

II. *New Experiments upon Ice; taken from Abbé Nolet, F. R. S. at Paris, and communicated by J. T. Defaguliers, F. R. S.*

I. ICE that begins to melt, and Water that begins to freeze, have always the same Degree of Cold.

2. That Cold may be increas'd by a Mixture of Salts.

3. It has been thought for a long time, that *Salt-petre* was most fit to increase the Cold of *Ice*; but Experiments have shewn, that few Salts increase Cold so little as that Salt. Mix one Part of fine *Salt-petre* with two Parts of beaten *Ice*, and *Mons. Reaumur's* Thermometer will descend in it but $3\frac{1}{2}$ Degrees below the freezing Point.

What had caus'd this Mistake, is, that People generally made use of *Salt-petre* of the first or second Melting, as being the cheapest; but that *Salt-petre* not being purified, contains a great deal of *Sea-Salt*; and it was in Proportion to the Quantity of the *Sea-Salt* that the Effect was the greater.

From this last Observation, one may deduce an advantageous Method for trying *Gunpowder*; for as of the three Ingredients of which it is made up, *Salt-petre* is the only one that can increase the Cold of *Ice*; if one Part of *Gunpowder*, or a little more, be mix'd with two Parts of *Ice*, and it increases its Cold more than $3\frac{1}{2}$ Degrees, it is a Sign that the *Salt petre* contain'd in it is not well purified; and the best Powder

der will be that which does least increase the Cold of *Ice*.

4. *Sea-Salt*, that is the *Bay-Salt*, which is commonly us'd at Table in *France*, and that which is immediately taken from the Mines, call'd *Sal gemmæ*, give the greatest Degree of Cold, for the most part; for *Pot-ash* gives sometimes a little more, but generally less. *Sea-Salt* mix'd with *Ice* in the abovesaid Proportion, gives 15 Degrees of Cold on *Monsf. Reaumur's* Thermometer, and *Sal gem.* 17.

5.	<i>Ashes</i> of green <i>Wood</i>	3 Degrees.
6.	of <i>Sea-Coal</i>	
7.	of <i>Vitriol</i>	2
8.	<i>Tartar</i>	10
9.	Common <i>Pot-ash</i> (in } <i>French</i> call'd <i>Soude</i> } <i>ordinaire</i>)	3
10.	<i>Pot-ash</i> made of <i>Vreck</i> } or <i>Sea-weed</i>	11

This last *Pot-ash* may be substituted instead of *Sea-Salt*, for making *Ice-Creams*, in Places where *Salt* is dear, as in *France*, where it is sold for 10 Sols a Pound.

1st, Because in *France* this *Pot-ash* is sold only for 2 $\frac{1}{2}$ Sols a Pound.

2^{dly}, Because, not freezing so fast, it does not spoil the Creams by reducing them to *Ice*s.

3^{dly}, Because *Ice-Creams* made this way, will keep longer in a Condition fit to serve at Table.

11.	<i>Sugar</i>	4 Degrees.
12.	<i>Allom</i>	1 $\frac{1}{2}$
13.	<i>Salt</i> of <i>Glass</i>	10

14. *Sal*

14. *Sal Ammoniac* 12 $\frac{2}{3}$ Degrees.

15. *Quick-Lime* 1 $\frac{1}{4}$

16. *Sal Glauberi* 2

17. The Cold of *Ice* may still be considerably increas'd by a Mixture of *Spirit of Wine*; about a Drinking-glass full of *Spirit of Wine* to a Pound of beaten *Ice*.

18. The Cold of *Ice* will not increase, unless the *Ice* melts.

E X P E R I M E N T S.

Put into one Vessel four Ounces of *Ice* beaten very small, and into another Vessel two Ounces of *Sea-Salt*; set the two Vessels in a Mixture of *Ice* and *Salt*, which is to be renew'd still, till by means of the Thermometer you find, that the *Salt* and the *Ice* of the two first Vessels have acquir'd each of them 10 or 12 Degrees of Cold; then mix your *Salt* with your *Ice*, and this Mixture will not increase the Degree of Cold that the Ingredients had acquir'd, because the Mixture does not melt.

But if instead of *Salt* you mix'd with your *Ice* *Spirit of Nitre* cool'd to the same Degree as the *Ice*, as this last is liquid, it will melt the *Ice*, and considerably increase its Cold.

19. Salt mix'd with Water, increases its Cold.

20. Of all Salts, *Sal Ammoniac* gives the greatest Degree of Cold; so that if that Salt has been cool'd in *Ice*, and then one Part of it be thrown into two Parts of Water cool'd to the same Degree in *Ice*, that Water will become colder than *Ice*, and will freeze other Water thrown into it in a small Quantity.

This last Observation may be applied to the cooling of Liquors where no *Ice* is to be had; for there is hardly any Place, but what has Wells: Now the Water of a Well moderately deep, wants about eight or 10 Degrees of the Cold of *Ice*; and *Sal Ammoniac* being cool'd beforehand in the Well, will, by mixing with some of the Water of that Well, come very near to the Cold of *Ice*.

III. *An Observation of the Magnetic Needle being so affected by great Cold, that it would not traverse; by Capt. Christopher Middleton, F. R. S.*

IN a Letter which was publish'd some Years ago in the *Philosophical Transactions*, (N^o 418.) I made Mention of a strange *Phenomenon* relating to the Sea-Compass, which I had frequently observed, when we were among the Ice in *Hudson's-Bay*; to wit, that the magnetic Virtue of the Needle was so far lost or destroyed, that it would not traverse as usual, even when the Ship was in a considerable Motion: And in my Voyage thither last Year, I observed our Compass would not move at all, any longer than the Quarter-Master kept touching it. We had then much Snow on the Land, and many Isles of Ice around us, and the Sea not very smooth: I order'd one of the Compasses to be brought into the Cabin, but did not find it any better, till it had stood near the Fire about a Quarter of an Hour, and then it began to traverse very well; I then order'd it to be placed in the Binnacle,