

But the statical effect of the attraction of manageable masses, or even of mountains, is very small. The effect of a small change in gravity may be accumulated by being constantly repeated in the oscillations of a pendulum, and thus may become perceptible. Mr. Airy attempted to determine the density of the Earth by a method depending on this view. A pendulum oscillating at the surface was to be compared with an equal pendulum at a great depth below the surface. The difference of their rates would disclose the different force of gravity at the two positions; and hence, the density of the Earth. In 1826 and 1828, Mr. Airy attempted this experiment at the copper mine of Dolcoath in Cornwall, but failed from various causes. But in 1854, he resumed it at the Harton coal mine in Durham, the depth of which is 1260 feet; having in this new trial, the advantage of transmitting the time from one station to the other by the instantaneous effect of galvanism, instead of by portable watches. The result was a density of 6.56; which is much larger than the preceding results, but, as Mr. Airy holds, is entitled to compete with the others on at least equal terms.

#### *Tides.*

I should be wanting in the expression of gratitude to those who have practically assisted me in *Researches on the Tides*, if I did not mention the grand series of Tide Observations made on the coast of Europe and America in June, 1835, through the authority of the Board of Admiralty, and the interposition of the late Duke of Wellington, at that time Foreign Secretary. Tide observations were made for a fortnight at all the Coast-guard stations of Great Britain and Ireland in June, 1834; and these were repeated in June, 1835, with corresponding observations on all the coasts of Europe, from the North Cape of Norway to the Straits of Gibraltar; and from the mouth of the St. Lawrence to the mouth of the Mississippi. The results of these observations, which were very complete so far as the coast tides were concerned, were given in the *Philosophical Transactions* for 1836.

Additional accuracy respecting the Tides of the North American coast may be expected from the survey now going on under the direction of Superintendent A. Bache. The Tides of the English Channel have been further investigated, and the phenomena presented under a new point of view by Admiral Beechey.