Winn, (Mr.)

Remarks on the aurora borealis.

National Oceanic and Atmospheric Administration

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continuation of that, which lies on the ſlope of the neighbouring hills, it is probable, that many centuries have not been requiſite to its production; and, conſequently, that theſe mineral waters are not of very antient date.

And, if we may rely upon an obſervation, which I had from a plain, inquiſitive, and intelligent man, on the ſpot, the ſource, whence theſe waters derive their impregnation, is in ſome degree exhauſted. This perſon aſſured me, from his own experience, that pieces of moſs, and other ſubſtances, put in the courſe of the waters, and in the ſame circumſtances as formerly, require more than double the time, for their petrifaction, that they did thirty years ago.

The *Stratum*, therefore, from which the Matlock waters are impregnated, muſt either be conſiderably exhauſted; or the waters have deviated from their former courſe, and are now only partially diſtributed over this *Stratum*.

Leverpool, Oct. 15, 1773.

XVII. *Re-*

XVII. *Remarks on the Aurora Borealis. By Mr.* Winn. *In a Letter to Dr.* Franklin.

Spithead, Auguſt 12, 1772.

SIR,

Redde, Jan. 20, 1774. I Have often wiſhed, that ſomebody would carefully collate a ſufficient number of meteorological journals, with intent to obſerve and claſs the ſeveral appearances in the atmoſphere, before great changes in the weather, particularly before great ſtorms. I am perſuaded, from my own obſervation, that, in general, ſufficient indications, of impending tempeſts preceed them a conſiderable time, did we but carefully note them. The phænomenon, which I am going to mention, is one of thoſe indications which not only portend an approaching tempeſt, but aſcertain from what quarter it will come; a circumſtance, that may render it of eſſential ſervice to ſeamen. I believe the obſervation is new, that the *Aurora Borealis* is conſtantly ſucceeded by hard ſoutherly, or ſouth-weſt winds, attended with hazy weather, and ſmall rain. I think, I am warranted from experience, to ſay conſtantly; for in twenty-three inſtances, that have occurred, ſince I firſt made the obſer-

obſervation, it has invariably obtained. However, I beg leave to requeſt, you will recommend it to the notice of the Royal Society, as a matter, which, when confirmed by further obſervations, and generally known, may be of more conſequence than at firſt appears. To ſhew that it may, give me leave to recite the circumſtance, which firſt occaſioned my taking notice of it. Sailing down the Engliſh channel in 1769, a few days before the autumnal equinox, we had a remarkably bright and vivid *Aurora* the whole night. In ſhore, the wind was fluctuating, between N.N.W. and N.W. and farther out, W. N. W. Deſirous of benefiting by the land wind, and alſo of taking advantage of an earlier ebb-tide, I diſpenſed with the good old marine adage, *never to approach too near a weather-ſhore, leſt it ſhould prove a lee-ſhore*, and, by ſhort tacks, clung cloſe along the Engliſh coaſt. Next day, the wind veered to the S. W. and ſoon after to S.S.W. and ſometimes S. We were then in that dangerous bay between Portland and the Start Point, and carried a preſſing ſail, with hopes of reaching Torbay before dark; but night fell upon us, with thick haze, and ſmall rain, in ſo much, that we could not have ſeen the land at the diſtance of a ſhip's length. The gale was now increaſed to a ſtorm; in this dilemma, nothing remained but to endeavour to keep off the ſhore, till the wind ſhould change. Luckily our ſhip was a ſtout one, and well rigged.

Reflecting ſome time after, on the circumſtances of this ſtorm, and the phænomena that preceded it, I determined to have particular attention to

future *Auroræ*, and the weather, that ſhould ſucceed them; and, as I have obſerved above, in twenty-three inſtances, have found them uniform, except in degree: the gale generally commencing between twenty-four and thirty hours after the firſt appearance of the *Aurora*. More time and obſervation will probably diſcover, whether the ſtrength, of the ſucceeding gale, is proportionate to the ſplendor and vivacity of the *Aurora*, and the diſtance of time between them. I only ſuſpect, that the more brilliant and active the firſt is, the ſooner will the later occur, be more violent, but of ſhorter duration, than when the light is languid and dull. Perhaps too, the colour of the *Aurora* may be ſome guide, in forming a judgement of the coming gale. That which preceeded the ſtorm I have mentioned, was exceedingly ſplendid. The tempeſt ſucceeded it in leſs than twenty-four hours, was violent, but of ſhort (about eight hours) continuance. In June laſt, a little without ſoundings, we had for two nights following, faint inactive *Auroræ*; the conſequent gale was not hard, but laſted near three days: the firſt day attended with haze, and ſmall rain; the ſecond with haze only, and the laſt day clear.

The benefit which this obſervation, on the *Aurora Borealis*, when further confirmed and known, may be of to ſeamen, is obvious, in navigating near coaſts, which tend eaſt and weſt, particularly in the Britiſh channel. They may, when warned by the *Aurora Borealis*, get into port, and evade the impending ſtorm; or, by ſtretching over to the ſouthward, facilitate their paſſage, by that very ſtorm,

ſtorm, which might have deſtroyed them; for no winds are ſo dangerous, in the channel, as ſoutherly and ſouth-weſt. In a word, ſince I have made this obſervation, I have got out of the channel, when other men, as alert, and in faſter ſailing ſhips, but unapprized of this circumſtance, have not only been driven back, but with difficulty have eſcaped ſhipwreck.

Perhaps, the obſervation, that ſoutherly gales conſtantly ſucceed theſe phænomena, may help to account for the nature of the *Aurora Borealis*; my own thoughts on that ſubject, I ſhall ſome time beg leave to lay before you.

I am, with great reſpect,

SIR,

Your obliged,

humble ſervant,

J. S. WINN.

A further Note from the ſame Gentleman.

In Auguſt laſt, Mr. WINN ſent Dr. FRANKLIN ſome obſervations on the *Aurora Borealis*, to which he would add, that, on Saturday evening, the 16th inſtant, as Mr. Winn came to town, the *Aurora* was ſo bright, that he found a croud of people in the Minories, gazing at it, which they took to be the effect of a great fire about Biſhopſgate-ſtreet; the next day we had a hard gale at S. S. W. with rain.

Friday Morn. 22 Jan.

Conjecture on the foregoing.

The *Auroræ Boreales*, though viſible almoſt every night of clear weather, in the more northern regions, and very high in the atmoſphere, can ſcarce be viſible in England, but when the atmoſphere is pretty clear of clouds, for the whole ſpace between us and thoſe regions, and therefore are ſeldom viſible here. This extenſive clearneſs may have been produced by a long continuance of northerly winds. When the winds have long continued in one quarter, the return is often violent. Allowing the fact ſo repeatedly obſerved by Mr. Winn, perhaps this may account for the violence of the ſoutherly winds, that ſoon follow the appearance of the *Aurora* on our coaſts.

B. F.

XVIII. *Ex-*