

III. *An Account of an Experiment touching the different Densities of Common Water, from the greatest degree of Heat in our Climate, to the Freezing Point, observ'd by a Thermometer. By Mr. Fr. Hauksbee, F. R. S.*

I Caus'd a Quart of Water to be heated near scalding hot, and then put it into a convenient Glafs with my Thermometer, the Spirit in which soon arose into the Ball a-top, where it remain'd till the Water cooling caus'd it to descend : by this time the Spirit in the Thermometer and the Water were become of an equal Temperature ; and when it had descended to 130 Degrees above the Freezing Point, I began my Observations ; which take as follows. I weigh'd a small Bottle in't, and found the Bulk of Water equal to it in that State was 574 Grains. When the Spirit had descended to 80 Degrees above the Freezing Point, the Bulk of Water equal to the Bottle then weigh'd three quarters of a Grain more than before. At thirty Degrees above the Freezing Point, the quantity of Water equal to the Bulk of the Bottle was again increased about three quarters of a Grain. At the Freezing Point, it weigh'd still something more ; in all about two Grains from 130 Degrees above the Freezing Point, to that very Point. Which to me seems considerable, and ought to be taken notice of by such Gentlemen, who judge of a Mineral or any other Water by its weight, when they have not an opportunity of making the Experiment at the Fountain-head ; for there I suppose the Water is at the same Degree of Temperature at all Seasons.

Now

Now according to this Experiment, I find, that Water is condensable by Cold one 28th part of the Whole, from the greatest Degree of Heat in this Climate. Supposing then, that the Water in the Sea should suffer the same Alterations by the change of the different Seasons, (as I see no reason but very nearly it must) it would be easy to compute, that a Ship which should draw two Fathoms, or 12 Feet Water, in such Weather as is understood by the greatest Degree of Heat, would draw about half an Inch less from the greater Density of the Fluid, when reduc'd to the premention'd Degree of Cold; and consequently woul Sail better at that time.

But this is not all that occasion'd the making this Experiment, for I did it in order to another. And since I find that Water is capable of Dilation and Contraction by Heat and Cold, I see no reason why the same may not be performed by force, notwithstanding the many Attempts to determine it have as yet been fruitless. For since the constituent Parts of the Fluid, are capable of being remov'd at greater Distances one from the other by Heat, and become more closely united by Cold; so I conclude, that there must be some Body contained in't of an Elastick Quality, which (I think) must be subject to the same Laws of such a Body; that is, be capable of Compression by force, as well as to become more Dense by Cold. But the Issue of this, I must leave to a more proper Season.