearing that her brother proposed to stand as a Parliamentary candidate for Newcastle-under-Lyme, she described him as "strange in his proceedings".

He was also, for a time, a silk manufacturer and dyer and perhaps would not have ventured into railway engineering had not his first partnership with his brother in law Henry Cruso and Francis Gybbon Spilsbury come to an early and abrupt end in 1826 with the bankruptcy of the partners and the parents of both Badnall and Spilsbury.

Following the announcement of his bankruptcy, Richard Badnall Junior had tried strenuously, both in this country and in France, to remedy matters, pay his creditors and sustain his wife and their young family. The contents of Ashenhurst were sold off and his wife's uncles, Samuel and William Philipps, took over the considerable mortgage on the property. For several years Badnall's life was extremely unsettled and between 1827 and 1832 he lived at six different addresses in London & Liverpool before going to live with his father in Liverpool. For much of this time he appears not to have had any settled occupation, except for a short period when he acted as a silk broker and merchant.

In 1832 his petition as an insolvent debtor was heard at Lancaster Court and later that year a patent application revealed that, although he may have been without an occupation, his mind was as active as ever. It was this patent that formed the chief item of discussion between Richard Badnall and Robert Stephenson, younger brother of George Stephenson, over dinner at the Manchester home of JL Gardener, and subsequently led to the formation of the Stephenson & Badnall partnership to exploit the patent's potential.

Richard Badnall Junior was born in Leek at the turn of the 19th century. He was the son of one of the town's most successful silkmen, Richard Badnall of Highfield, Leek whose family firm had been established in the town for some 75 years.

Richard Junior eventually took over the family firm in 1824 when his father decided to concentrate on his young family, his duties as a JP and his farm. Richard Junior entered into partnership with his brother-in-law Henry Cruso and Francis Gybben Spilsbury and began to develop the firm to exploit their various patents relating to tanning and the manufacture of silks. Unfortunately, they entered into the euphoria of the times and within a short time they were bankrupt and their failure subsequently caused the bankruptcy of Richard Badnall, senior. Following a period in which he kept moving from place to place in a vain attempt to restore the family fortunes, he lived for a while on the Isle of Man and whilst there developed his theories of the "Undulating Railway". Though his theory proved in the end to have been flawed he was convinced of the value of his railway design, primarily because of the practical tests which he had carried out using, initially, clockwork models but subsequently, the real trains of the Manchester & Liverpool Railway. There is a lengthy correspondence in the Mechanics Magazine in which he vigorously defended his ideas. In 1833 he entered into partnership with Robert Stephenson, senior, of Pendleton Colliery, to exploit the undulating railway patent.

Richard Badnall was politically a Whig, and had a somewhat romantic nature. He wrote poetry and several books, registered several patents for improvements in silk machinery and stood as Parliamentary candidate for Newcastle-under-Lyme in the elections of 1837. He appears to have had a tendency to enjoy the fruits of success before they had been harvested. For example, on first entering into partnership with Cruso and Spilsbury, he took on a mortgage of £12,000 in order to acquire the Ashenhurst estate near Leek, and following his bankruptcy continued to try to live in a style which his income couldn't maintain. Unfortunately too, he suffered all his life from gout, and the combination of this and the stress under which he lived from 1827 resulted in his death in 1842, at the relatively early age of 42.