which was more than double the original estimates, and it was next to useless after it was inished. It proved disastrous as an investment to all who were concerned in it. Brunel died at the advanced age of 81 years in December, 1849.

Isambard Kingdom Brunel, the son of Marc, became quite distinguished as an engineer when a youth,-he acting as assistant engineer of the tunnel, to his father. When it was com-pleted, he devoted himself to railway engineering, and being somewhat ambitious perhaps for distinction, he projected the wide guage of seven feet for the Great Western Railway in England. He produced many arguments to show that it was preferable to the common narrow guage of four feet eight and a half inches, which had been adopted by George Stephenson and others. Brunel's plan was vio-lently attacked by leading engineers, but he was successful in carrying out his wishes. This was the parent of wide guage railroads; and it is the most magnificent railway in the world. Some of the structures on it are splendid exhibitions of daving engineering skill. One viaduct over the river Trent is 880 feet in length; it is supported by eight elliptical arches of seventy feet span, having a spring of eighteen feet in the center. Gigantic square columns rise in pairs from a broad square basement, each pair being united at the top by bold architraves, forming the pier from which the arches spring. The structure imparts the idea of massiveness combined with elegance. A bridge on the same line, at Maidenhead, consists of ten brick arches, two of which have 128 feet span, each with a spring of only twenty-four and a half feet. They are the flattest arches ever made in brick. Brunel was apparently fond of executing daring projects, and doing things differently from other engineers; but he sometimes committed great mistakes. He became engineer of the Croydon and South Devon Company, for constructing an atmospheric railway; which he advocated against the opinions of several scientific engineers. He invested \$100,000 in the project and lost it all, as it was a complete failure. Compressed air with stationary engines was not found equal to steam locomotives; and in view of this fact, one of its shareholders, in 1848, described himself and his fellows, " as the most unfortunate proprietors of the most unfortunate railway in the kingdom."

The younger Brunel was the engineer of several railways; and all the structures which he designed are distinguished for boldness and grandeur. We can form but a very inadequate idea of the great bridges and viaducts, and other similar structures on English railways, from those on most American railways. Take for example one of two similar bridges designed by Brunel and constructed under his superintendence. It is called Saltash Viaduct, and passes over the river Tamar, on the Cornwall Railway. It consists of nineteen arches, seventeen of which are from seventy to ninetythree feet span, and the two main central spans are no less than 445 feet each.

## THE DEPTH OF DRAINS.

On this subject the Irish Farmers' Gazette gives the result of experiments on one of the largest estates in Ireland : " The case we allude to is the draining of Mount Stewart demesne, in the county of Down, Mr. Andrews, Lord Londonderry's agent. having found drains 30 to 32 inches deep, and 20 feet apart, most effective in draining the stiff soils of his own farms near Comber, even after a period of 30 years had elapsed since those drains were made, resisted the Board's regulations regarding the depth and distance apart. The result was a compromise between the views entertained by Mr. Andrews and those held by the Board, ending in the drains at Mount Stewart being cut 36 inches deep and 21 feet apart, filled with 9 inches of stones, the largest of which do not exceed 21 inches, over which is laid a sod, having the grassy side under. That drainage is perfectly effective."

## SIMPLE BAROMETER.

I beg to call your readers' attention to a very simple, but at the same time most effective barometer, which I have now used since last July, and I have found it quite as true, both for rain as d wind, as the aneroid. It is constructed as follows :- Take a common glass pickle-bottle, fill it within about three inches of the top with water, then take a Florence oil-flask (remove the straw covering and clean well out from all remains of oil,) and plunge the neck of the flask into the pickle bottle, and the barometer is complete. In fine weather the water will rise into the neck of the flask, even above the mouth of the pickle bottle, and in wet and windy weather it will fall to within an inch or so of the flask's mouth. Before a heavy gale of wind I have twice seen the water leave the flask altogether at least eight hours before the gale came to its height. I find in my journal, Oct. 19, " Rained and blew tremendously in the afternoon and evening. Rain-glass fell to zero. Barometer 28; lower than it has been since Nov. 1, 1859, when the Royal Charter was lost." I believe that no better weather guide can be used. I do not lay any claim to its invention, for I read an account of it in an extract from the Athenceum last summer, signed Thomas Zuiller.-G. MORANT, jr., in London Field.

An agricultural Show is proposed at an early period at the city of Calcutta, India.