



## III. Aëronautics applied to meteorology

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chartered companies, we have seen usurped and persevered in to an improvident extent. Hence it is these instruments of analysis may remain dormant as speculative truths, till, by the accession of more copious and efficient auxiliaries, the practical may be said to keep pace with the mathematical means.

Having been prevented by particular circumstances from paying earlier attention to this matter, if you will have the goodness to allot it a place in the next number of the *Philosophical Magazine*, it will confer an obligation upon, Sir,

Your obliged and humble servant,

Haberdashers' Place, Hoxton,  
December 12, 1817.

JAS. BENJ. BENWELL.

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### III. *Aëronautics applied to Meteorology.* By T. FORSTER, Esq.

*To Mr. Tilloch.*

SIR, — I HAD for a long time suspected, from the direction of the flying clouds, that the currents of air which occupied the higher regions of the atmosphere came down afterwards, and blew over the earth's surface in the same direction as they had previously blown above. To ascertain this fact, I observed attentively the various directions of small air-balloons made and sent up by my brother. Out of more than twenty experiments, I have selected the following as confirming this fact:—they were made in different years, and in different times of the year.

In October 1809, a gas-balloon three feet seven inches diameter, on ascending, first moved with an E. wind; at the height of (*about*) 500 feet it got into a NN.W. current; and lastly, at a much greater altitude got into a strong gale from SW., which carried it into Cambridgeshire. The successive changes of the wind next the earth as indicated by the weathercocks were E., NNW., and SW.

I have minutes of nine experiments made during the two consequent years (1810 and 1811), in which each balloon got three currents, whose directions became successively the directions of the currents next the earth within the space of thirty-six hours.

In four other experiments made in the same years, two of the balloons went uniformly in one direction, and the wind remained steady for several days. The other two experiments failed; that is to say, the currents indicated by them did not come down, or else they came in the night-time, and were unobserved. Of late years, not being stationary in one place, I have not made so many experiments; and I have only accurately observed four balloons made by my brother, whereof three got four, and the other got two currents of air: out of these only two were fol-  
lowed

lowed by successive currents next the earth in the same direction.

Yesterday he launched from Clapton a middle-sized inflammable gas-balloon, at three o'clock P.M., the smoke and weathercocks indicating a W. wind. The balloon consequently went in an E. direction ; but at the height of what on a rough guess might seem to be above five or six thousand feet, it got into a NW. gale, and seemed carried toward SE. At half after four the smoke from the chimneys indicated the same wind, though so gentle as hardly to be perceived, and which did not move the common weather-vanes.

The last experiment confirms also an observation which I have before made, by means of the movement of the higher clouds ; namely, that when the thermometer is below the freezing point with a southerly wind, there is then a northerly wind blowing above it.—We have offered a small reward for the balloon, and shall be obliged to any person who may communicate where it fell, that we may ascertain its ultimate direction.

I hope to communicate in future more accurate details of aëronautic experiments on wind ; and I merely communicate the above to excite persons in different places to make corresponding observations. The small balloons are easily made of varnished paper ; they are preferable to those sent up with rarefied air, as they ascend higher and keep up longer. But the rarefied air-balloons are capable, when made large enough, of indicating several currents of air.

Besides the above experiments of which I have minutes, my brother has sent up a great many balloons, and has almost always observed them moved by two or three currents : a circumstance which shows how little these machines (notwithstanding the sanguine assertions of some French writers) can ever be depended on as instruments to convey intelligence to armies where the ordinary means of communication may have been intercepted by the enemy I am, sir, yours, &c.

Walthamstow, Dec. 12, 1817.

T. FORSTER.

IV. *An Analysis of Sea-water ; with Observations on the Analysis of Salt-brines.* By JOHN MURRAY, M. D. F.R.S.E.\*

THE composition of sea-water has been variously stated by different chemists, not only with regard to the proportions of the salts which it holds in solution, but with regard even to the ingredients themselves.

\* From the Transactions of the Royal Society of Edinburgh for 1816.

According