

3. Right Lines not taking up more than $\frac{2}{3}$ of the Time of Description of crooked Lines, as the Diameter is $\frac{2}{3}$ of the Semiperiphery, it appears, if only right Lines were used, these $\frac{1}{10}$ would be reduced to $\frac{2}{10}$, by the Subtraction of $\frac{1}{3}$ of $\frac{3}{10}$. But, because the Number of right Lines, all things consider'd, should not be reckon'd but about double the Number of crooked ones, only $\frac{2}{3}$ of $\frac{1}{10}$ can be taken from the $\frac{1}{10}$; that is to say, the Time taken up in writing this Hand will be $\frac{2}{30} - \frac{1}{30} = \frac{1}{30}$ of the Time taken up in writing of the common Long-Hand, or or less than the $\frac{1}{4}$ of the Time.

As I have shewn all the Principles on which Short-Hands can be constructed to Advantage, I have no need to compare this with any other; because I have enabled every Reader to judge of them, by shewing within what Limits all Improvements are bounded.

XV. *An Account of a Treatise by Wm. Brownrigg M.D. F.R.S. intituled, "The Art of making common Salt, as now practised in most Parts of the World; with several Improvements propos'd in that Art, for the Use of the British Dominions;" abstracted by W. Watson F. R. S.*

Gentlemen,

Read June 15.
1748.

I RECEIVED your Commands to lay before you an Extract of our worthy Brother Dr. *Brownrigg's* Book; which, though at

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all times ready to execute whatever you think proper to charge me with to the utmost of my Abilities, I engaged in the more readily, from the Pleasure and Instruction I had already received from the Perusal of that excellent Work, in which its Author has eminently distinguished himself both as a Chemist, and as a Philosopher.

This Work consists of 295 Pages in 8^{vo}, exclusive of the Preface, and of 6 Copper-Plates, exhibiting different Views of Salt-Houses, Instruments, &c. necessary to the Preparation of Salt. It is enriched likewise with Notes of great Importance to the Work, not only of the Author, but also from the *Philosophical Transactions*, *Medical Essays*, *Memoirs of the Royal Academy of Sciences at Paris*, *Pliny*, *Agricola*, *Alonso Barba*, *Ramusio*, *Boyle*, *Hoffman*, *Lister*, *Herrera*, *Dampier*, *Baccius*, *Pomet*, *Marsilli*, *Plot*, *Scheuchzer*, *Hales*, *Rastel*, *Leigh*, *Boerhaave*, *Shaw*, and others.

Amongst the vulgar Arts, that of preparing Sea-Salt for the Uses of Mankind hath been thought worthy the notice of many great and learned Men, as well antient as modern. Thus many things relating to this Art are recorded by *Cato* and *Pliny*, *Agricola* and *Hoffman*, to whom our Author is much indebted for those Memoirs that have been transmitted to us, relating to its History. Had those great Men been as diligent in improving this Art, as they were in recording the Improvements made therein by others, there would not now have been Occasion to remark, that, after the Practice of so many Ages, an Art so simple, and withal so necessary, hath not yet been brought to any Degree of Perfection.

That

That this Art was capable of great Improvements, especially as practis'd in *Great Britain*, was the Sentiment of this *Society* soon after its Institution; at which time the Members thereof were very intent upon bringing it to a greater Perfection; as may be gather'd from the Inquiries and Suggestions of *Dr. Beal*, and the Histories of several Methods of making Salt, which then were published by the *Society*. And although the *English* have, since that time, considerably improved their Method of boiling Salt; yet this Art is still practis'd with greater Skill and Success by the *Dutch*, as the superior Goodness of the Fish, cured with their Salt, doth sufficiently prove.

The Commons of *Great Britain*, having taken into Consideration the great Importance of this Art, judg'd some Improvements propos'd therein worthy their Regard and Encouragement; well knowing, that, could this be brought to the same Perfection in *Britain* as in some neighbouring Countries, large Sums of Money might be sav'd in the Nation, which are now paid to the *French* and others; its Fisheries improved, and its Navies and Commerce, and many of its richest Colonies, would no longer depend upon its Enemies for one of those Necessaries, without which they cannot be supported.

These Considerations have induc'd our Author to give a brief Account of the various Methods of making Salt, which are now used in *Great Britain*, and in other Countries, where this Art is practis'd with more Success; and also to attempt several further Improvements for the Use of the *British* Dominions. How far he has succeeded in these At-

tempts, will best appear, if the Public shall think the following Proposals, so far worthy their Attention, as to merit a fair and impartial Trial. The principal Conclusions, deduced from a Variety of Observations and Experiments, are as follows: 1. That, by the Methods here proposed, an excellent Bay-Salt may be made in *Britain* in very large Quantities, so as to be afforded cheaper than at the Prices paid for foreign Salt; and that the *British* Colonies in *America* may very commodiously be supplied with Bay-Salt of their own Manufacture, without having recourse for it to the *French*, *Spaniards*, and *Portuguese*. 2. That, by the Methods here proposed, an excellent kind of refined white Salt may be made in *Britain*, as well from Sea-Water and Rock-Salt, as from natural Brine, in any Quantity wanted, so as to be afforded cheaper than foreign Bay-Salt; and which will also be better for curing Fish, Flesh, and other Provisions.

In forming these Conclusions, an impartial Regard has been had to Truth, without attending to the private Advantage of any particular Set of Men. The Sense of this, together with a Desire of promoting the public Advantage, has induced our Author to communicate the following Sheets at this time, although by deferring the Publication some time longer he might have made them possibly more accurate; because, besides other Considerations of no small Import, an Opinion has prevailed, that the establishing of Fisheries in the North of *Scotland* would be the best Means of affording an useful Employment to more unciviliz'd Inhabitants of that Part of the Kingdom, for carrying on of which they are most commodiously situated.

What

What Mr. *Lowndes* * hath lately done towards the Improvement of Brine-Salt, may, perhaps by some, be thought to supersede the Necessity of further Attempts for improving and extending our Salt Manufacture. Dr. *Brownrigg* is very far from depreciating the Endeavours of that Gentleman, which have met with Parliamentary Encouragement; and had his Discovery appeared to the Doctor sufficiently complete and extensive, he would not have given the Public and himself this Trouble. He makes no Doubt but that the Specimen of Salt, which Mr. *Lowndes* exhibited before the College of Physicians, was a strong and pure Salt, since such it appeared to that most learned Body. Whether the Alum mixed with it (agreeable to the antient Practice of the *Cheshire* Salt-boilers) contributed any thing to its Goodness, is more properly consider'd hereafter. It is only necessary here to observe, in Justification of the present Undertaking, that Mr. *Lowndes's* Method of making Salt for curing Provisions, doth not appear to be the best that may be put in Practice; since our Author hopes to shew, that, by other Methods, a purer and a stronger Salt may be made, and at a less Expence. Neither is his Method so general and extensive as seems to be required for the public Good; since Mr. *Lowndes* confines it almost intirely to boiled Brine-Salt; and hath given no Directions concerning the Preparation of Bay-Salt. He indeed proposes to meliorate the *British* Sea-Salt, but seems to despair of preparing a Salt either from Sea-Water, or *English* Rock-Salt,

fit

* Mr. *Lowndes's* Proccs is inserted in this Work. See p. 104. et seq.

fit for the Uses of the Navy or Fisheries ; altho' the *Dutch* Salt, which is the strongest and purest boiled Salt now made, is entirely a marine Salt, and even the Brine, of which Mr. *Lowndes* makes his Salt, is only a Solution of the *English* Rock-Salt, often in very impure Water, as is well known to the Naturalists.

Our Author, treating of Salt in general, takes notice of the Excellence and Usefulness thereof ; and that it hath pleased the *Author* of Nature to provide Mankind therewith in such Abundance, that there are few Countries which do not afford vast Quantities of Rock or fossil Salt. Mines of it have been long discovered and wrought in *England, Spain, Italy, Germany, Hungary, Poland*, and other Countries in *Europe*. Moreover the Sea affords such vast Plenty thereof, that all Mankind might thence be supplied with Quantities sufficient for their Occasions. There are also innumerable Springs, Ponds, Lakes, and Rivers impregnated with common Salt, from which the Inhabitants of many Countries are plentifully supplied herewith.

In some Countries, which are remote from the Sea, and have little Commerce, and which are not blessed with Mines of Salt, or salt Waters, the Necessities of the Inhabitants have forced them to invent a Method of extracting their common Salt from the Ashes of Vegetables.

In short, this Salt is dispersed all over Nature ; it is treasured up in the Bowels of the Earth ; it impregnates the Ocean ; it descends in * Rains ; it fertilizes

* See *Boyle* on the Saltness of the Sea.

tilizes the Soil; it arises in Vegetables; and from them is convey'd into Animals; so that it may well be esteem'd the universal Condiment of Nature.

Naturalists, observing the great Variety of Forms under which this Salt appears, have thought fit to rank the several Kinds of it under certain general Classes, distinguishing it most usually into Rock or fossil Salt, Sea-Salt, and Brine or Fountain-Salt: To which may be added others of those muriatic Salts, which are found in vegetable or animal Substances. These several Kinds of common Salt often differ from each other in their outward Form and Appearance, or in such accidental Properties as they derive from the heterogeneous Substances with which they are mixed; but, when perfectly pure, they have all the same Qualities; so that Chemists, by the exactest Inquiries, have not been able to discover any essential Difference between them. In this our Author agrees with the celebrated † *Hoffman*. Leaving therefore these Divisions to those whom they may concern, it may for the present Purpose be more proper to distinguish common Salt after a different Manner into the three following Kinds; *viz.* into Rock or native Salt, Bay-Salt, and white Salt.

By

* *Hoffman de salinibus Hallens.* cap. viii.

Ut igitur nostra hac de re innotescat sententia, hanc interponimus; sicuti in tota universi hujus orbis compage, una tantum est aqua, unus per fermentationem paratus spiritus ardens, unus Mercurius, unum volatile sal, unum acidum nitrosum ac vitriolicum sal; ita, pari ratione unum idemque sal commune est. Sed quum plures alienæ, terreæ, lapidosæ, sulphuræ, calcaris minerales ac pingues particulæ cum hisce corporibus connubium ineant, diversa exinde emergit eorum indoles; et sal commune idem semper obtineret ingenium, si quis pingues terreas, calcareasque partes ab illo artificiose segregaret.

By Rock-Salt*, or native Salt, is understood all Salt dug out of the Earth, which hath not undergone any artificial Preparation.

Under the Title of Bay-Salt may be ranked all Kinds of common Salt extracted from the Water, wherein it is dissolved by means of the Sun's Heat, and the Operation of the Air; whether the Water, from which it is extracted, be Sea-Water, or natural Brine drawn from Wells and Springs, or Salt Water stagnating in Ponds and Lakes.

Under the Title of white Salt, or boiled Salt, may be included all Kinds of common Salt extracted by Coction from the Water wherein it was dissolved; whether this Water be Sea-Water, or the salt Water of Wells, Fountains, Lakes, or Rivers; or Water of any sort impregnated with Rock-Salt, or other Kinds of common Salt.

The first of these Kinds of Salt is in several Countries found so pure, that it serves for most domestic Uses, without any previous Preparation, Triture excepted. But the *English* fossil Salt is unfit for the Uses of the Kitchen, until by Solution and Coction it is freed from several Impurities, and reduced to white Salt. The *British* white Salt also is not so proper as several Kinds of Bay-Salt for curing Fish, and such Fleh-Meats as are intended for Sea Provisions, or for Exportation into hot Countries. So that, for these Purposes, we are obliged, either
wholly

* By *Rock-Salt*, or *Sal Rupium*, the antient *Chemists* mean Salt adhering to the Rocks above the high Water Mark, being there lodged by the Spray of the Sea, evaporated by the Heat of the Sun; which is the purest Salt of all for chemical Uses, and is to be had off the Rocks of *Sicily*, and several Islands in the *West Indies*.

wholly or in part, to use Bay-Salt, which we purchase in *France, Spain*, and other foreign Countries. To remedy these Inconveniencies this Treatise was wrote, in order to shew how the Subjects of *Great Britain* may be supplied with Salt of their own Manufacture, fit and sufficient for all their Occasions.

In order that the Methods here proposed might be better understood, and that the Reasonableness of them might more fully appear, the Author thought it necessary to premise a brief Account of the several Ways of preparing Bay-Salt, as well as white Salt, as far as they came to his Knowledge. From this History may be formed a Judgment, how far the Methods now in Use are proper, in what deficient, where erroneous, and how they may be improved.

Bay-Salt in general may be divided into two Kinds. First, Bay-Salt, drawn from Sea-Water, as is practised in *France, Spain, Portugal*, and many other Countries. Secondly, Bay-Salt extracted from salt Springs, Ponds, and Lakes; as at *Cape de Verd* Islands, *Tortuga*, and other Places. Of these the first is imported in large Quantities into *Great Britain* and *Ireland*: Our *American* Colonies, in Times of Peace, are chiefly supplied with the latter; but in Time of War they have large Quantities of Bay-Salt from *Lisbon*, and other Parts of *Portugal*.

Bay-Salt is prepared in a Manner the most simple and easy, when the Water of Ponds and Lakes impregnated with Salt is totally exhale'd by the Force of the Sun and Air, and the Salt is left concreted into a hard Crust at the Bottom of the Lake or Pond. Of Salt thus prepar'd we have Instances

in many Parts of the World, as in the *Podolian* Defert near the River *Borysthenes* on the *Russian* Frontiers towards *Crim Tartary*, in the Kingdom of *Algiers*, and in other Parts of the World.

Bay-Salt is also drawn from the Brine of Ponds and Lakes, and our Author gives us an Account of the preparing it in this manner in the *Cape de Verd* Islands. This Account was collected chiefly from the Relations of several Persons of Credit, who themselves assisted in making Salt in these Islands. He also takes notice of the Bay-Salt made at *Tortugas*, and other Places in *America*. He describes likewise the Manner of making marine Bay-Salt in *France*, and other Parts of *Europe*. For the Particulars of these Operations I must refer you to the Work itself; and only take notice, that every kind of Bay-Salt is prepared without artificial Heat, and by only exposing the Brine under a large Surface to the Action of the Sun and Air, by which, in proportion to the Strength of the Brine, and to the different Temperature of Climate and Season, the Salt chrySTALLIZES into what we call Bay-Salt, and comes under different Appearances to us from different Places, which arise principally from the Cleanliness and Care of the Artist.

Our Author, when treating of white Salt in general, acquaints us, that although Salt is made, in warm Climates, with the greatest Ease, and at the least Expence, by the Heat of the Sun, after the Methods already described; yet, in several Countries, where Bay-Salt might be conveniently made, they prepare all their Salt by culinary Fires. Thus in *Austria*, *Bavaria*, and many other Parts of *Germany*, and also in *Hungary*, and even in some Parts of *Italy*, they constantly boil the Water of
 their

their salt Springs into white Salt. But in other Parts of *Europe*, as in *Britain*, and in the Northern Parts of *France* and *Germany*, an erroneous Opinion long prevailed, that the Heat of the Sun was not there sufficiently intense, even in the Summer Season, to reduce Sea-Water, or Brine, into Bay-Salt. And all Arguments would probably have been insufficient to remove this Prejudice for the *English*, had not the contrary been fully proved by Experiments, which were first accidentally made in *Hampshire*. However, the Method of making Salt by Coction will probably still continue to be practised in *Britain*; as the Salt so prepared is for several Uses preferable to Bay-Salt; and when prepared after a particular Manner, is preferable to common Bay-Salt, even for curing Provisions, as the Practice of the *Hollanders* sufficiently testifies: So that the due and right Preparation of white Salt seems very deserving of the Notice and Regard of the Public.

White Salt, as it is prepared from various saline Liquors, may therefore be distinguished into the following Kinds:

1. Marine boiled Salt, which is extracted from Sea-Water by Coction.
2. Brine or Fountain-Salt, prepared by Coction from natural Brine, whether of Ponds or Fountains.
3. That prepared from Sea-Water, or any other kind of Salt-Water, first heightened into a strong Brine by the Heat of the Sun, and the Operation of the Air.
4. That prepared from a strong Brine or *Lixivium* drawn from Earths, Sands, or Stones impregnated with common Salt.
5. Refined Rock-Salt, which is boiled from a Solution of fossil Salt in Sea-Water, or any other kind of salt Water, or pure Water.
6. Lastly, Salt upon Salt, which is Bay-Salt dissolved in Sea-Water,

or any other salt Water, and with it boiled into white Salt; and under these Heads may be ranked the several kinds of boiled Salt now in Use. Our Author has given us an exact History of the Manner of preparing these different kinds of Salt, as practised in different Places, with miscellaneous Observations and Cautions relating to their respective Processes, for which in the general I must refer you to the Work itself: But the making Salt upon Salt deserves more particular Attention; as the Author, being under no Tie of Secrecy, has revealed to us the Method of making in *Holland* and *Zealand* that strong and pure kind of Salt, with which they cure Herrings, and all other Provisions for long keeping; which gives the *Dutch* a great Advantage over all other Nations in the Herring-Fishery; since Fish preserved with this Salt look much cleaner and fairer than those that are cured with Bay-Salt, and keep much better than those preserved with any other kind of white Salt.

From the Process whereby white Salt is made from Sea-Water by Coction, it appears, that Sea-Water, besides common Salt, contains several other Ingredients; some of which are separated before the common Salt falls, and others remain in the Bittern, after all the Salt is extracted. Our Author has given a full and circumstantial Account of these in an express Chapter, under the Appellation of Memoirs for an Analysis of Sea-Water.

The Salt-Boilers, and particularly those who prepare Brine-Salt, have long been accustomed to make use of various Substances, which they call Additions or Seasonings, and mix them with the Brine while it

is boiling, either when they first observe the Salt begin to form, or else afterwards during the Time of Granulation. These Additions they use for various Purposes. First, to make the Salt grain better, or more quickly form into Chrystals. Secondly, to make it of a small fine Grain. Thirdly, to make it of a large firm and hard Grain, and less apt to imbibe the Moisture of the Air. Fourthly, to render it more pure. And lastly, to make it stronger, and fitter for preserving Provisions.

These Additions, most commonly used to answer the above-mention'd Purposes, are Wheat-Flour, Resin, Butter, Tallow, new Ale, stale Beer, Bottoms or Lees of Ale and Beer, Wine-Lees and Alum. Wheat-Flour and Resin are used for the Property they possess of making the Salt a small Grain. Butter, Tallow, and other unctuous Bodies are commonly applied, as they are said to make the Brine chrySTALLIZE more readily; for which End some Salt-Boilers more particularly prefer the Fat of Dogs: But others have little to plead for their using these Substances, but immemorial Custom: How far they have the Effects ascribed to them can only be determined by Experiments, as several Boilers, who formerly used them, now find they can make as good Salt without them. Wine-Lees, new Ale, stale Ale, the Lees of Ale and Beer are now generally rejected by the marine Salt-Boilers; except in the West of *England*, where the Briners, who use them, affirm that they raise a large Grain, and make their Salt more hard and firm, and some say that they make it chrySTALLIZE more readily. *Hoffman* prefers the strongest Ale; and *Plot* assures us, that
it

it makes the Salt of a larger or smaller Grain, according to the Degree of its Staleness. The only good Effects that fermented Liquors can have as an Addition, are probably owing to their acid Spirit, which may correct the alkaline Salts of the Brine, and so render the common Salt more dry and hard, and less apt to dissolve in moist Air. If therefore it should be thought necessary to use any of these Additions, in order to correct the alkaline Quality of the Brine, stale Ale, or *Rhenish Wine**, ought to be chosen, as new Ale contains but little Acid.

Alum is an Addition long known and used in *Cheshire*, together with Butter, to make the Salt precipitate from some Sorts of Brine, as we are assured by Dr. *Leigh* in his Natural History of *Lancashire, Cheshire, &c.* who first taught the *Cheshire* Salt-Boilers the Art of refining Rock-Salt. As the bad Properties of their Salt proceeded from hard boiling, they found every Method ineffectual, until they had recourse to a more mild and gentle Heat. And as Alum hath been long disused amongst them, it is not likely, that they found any extraordinary Benefit from it; otherwise they would scarce have neglected it, and continued the Use of Butter. However Mr. *Lowndes* hath lately endeavour'd to revive its Use; asserting, that Brine-Salt hath evermore two main Defects, Flakyness and Softness; and to remedy these Imperfections, he tried Alum, which fully answered every thing he propos'd; for it restor'd the Salt to its natural cubical Shoot, and gave it a proper Hardness; nor had it any bad Effect whatever. But our Author is of Opinion, that whoever considers the Nature of Alum, will scarce expect

* Why not Malt-Vinegar?

pect such extraordinary Effects from it. Neither does it here seem wanted; for the Grains of common Salt will always be sufficiently hard, and of their natural Figure, large Size, and no-ways disposed to run by the Moisture of the Air, if formed by a gentle Heat, and perfectly free from heterogeneous Mixtures: So that the Goodness of Mr. *Lowndes's* Salt does not seem owing to the Alum, with which it is mixed, but chiefly to the gentle Heat used in its Preparation.

The *Dutch*, who have long shewn the greatest Skill and Dexterity in the Art of boiling Salt, make use of another Addition, which they esteem the greatest Secret of their Art. This is Whey, kept several Years till it is extremely acid; now first revealed by our Author to the *British* Salt-Boilers, but long held in great Esteem by the *Dutch*, for the good Effects it hath upon their Salt; which it renders stronger, more durable, and fitter to preserve Herrings, and other Provisions.

Bay-Salt, as well as white Salt, is of different Kinds, and possessed of different Qualities: With the different Kinds of these Provisions must be cured, according to the Uses for which they are designed. The *Dutch* indeed use no Salt for curing Provisions, besides their own refined Salt. With it they can preserve Flesh and Fish of all Kinds as well as with the strongest Bay-Salt; and chuse to be at the Expence of refining Bay-Salt, rather than to defile their Provisions with the Dirt and other Impurities, with which it commonly abounds.

Salt, esteemed the best for curing Provisions, and for preserving them the longest time, is that which is the strongest and the purest. This may be known by

the following Characteristicks; *viz.* it is usually concreted into large Grains or Chrystals, which are firm and hard, and in respect to those of other Kinds of common Salt, the most solid and ponderous; it is not disposed to grow moist in a moderately dry Air, to which it has been exposed a considerable time; its Colour is white, and somewhat diaphanous; it hath no Smell; its Taste is truly muriatic, and more sharp and pungent than that of other Kinds of common Salt. It has, besides these, several other distinguishing Properties mentioned by our Author. The Salts, which approach nearest to this Degree of Perfection, are the best Kinds of Bay-Salt, and the strong *Dutch* refined Salt; but most of the Salt now made for Sale is very far from answering to these Characteristicks.

Having related the various Methods of preparing Salt that now are in Use, as far as they are come to our Author's Knowledge, it appears, that this Art is not brought to such Perfection in the *British* Dominions as in several other Countries, the Salt there prepared being unfit for preserving many Kinds of Provisions. It remains now to shew, that this Want of a strong Salt of *British* Manufacture proceeds not from any Defect in Nature, but of Art; and that, if proper Skill and Industry be used in the *British* Dominions, and due Encouragement there given by the Legislature, such Improvements may be made in this Art, that not only *Great Britain*, but *Ireland* also, and the *British* Colonies in *America*, may be supplied with Salt of their own Manufacture, proper for curing all Kinds of Provisions, in Quantity sufficient for all their Occasions, in Quality equal, if not superior, to any foreign
Salt

Salt now made, and at a moderate Price. These are Truths, which the Author hopes will appear evident from the Facts and Reasonings contained under the following Positions :

Lemma I. The Quantity of Water which annually falls in Rain, Snow, and Hail, is very different in different Parts of *Great Britain*; there commonly falling almost double the Quantity on the Western Coasts, that falls on the Eastern Coasts of that Island.

Lemma II. The Quantity of Rain which falls in *Lancashire*, during the four hottest Months of the Year, *viz. May, June, July, and August*, doth not at a Medium amount to more than a third Part of the Quantity of Water, which falls in Rain, Snows, and Hail, during the whole Year.

Lemma III. The Water which ascends in Vapours from the Sea very greatly exceeds that which descends thereon in Rain and other aqueous Meteors: But the Quantity of Water, which usually exhales from a given Part of the Ocean in a given Time, cannot with any Exactness be determined.

Lemma IV. The Quantity of Water which commonly exhales in *Great Britain* from shallow Ponds during the four hottest Months of the Year, greatly exceeds the Quantity of Rain which commonly falls on the Surface of those Ponds during the said Months.

From these *Lemmata*, which the Author has supported by the Observations, not only of himself, but of other learned Men, are deduced the following Propositions :

Proposition I. In several Parts of *England* large Quantities of Bay-Salt may be extracted from Sea-Water during the hottest Months of the Year, by receiving the Salt-Water into Ponds, and suffering its aqueous Parts thence to exhale by the Heat of the Sun, and the Operation of the Air and Winds.

Prop. II. In several Parts of *England* large Quantities of Bay-Salt may very commodiously be extracted from Sea-Water, after the same manner that is practised in *France*, and in other Parts of *Europe*.

Prop. III. Bay-Salt may be extracted in *England* from Sea-Water in larger Quantities, and with more Certainty, than by the foregoing Method, if Care be taken to preserve the Brine contained in the Salt-Pits from being diluted with Rains, and to promote the Evaporation of the Water by several artificial means, which may easily be put in Practice.

Prop. IV. In several Parts of *England* large Quantities of excellent Bay-Salt may with great Ease be made from the natural Brine of salt Springs, and also from Rock-Salt dissolved in weak Brine or Sea-Water,

Prop. V. Bay-Salt may be prepared in *England* by the foregoing Methods at a very moderate Expence, equal in Goodness to the best foreign Bay-Salt, and in Quantity sufficient for the Consumption of all the *British* Dominions.

Prop. VI. In several of the *British* Colonies in *America*, Bay Salt might, with little Expence and Trouble, be prepared from Sea-Water, in Quantities sufficient to supply the *American* Fisheries, and

and all other Occasions of those Colonies, so as to become a considerable Branch of their Trade.

The Author has supported all these Propositions with great Ingenuity; but I cannot pass over in Silence the artificial means to promote the Evaporation of Sea-Water, mention'd in *Prop.* III. as well as to preserve the Brine contained in the Salt-Pits from being diluted with Rains. I therefore shall lay before you a short Account of these.

It will be proper, says our Author, to make all the Salt-Pits of the Marsh in one long Row extended from East to West, and for each Pit to make Covers of thin Boards, or rather of coarse Canvas, or Sail-Cloth, stretched on Frames of Wood and painted white. These Covers must all be fixed with Hinges to strong Posts and Beams on the North Side of the Pits; so that they may be let down and drawn up with Cords and Pulleys, or by some other Contrivance, somewhat like Drawbridges. These Covers thus fixed may be let down over the Pits like a Shed or Penthouse in rainy Weather; and in dry Weather may be erected almost to a perpendicular, but inclining a little towards the South; so as to form a Wall with a South Aspect. Thus these may serve a double Purpose, as Coverings for the Pits in wet Weather, and as Reflectors of the Sun's Heat upon them in dry Weather, and thus greatly promote the Evaporation of the aqueous Parts of the Brine. The Hinges on which the Reflectors turn may be fixed about eight or ten Inches from the Ground; by which means, when the Reflectors stand upright, there will be an Opening left beneath them, through which the Air will continually

ally flow in a brisk Current, and greatly increase the Evaporation of the Water.

After having gone through that Part of Dr. *Brownrigg's* Work, which relates to Bay-Salt, we proceed to the Methods that Gentleman proposes for preparing and improving white Salt, which, if brought into Use, may probably be of Advantage not only to private Undertakers, but also to the Public. For it appears, that two very different Kinds of white Salt are required; the one for the Use of the Table, and the other as a Condiment for Provisions. Its Whiteness, Dryness, and the Smallness of its Grain, are the Properties which chiefly recommend the first Kind; and its great Strength and Purity the latter. It is this strong and pure Kind of white Salt, which is wanted in the *British* Dominions; and it is therefore our Author's principal Design here to consider how this Defect may be supplied; although at the same time Instructions are given how to prepare Table-Salt, not only better in Quality, but also at a less Expence than it is now prepared by the common Methods. |

Lemma I. In the common Processes for making white Salt, the Salt is deprived of a considerable Part of its acid Spirit, by the violent Boiling used in its Preparation.

Lemma II. Most Kinds of white Salt are render'd impure by the Mixture of various heterogeneous Substances.

Lemma III. White Salt, by the violent Coction commonly used in its Preparation, is render'd less fit for preserving Fish, Flesh, and other Provisions, than it would be if prepared with a more gentle Heat.

Lemma

Lemma IV. The heterogeneous Substances which are commonly mixed with white Salt, render it less proper for preserving Provisions, than it would be if separated from them.

After having fully consider'd the foregoing, our Author gives a Method of preparing a Kind of white Salt proper for curing Fish, Flesh, and other Provisions; likewise a Method of refining Salt; but for these I must refer you to the Work itself, as well as for the Tables, wherein the several Expences attending these Operations are minutely consider'd.

Most of the Facts referred to in these Disquisitions are such, as the constant Practice of those who make Salt sufficiently warrants us to rely upon for true and certain; or else, they are the Observations of judicious Salt-Officers, daily conversant in these Matters, or of curious and inquisitive Navigators, Merchants, Travellers, and Naturalists; or, lastly, the Experiments of many learned Physicians, Chemists, and Philosophers: The Truth of which several Facts, though many of them have long been published, hath never been called in Question. So that these Observations and Experiments may probably be more relied on by the Public, than if they had only been made by our Author; since they have the Testimony of many skilful and unprejudiced Persons, who could have no Notion of the Uses to which they have been here applied. If therefore the Arguments founded upon those Facts should be esteemed any ways reasonable and satisfactory, the Author presumes to remark, that it might not be unworthy the Wisdom of the *British* Legislature to direct

direct a more full Inquiry to be made into a Matter of this Importance, and to order proper Works to be erected for making Bay-Salt, and for making and refining white Salt, and to put those Works under the Management of able and judicious Persons, to make exact and accurate Trials, in order to discover the best and cheapest Methods of doing them. And the Methods, which should be most approved of, might for the general Good be made public, and established by Law as a common Standard, to which all those who make Salt in the *British* Dominions should be obliged to conform.

However imperfect this Extract may appear, I must now beg your Indulgence for having taken up more of your Time than is usually allow'd to Works of this kind. I must plead in my Excuse the great, the National Importance of the Work itself, the masterly Manner with which the Subject-Matter is treated, as well as its falling in so exactly with that Institution, in which we are so desirous of distinguishing ourselves. The making and refining Salt must certainly be considered as one of those mechanic Arts, the History of which, as we are taught by the noble * *Verulam*, is a necessary Part of that Knowledge, that true Science of Nature, which is not taken up in vain and fruitless Speculations, but effectually labours to relieve the Necessities of human Life.

XVI.

* *Verulam de Aug. Scient. lib. II. cap. 2.*