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lurdo Downie, homas Yeates, latterly, been subject. Nor forgotten, A vs, "We have the magnetic ut it is of still ves to a source er appeared in cerned. The he ship on the the position of between iron ention of that atity of iron in it no suspicion deranging the upposed, that, red to depend ppear to have nvolving some ent, that are

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much more will observations observed on board different ships, which I now and fully verified, on comparing those made on board the Adventure, with my own made about the same time in the Resolution."

Notwithstanding the singularity of these results, and the interest which Mr. Wales seems to have taken in them, we see no attempt at explanation; nor are we aware that they were ever seriously considered till Captain Flinders undertook his voyage to Australia, in 1801 and 1802; but the attention of this able navigator was very early, in the course of that voyage, called to an investigation of the same circumstances; and he soon found that the quantity of local attraction of the vessel was not the same in all places, nor depending on the quantity of the natural variation. It was not till after much research, and comparison of different observations, that he found it varied with the dip of the needle;* so that, when there was no dip, there was no variation arising from the local attraction of the ship; and, when the dip was the greatest, the ship's attraction was also a maximum.

On this subject, Captain Flinders observes :

"After some cousideration, it appeared to me that, the magnetism of the earth, and the attraction forward in the ship, must act upon the needle in the nature of a compound force; and that the errors produced by the attraction should be proportionate to the sines of the angles between the ship's head and the magnetic meridian. I tried this upon many observations where the direction of the head was least doubtful, and found the difference to correspond as nearly as could be expected, and sometimes exactly : it therefore seemed probable, that, the error produced at any direction of the ship's head would be to the error at east or west, at the same dip, as the sine of the angle between the ship's head and the magnetic meridian was to the sine of eight points, or radius. According to this, when the error was ascertained at any given direction, more especially at east or west, where it was greatest, it might be found at any direction required, by inspection in the Traverse Table.

After Captain Flinders' arrival in England, he made application to the Lords Commissioners of the Admiralty to have experiments tried on board some of his Majesty's ships, that the observations he had made during his voyage might be verified. A series of observations were accordingly made on board five different ships at Sheerness and Portsmouth, which appeared to establish the accuracy of his former conclusions. After being satisfied in this particular, he considers the law before deduced from analogy as certain.

Mr. Bain has added many observations to those of Carfain Flinders, and has examined the fatal consequence that must, at times, arise to navigators who neg-

* To some of our readers the following may be information. The DIFFING NEEDLE is an instrument used for observing the quantity of inclination towards the earth, assumed by any needle or other body after it has acquired the magnetic virtue. This was first observed by our countryman, Robert Norman, a maker of compasses, about the close of the 16th century; who, finding that he was always obliged to counterbalance that end which turns to the north, by a bit of wax or such other substance, though the balance had been ever so exact before, published an account of his discovery, as a matter of importance. The subject was instantly attended to; and instruments were not only contrived for ascertaining the quantity of the *dip*, but various speculations formed concerning the cause of such a surprising phenomenon.

The general phenomena of the dipping needle are, that, about the <u>equatorial parts</u> of the earth, it varies but a few degrees from an horizontal position, but depresses one end as we recede from these; the north end, if we go towards the north pole, and the south end if we proceed towards the south pole. The farther north or south that we go, the inclination becomes the greater. At London, in the year 1592, the dip was 71° 50' below the horizon, and it is, at present, nearly the same. At Spitzbergen, as shown hereafter, it is 82°, and, in Baffin's Bay, it has been found to amount to 86°.

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