

IV. *An Account of some Magnetical Observations made in the Months of May, June and July, 1732, in the Atlantick or Western Ocean; as also the Description of a Water-Spout, by Mr. Joseph Harris. Communicated by Mr. George Graham, F. R. S.*

THE Knowledge of the Magnetical Variation is of such Consequence to the Mariner, that without it he cannot know his Course; and were the Theory thereof once established, it might be of great use for estimating the Longitude in several Parts of the World, as has been often and very justly observed by others. But 'till this be determin'd, we must rely upon Observations.

I sometime since took notice of the Imperfections of the common Azimuth Compass, and how ill adapted that Instrument is for the Purpose intended. I also gave the Description of a new Instrument, whereby I propos'd to remedy the principal Objections to the former; and farther Experience has sufficiently confirmed me in what I have said. But I should be glad to have it determined by those who have convenient Opportunities of making Experiments of this kind, what would be the properest Diameter and Weight for a Needle and Card, and what ought to be their proportional Weights to each other when taken separately: Regard being had that the Friction
be

be no more than what is necessary to prevent the Card from being too much affected by the Motion of the Ship. Some Observations incline me to think, that a Sea-Card should not exceed six Inches Diameter, and that most of those generally used, are too heavy for nice Experiments, tho' they may be well enough adapted for common Purposes.

In the Months of *March* and *April*, 1732, the Variation at *Black-River* in *Jamaica*, was very accurately observed to be from 6° to $6^{\circ} 05'$ Easterly.

Off the *Havanna* about $4\frac{1}{2}$ Deg. Easterly.

The rest of the Observations I made, are expressed in the following Table.

| Latitude. N. | Longit. from Lon- don, W. | Variat. | Latitude. | Longit. from Lon- don, W. | Variat. |
|-----------------|---------------------------------|----------------|-----------|---------------------------------|-----------------|
| Deg.Min. | Deg.Min. | Deg. | Deg.Min | Deg.Min. | Deg. |
| 27 00 | 80 00 | 4 E. | 35 55 | 65 30 | 5 W. |
| 28 45 | 80 00 | $3\frac{1}{2}$ | 38 06 | 60 30 | $6\frac{1}{2}$ |
| 31 00 | 77 45 | $1\frac{1}{4}$ | 39 10 | 57 30 | $8\frac{1}{3}$ |
| 32 15 | 72 30 | 00 | 39 40 | 56 30 | $8\frac{1}{4}$ |
| 32 40 | 72 00 | 1 W. | 43 00 | 45 00 | $9\frac{1}{2}$ |
| 32 45 | 71 30 | $1\frac{1}{2}$ | 43 05 | 44 35 | $9\frac{1}{2}$ |
| 32 52 | 70 40 | $2\frac{3}{4}$ | 44 40 | 35 15 | $11\frac{1}{2}$ |
| 34 30 | 67 25 | $4\frac{1}{3}$ | 47 20 | 20 20 | 11 |

The Instrument I used was so easily managed, that unless the Sea was pretty rough, an Observation might be depended upon to about a quarter of a Degree, had the Card performed to the same Exactness. But by comparing several Observations made under the like

like Circumstances, as to the Weather, it seems to me as if the Virtue of the Needle was not always of equal Strength. Sometimes several Observations would agree exceedingly well; at other times the Card would stand indifferently any where within a Degree or more of its Meridian; and this I observ'd in several Cards. I found another Circumstance which surprized me much: The Card would sometimes differ about two Degrees from it self betwixt the Morning and Evening of the same Day; and this Difference would continue as it were regularly for several Days, then vanish for a Week or more, and afterwards would return and continue as before.

The greatness of this Difference, and the near Agreement betwixt the Observations made in the same Forenoon, or Afternoon, amongst themselves, will not give me room to suspect that it proceeded altogether from an Error in observing. I own I cannot account for it, but whatever be the Cause thereof, the Error was always the same way; that is, the Westerly Variation in the Morning would be less than in the Afternoon. I carefully examined if this could be any ways owing to the Instrument, or to any Iron near the Place where it was usually set for Observation; but I was fully convinced it could proceed from neither. I know not whether any such Observations as these have been made before; but I think it would not be unuseful, if those who have proper Instruments, and are sufficiently skilled, would communicate any thing of this kind that may occur.

It now appears that the Numbers in the foregoing Table cannot be strictly accurate; but I think the Error can scarce any where exceed half a Degree; for

in most Cafes feveral Observations were made pretty near together, of which I took a Medium, making Allowances according to the Circumstances attending each: And perhaps they are as exact as can be well expected from Sea-Journals. And there can be no fenfible Error as to Longitudes, our Reckoning, when we made the Land, happening to fall out to a more than ufual Exactnefs. I fhall take another Opportunity to communicate fome *Magnetical Observations* made with great Care at *Jamaica*.

To this I fhall add the Description of a *Water-Spout*, which we faw about Sun-fet, *May 21ft, 1732*, in the Latitude $32^{\circ} 30' N.$ and Longitude 9° Eaſterly from the Meridian of Cape *Florida*. *Vide TAB. Fig. 2.*

When firſt we faw the *Spout*, it was whole and entire, and much of the Shape and Proportion of a Speaking-Trumpet (as expreſſed by the Figure annexed) the ſmall End being downwards, and reaching to the Sea, and the big End terminated in a black thick Cloud. The *Spout* itſelf was alſo very black, and the more ſo the higher up. It ſeemed to be exactly Perpendicular to the Horizon, and its Sides perfectly Smooth, without the leaſt Ruggednefs. Where it fell the Spray of the Sea roſe to a conſiderable Height, which made ſomewhat of the Appearance of a great Smoak.

From the firſt time we faw it, it continued whole about a Minute, and 'till it was quite diſſipated about three Minutes. It began to waſte from below, and ſo gradually up, whilſt the upper Part remained entire, without any viſible Alteration, 'till at laſt it ended in the black Cloud above. Upon which there
feemed

ſeemed to fall a very heavy Rain in that Neighbourhood. As it waſted, the Bottom of the remaining Part was irregular, ſomewhat like the Trunk of a Tree broke aſunder: There was but little Wind, and the Sky elſewhere was pretty ſerene. We judged the Spout to be above two Leagues off, and I think the Angle under which the ſmall End appeared, muſt be at leaſt 20 Min. According to which Eſtimation, the Thickneſs of it muſt be upwards of 60 Yards, and its Height or Length about three quarters of a Mile.

V. HISTORIA TERRÆMOTUS Apuliam & totum ſerè Neapolitanum Regnum, Anno 1731, vexantis. A Nicolao Cyrillo, in Regiâ Univerſitate Neapolitanâ, Pr. Med. Prof. & R. S. S.

SCIENTIÆ Naturalis incremento, adeoque noſtræ Societatis Inſtituto valde conſentaneum exiſtimavi, ſi Terræmotus, qui hoc Anno Apuliam, & ſerè univerſum hoc Regnum ſæpè ſuccuſſit, Hiſtoriam hîc attexerem. Rei accidentia Felici Roſeto Medicinæ & Philoſophiæ Doctori, atque in Mathematicis diſciplinis & Humanioribus literis non mediocriter erudito, olim meo Diſcipulo, nunc in eâ Regni regione Medicinam facienti, debeo: ex cujus atque aliorum, & Juvenatij, & Foggia degentium Obſervationibus brevem Synopſim concinnabo.

Fig. 1.

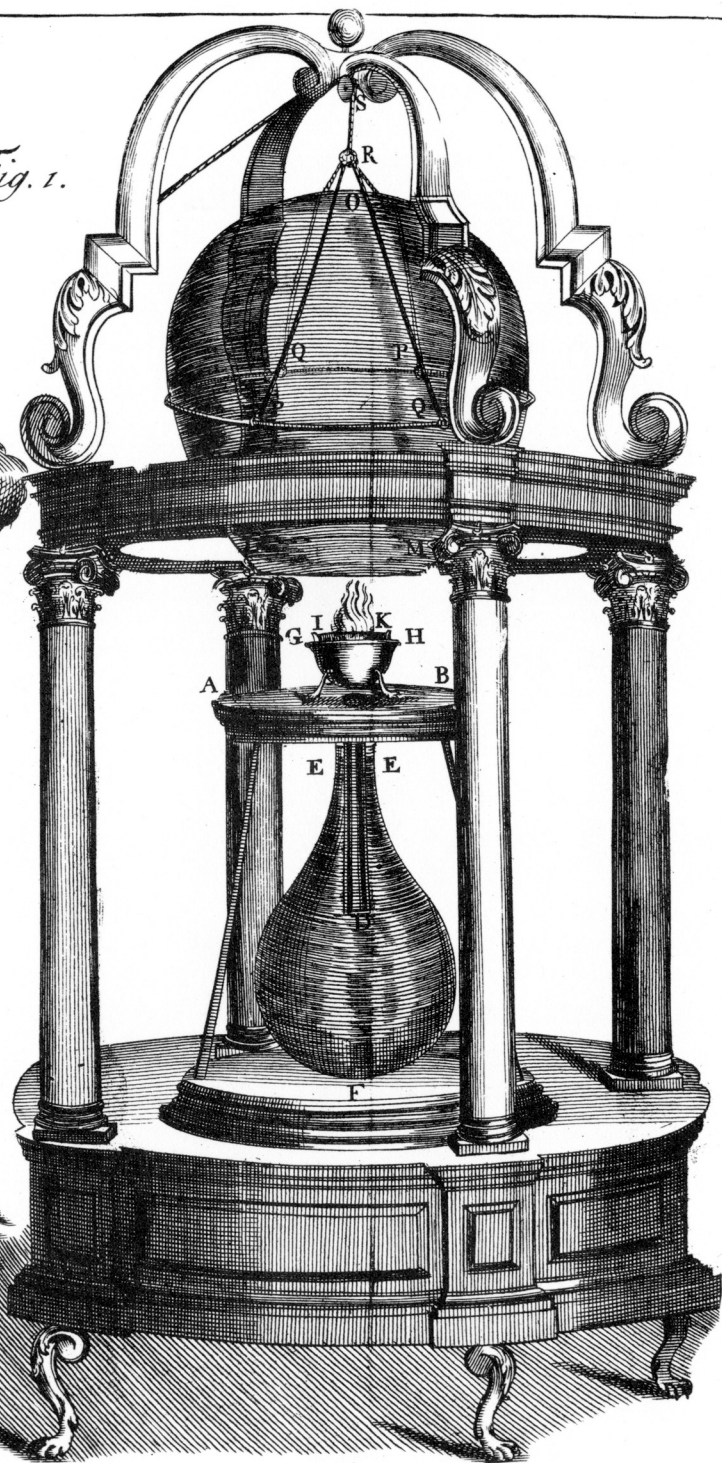


Fig. 2.

