town, and doubtless the Historic Society will bring out much latent talent. To them these hints will be quite unnecessary. You have one of by-gone days, your poet-historian, Roscoe, to whom all honour is due, and you may be justly proud of another native of Liverpool, Swainson, who although now inhabiting a distant region, stands very prominently forward as a most accomplished naturalist and author.

I will now conclude with a verse of Campbell's, on the wild flowers, which beautifully shadows forth that combination of sciences for which I am contending, and had I thought of it sooner it might have served me for a motto:

"Not a pastoral song has a pleasanter tune
Than ye speak to my heart, little wildlings of June,
Of old ruin'd castles you tell—
Where I thought it delightful your beauties to find
When the magic of nature just breath'd on the mind
And your blossoms were part of her spell."

ON THE RESULTS OF THE SELF-REGISTERING TIDE GAUGE.

By Lieutenant W. Lord, R.N.

(Read 26th April, 1855.)

It is not generally known that Liverpool, notwithstanding its importance, has possessed a self-registering tide gauge for little more than twelve months, while other ports of far inferior importance have been able to boast its possession for many years. There are two of these connected with what is officially termed "the port of Liverpool," both of which were constructed by the dock surveyor in the close of the year 1853. One is at Hilbre Island, the eastern entrance of the river Dee, and the other at St. George's Dock, Liverpool. They were intended to commence operations on the first of January, 1854, but practically it was about the 15th of the month. The machinery, which is by Newman, of Regent street, London, consists of a cylinder or "drum" connected with a clock. The cylinder carries round with it in its revolutions a prepared sheet of paper, on which hours are marked in one direction and feet in the direction at right angles to it in dark lines. Each of these is subdivided by fainter lines into more minute spaces, representing respectively quarters of hours and three-inch spaces. The large landing stage at the George's pier forms the float,
and is connected with the machinery of the gauge; and at Hilbre Island a copper float rises and falls in a well, which always exhibits the sea level, being connected with the tide by a syphon. A pencil, connected with the float, works horizontally on the surface of the paper, the cylinder making an entire revolution with it in twenty-four hours.

Four large and beautiful diagrams now laid upon the table, each exhibit the diurnal rise and fall of the tide for a period of six months. Two of them show the working of the gauge for the whole year at St. George's pier, and the other two give the same results for Hilbre Island. The difference shown at two points so adjacent to each other, and so thoroughly subject to the same general influences, is such as not to call for any special remark. The former tables, however, have annexed to them a daily registry of the direction and force of the wind, and the height of the barometer also; for the whole of the year 1854. These facts have been furnished by Mr. Hartnup, from the observations made at the Liverpool Observatory; and they are of great importance in ascertaining how far the ordinary tidal changes are influenced by the wind and atmospheric pressure. The marine surveyor has also been at great pains in making out monthly tables, showing the difference between the calculated and actual times and heights of high water. The former were obtained from Holden's tide tables, the latter were furnished by the gauge at George's pier. These will, in the course of a few years, form a body of most valuable data, from which important general conclusions may be drawn.

In the year 1854 there were 231 tides plus, 112 minus, and 22 agreeing exactly with Holden's tide table. The greatest rise of water was February 28th, when it reached the height of 20 feet 2 inches above the old dock sill, or 30 feet 7 inches in all. The reasons were, that it was a spring tide, the wind was W.N.W., and it was blowing strong at the time. The least rise of water was on October 15th, when the range of tide was only 7 feet 9 inches from high to low water. This was a neap tide; the wind was N.W., and it was blowing gently.

The greatest difference between the tide gauge and Holden's tables was two feet eight inches plus, occurring on the 17th of February. The tidal curve presents a remarkable variation on that occasion, the wind being near its greatest force, or with a horizontal motion of 965, and the barometer