

Received June 6, 1766.

XXV. *A Letter from Mr. William Mountayne, F. R. S. to the Right Honourable James Earl of Morton, President of the Royal Society, containing some Observations on the Variation of the Magnetic Needle, made on Board the Montagu Man of War, in the Years 1760, 1761, and 1762, by Mr. David Ross, Surgeon.*

My Lord,

Read June 13, 1766. **T**HE following tables I have compared with the Variation Chart, published in the year 1756, and do find that they agree pretty well in general, making allowance for the time elapsed *: it is true, that, in some few places in the Atlantic Ocean, they differ; yet this may probably arise, as is often the case, from an error in the Montagu's supposed longitude, where such observations were made. But the greatest difference (a greater than should arise, I think, according to common course) appears upon the coast of Portugal, Cape Saint Vincent, and about Gibraltar, near and within

* By this expression, I do not mean that the variation undergoes a regular and uniform alteration, notwithstanding such appearance, but rather suspect the contrary.

fight

fight of land, where the observations are ascertained to the spot. Hence, if mine observed about the year 1756, and those of Mr. Rofs's, were both near the truth, at the respective times when they were taken, I know not how to account for this considerable encrease, unless those late extraordinary convulsions, in the bowels of the earth, upon those several coasts, may be found, by further experiments, to have there influenced the directions of the magnetic needle.

When these observations first came to my hands, I intended to employ them, among others, in the construction of a variation chart, at some proper period of time ; but, by reason of a long and severe indisposition, I am obliged to suspend those my intentions. As, therefore, they appear to be made by a judicious and accurate observer, and, as Mr. Rofs remarks, upon some local attractions in the West-Indies, mentioned at the close of his letter (which, without doubt, obtains in many other places) may induce some able philosopher, skilled in these matters, to investigate the cause of those phænomena ; I beg leave to address the whole to your lordship, to be disposed of, as you shall think proper. I am,

My Lord,

Your Lordship's most obedient servant,

Gainsford-street, South-
wark, May 18, 1766.

W. Mountaine.

Extract of a Letter from Mr. David Ross, Surgeon of His Majesty's Ship the Montagu, to Mr. William Mountaine, F. R. S. relating to the Variation of the Magnetic Needle; with a Sett of Observations made by himself, on Board the said Ship, during the Years 1760, 1761, and 1762.

N^o 6, in Virginia-Street, April 9, 1763.

S I R,

REPEATED observations of the variation of the magnetic needle, when the spot they are taken upon can be tolerably well ascertained, are of great service to philosophy in general, but particularly to navigation, as in future ages they may serve as a basis, to found its theory upon.

Having had an opportunity of observing, with all the care and accuracy in my power, the deflection of the magnetic needle, by an azimuth compass of Dr. Gowen Knight's construction, during a passage to the West-India Islands, a cruise there, and return to Britain; and likewise a cruise about the Straits of Gibraltar, I with pleasure communicate them to you, as a person deserving the highest esteem of the commercial part of Britain, by your excellent new edition of the Variation Chart of the late celebrated Dr. Halley; and I beg, Sir, your favourable acceptance of them.

I can assure you, I have endeavoured, as far as the thing would admit of, to get at the truth, having, at every observation, not trusted to a single azimuth,
but

but generally have taken a medium of, from six to ten, or more.

I cannot help taking notice of what surprized me greatly, viz. that I should always find the variation less at anchor, in the West-India Islands, than at sea, though near the same spot. As for instance, June 18, 1760, three leagues south Prince Rupert's Bay, Dominico, I found the variation, by a medium of five azimuths and an amplitude, to be $5^{\circ} 27'$ E. And in the Bay itself, June 20, by three azimuths and an amplitude, it was $3^{\circ} 27'$; and on the 22d, by six azimuths and amplitude = $3^{\circ} 12'$ E. The medium of these is $3^{\circ} 20'$ E. full $2^{\circ} 7'$ less than in the offing, though but nine miles off.

The same phenomenon appeared, upon experiments repeated March the 23d, 1761, when in the same Bay, the medium of eight azimuths gave $3^{\circ} 19'$ E. Off of Antigua, and at anchor in Saint John's Road, the same thing was observed, though the difference was not so great. These things exercised my thoughts, though I must own I could not hit on any solution that pleased myself. I am,

S I R,

with great truth,

your very humble servant,

David Ross.

A TABLE of the Variations of the Magnetic Needle, as observed on Board His Majesty's Ship Montagu, in the Years 1760, 1761, and 1762, by Mr. David Ross; and communicated by Mr. William Mountaine, F. R. S.

| Time when. | Latitude | Long. fr. Lon. | Variation. |
|---------------|--------------------------|----------------|------------|
| 1760 April 12 | Off Bell-Isle and Grois. | | 19 ° 11 W. |
| | ° ' N. | ° ' W. | |
| 26 | 43 23 N. | 11 15 W. | 18 51 W. |
| 29 | 40 20 N. | 13 39 W. | 19 11 W. |
| May 2 | 40 18 N. | 18 36 W. | 17 0 W. |
| 5 | 34 44 N. | 21 42 W. | 14 30 W. |
| 6 | 31 38 N. | 22 25 W. | 14 15 W. |
| 7 | 30 7 N. | 23 12 W. | 13 50 W. |
| 9 | 28 51 N. | 25 39 W. | 10 4 W. |
| 10 | 27 2 N. | 28 40 W. | 10 30 W. |
| 11 | 26 10 N. | 30 30 W. | 10 16 W. |
| 12 | 25 9 N. | 32 37 W. | 7 10 W. |
| 13 | 24 3 N. | 34 14 W. | 5 59 W. |
| 14 | 22 51 N. | 35 51 W. | 5 0 W. |
| 15 | 21 40 N. | 37 33 W. | 4 20 W. |
| 17 | 19 8 N. | 41 27 W. | 1 30 W. |
| 18 | 18 4 N. | 43 18 W. | 1 0 W. |
| 19 | 16 58 N. | 45 9 W. | 0 20 W. |
| 20 | 16 7 N. | 46 50 W. | 0 30 E. |
| 21 | 14 52 N. | 48 39 W. | 1 7 E. |
| 22 | 13 38 N. | 50 28 W. | 1 59 E. |
| 23 | 13 13 N. | 51 48 W. | 2 12 E. |
| 25 | 13 30 N. | 56 5 W. | 3 45 E. |
| 26 | 13 10 N. | 57 50 W. | 3 58 E. |

| Time when. | | Variat. |
|---------------------------|---|----------|
| *60 May 28, 29, and 31 | In Carlisle, Barbadoes | 4 3E. |
| June 1 | Barbadoes S. E. $10\frac{1}{2}$ leagues dist. | 5 20E. |
| 2 | 15° 19' N. 59° 0' W. | 5 12E. |
| 3 | 16 16 N. 59 18 W. | 4 24E. |
| 4 | Antigua W. N.W. dist. 6 leagues | 4 51E. |
| 6 | Redondo E. $\frac{1}{2}$ N. 4 leagues | 4 50E. |
| 8 | Montserrat S. by E. | } 5 32E. |
| | Redondo S. by W. | |
| 15 | In the pas. bet. Martinique and Dominico | 5 6E. |
| 16 | Off the S. W. end of Martinique | 5 41E. |
| 17 | Off the S. end of Dominico | 5 21E. |
| 18 | S. of Rupert's Bay, Dominico, dist. 3 leag. | 5 27E. |
| 20 | In Prince Rupert's Bay — 3° 27' | } 3 20E. |
| 22 | Dominico — 3 12 | |
| July 11 | Defeada S. W. by W. $\frac{1}{2}$ W. dist. 3 leag. | 5 3E. |
| 12 | 15° 0' N. 59° 7' W. | 5 35E. |
| September 15 | In Grand Courland's Bay | } 4 32E. |
| 16 | At the South West end of Tobago, | |
| 18 | the medium is | |
| October 5 | N. end of Tobago E.N.E. $\frac{1}{2}$ E. dist. 5 leag. | 4 45E. |
| 6 | D° E. by S. dist. 4 leagues | 5 0E. |
| 10 | Island Bequia N.W. by N. $\frac{1}{2}$ W. dist. 7 leag. | 4 0E. |
| 14 | Off the N. W. end of Saint Lucia | 5 14E. |
| 15 | Off Saint Pierre's Martinico | 5 17E. |
| 22 | At the wind of the Channel between Martinique and Dominico | } 5 19E. |
| 23 | At the East end of the same | 5 36E. |
| 24 | Saint Lucia W. $\frac{1}{4}$ N. dist. 15. leagues | 5 34E. |
| 1761 March 23 | In Prince Rupert's Bay, Dominico | 3 19E. |
| April 4 | In St. John's Road, Antigua | 3 9E. |
| 15 | Off the east end of Antigua | 4 31E. |
| May 4 | In Carlisle Bay, Barbadoes | 3 47E. |
| July 27 | At the Dog and Prickly Pear | 4 44E. |

| Time when. | | Latitude in | | Long. fr. Lon. | | Variation. | |
|------------|---------|-------------|-------|----------------|-------|------------|-------|
| 1761 | July 28 | 19 | 35 N. | 62 | 50 W. | 4 | 35 E. |
| | 29 | 20 | 46 N. | 62 | 43 W. | 4 | 27 E. |
| | 30 | 22 | 20 N. | 62 | 30 W. | 2 | 42 E. |
| August | 31 | 23 | 42 N. | 62 | 36 W. | 2 | 15 E. |
| | 1 | 25 | 5 N. | 62 | 37 W. | 1 | 38 E. |
| | 2 | 26 | 20 N. | 62 | 57 W. | 1 | 18 E. |
| | 3 | 27 | 26 N. | 62 | 37 W. | 0 | 44 E. |
| | 4 | 27 | 56 N. | 62 | 43 W. | 0 | 3 E. |
| | 5 | 28 | 5 N. | 62 | 50 W. | 0 | 23 E. |
| | 6 | 28 | 11 N. | 62 | 35 W. | 0 | 1 E. |
| | 7 | 28 | 40 N. | 62 | 59 W. | 0 | 27 W. |
| | 8 | 29 | 23 N. | 63 | 1 W. | 0 | 48 W. |
| | 9 | 30 | 1 N. | 62 | 59 W. | 1 | 33 W. |
| | 10 | 31 | 1 N. | 62 | 21 W. | 1 | 58 W. |
| | 11 | 32 | 41 N. | 60 | 37 W. | 2 | 45 W. |
| | 12 | 33 | 58 N. | 59 | 14 W. | 4 | 13 W. |
| | 13 | 35 | 3 N. | 57 | 54 W. | 5 | 0 W. |
| | 15 | 36 | 31 N. | 54 | 57 W. | 7 | 4 W. |
| | 16 | 37 | 33 N. | 52 | 55 W. | 8 | 20 W. |
| | 17 | 37 | 59 N. | 51 | 4 W. | 9 | 40 W. |
| | 18 | 38 | 8 N. | 50 | 13 W. | 10 | 20 W. |
| | 19 | 38 | 36 N. | 48 | 41 W. | 10 | 12 W. |
| | 20 | 38 | 23 N. | 47 | 48 W. | 10 | 57 W. |
| | 21 | 38 | 57 N. | 46 | 30 W. | 11 | 52 W. |
| | 22 | 39 | 22 N. | 45 | 52 W. | 12 | 0 W. |
| | 23 | 40 | 13 N. | 44 | 29 W. | 12 | 0 W. |
| | 24 | 41 | 8 N. | 42 | 26 W. | 12 | 0 W. |
| 26 | 41 | 31 N. | 41 | 42 W. | 13 | 0 W. | |
| 27 | 42 | 0 N. | 39 | 58 W. | 13 | 35 W. | |
| 28 | 42 | 38 N. | 38 | 11 W. | 13 | 36 W. | |
| 29 | 43 | 15 N. | 36 | 21 W. | 14 | 0 W. | |
| 30 | 43 | 0 N. | 35 | 53 W. | 14 | 30 W. | |
| 31 | 43 | 28 N. | 34 | 40 W. | 14 | 30 W. | |
| September | 1 | 44 | 45 N. | 31 | 58 W. | 17 | 11 W. |
| | 2 | 45 | 36 N. | 29 | 49 W. | 18 | 51 W. |
| | 4 | 48 | 14 N. | 25 | 17 W. | 18 | 31 W. |
| | 5 | 48 | 57 N. | 23 | 13 W. | 19 | 37 W. |
| | 6 | 49 | 11 N. | 20 | 28 W. | 19 | 30 W. |
| | 7 | 50 | 35 N. | 18 | 17 W. | 19 | 52 W. |

| Time when. | | Variation. |
|---|--|--------------------------|
| 1761 Sept. 10 | Off Cape Clear in Ireland | 19° 55' W. |
| 20 | Scilly S. S. E. dist. 5 leagues | 19° 55' W. |
| 21 | The Start E. $\frac{1}{2}$ N. dist. 16 miles | 20° 16' W. |
| December 8 | 36° 25' N. 7° 45' W. | 16° 53' W. |
| 19, 25, and 26 | In Gibraltar Bay | 17° 11' W. |
| 1762 Jan. 23 | 35° 46' N. 7° 2' W. | 18° 3' W. |
| Jan. and Feb. | Between Cape Saint Vincent and the Straits Mouth | 17° 31' W. |
| February 11 | 'n Cascais Road | 17° 32' W. |
| D° 12, 23, and March 2 | In Lisbon River | 17° 32' W. |
| 5 | 37° 56' N. 9° 55' W. | 17° 29' W. |
| | Between Cape Saint Mary's and Cape Spartel, the medium is | 17° 15' W. |
| From 3 to 12 leag. } E. off Gibral. Hill } | on the { European Shore { Barbary Shore | 17° 20' W. 18° 30' W. |