The Soliton

The phenomenon of the Soliton, or single wave, one of the principles behind optoelectronics was first demonstrated by John Scott Russell on the Union Canal in 1838.

Born in Parkhead, Glasgow, he soon abandoned plans to join the ministry for a career in engineering. His first invention - a steam carriage - was initially successful, but his enterprise as a steam-coach operator between Glasgow and Paisley came to a sudden end in 1834, when four fatalities resulted from the crash of one of his carriages.

By this time, he was starting to become interested in naval architecture and was commissioned by the Union Canal Company to build three experimental wave line vessels.

While trialling these in 1834, he observed the solitary wave which the boat made when travelling through water. He called it the Soliton and was able to follow it, on horseback, for several miles.

Although the significance of his observation is now attracting renewed attention in the areas of optoelectronics and telecommunications, Russell applied his observations of the single wave effect to the redesign of ships' hulls, providing shipbuilders with their first scientific guide in the pursuit of speed.

He went on to design much of Isambard Kingdom Brunel's Great Eastern, for many years the world's largest steamship.