so correct, as to render the fact unquestionable, although the average rate of decrease was but three minutes annually.

To the late Mr. William Wales, Mr. John Churchman, Mr. Murdo Downie, and Captain Matthew Flinders, to Mr. Ralph Walker, Mr. Thomas Yeates, Captain Horsburgh, and Mr. William Bain, navigators have, latterly, been indebted for keeping up a spirit of enquiry into this important subject. Nor are the recent remarks of Captain Ross and Lieut. Parry to be forgotten. A liberal and judicious critic, in noticing Mr. Bain's work,* says, "We have read this little treatise with very considerable interest, as we think all persons must, who have ever contemplated the curious phænomena of the magnetic needle, its direction, its dip, and the variation of the dip, &c.: but it is of still greater importance to the mariner, from the publicity which it gives to a source of variation, which, though it might be known before, has never appeared in any shape to meet the eye of those whom it more immediately concerned. The circumstance to which we here allude is the *local attraction* of the ship on the compass, and the consequent change of direction, according to the position of the vessel at the time of observation. The reciprocal attraction between iron and the compass-needle has always been known, since the invention of that useful nautical instrument; and, when we consider the great quantity of iron in all vessels, and particularly in ships of war, it appears singular that no suspicion was ever entertained that this substance might have the effect of deranging the natural position of the needle. Yet this was so far from being supposed, that, even after a change in the direction of the needle had been observed to depend on the position of the ship's head, this explanation does not appear to have suggested itself; but the fact seems to have been considered as involving some mystery, like many others of the phænomena of this instrument, that are inscrutable to the philosophical enquirer.

Mr. Wales, so well known for his mathematical talents, as also from his having accompanied Captain Cook in his several voyages in the capacity of astronomer, appears to have been the first who noticed this phenomenon; and we are surprised that the source of it did not immediately suggest itself to so keen an examiner of natural causes. Mr. Wales remarks, in the introduction to his Astronomical Tables, at the end of the voyage:

"In the English Channel, the extremes of the observed variation were from 19½ to 25°; and, all the way to the Cape of Good Hope, I frequently observed differences nearly as great, without being able any way to account for them, *the difference in the situation being by no means sufficient.* These irregularities continued after leaving the Cape, which at length put me on examining into the circumstances under which they were made. In the examination it soon appeared that, when most of these observations were made, wherein the greatest west variation had happened, the *ship's head was north and easterly;* and that when those, where it was least, had been observed, it was *south and westerly.* I mentioned this to Captain Cook and some of the officers, who did not, at first, seem to think much of it; but, as opportunities happened, some observations were made under those circumstances, and very much contributed to confirm my suspicions; and, throughout the whole voyage, I had reason to believe that, variations observed with the *ship's head in different positions, and even in different parts of her, will differ very materially from one another;* and

* An Essay on the Variation of the Compass, showing how far it may be influenced by the direction of the Ship's Head; with an exposition of the dangers arising to navigators from not allowing for this change of variation. Interspersed with practical observations and remarks. By William Bain, Master in the Royal Navy, octavo, London, 1817.

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