

By another Account communicated to the Royal Society, we are inform'd, that these Children lived two Months after the Birth.

- Fig. 1.* Represents the fore View of the Twins.
 2. Their Back-part.
 3, & 4. The Skeleton.
 5. The Breasts and Abdominal Muscles, after the external Teguments were removed.
 6. Part of the *Viscera* of the *Abdomen*.
 7. The Urinary and Genital Parts.

The two first Figures were drawn in their Life-time, and the five following were taken after their Death, by Order of his Royal Highness the Duke of Lorrain.

X. *Observations and Experiments on the Sal Catharticum Amarum, commonly called the Epsom Salt.* By Mr. John Brown, Chymist, F. R. S.

THAT the Salt, of late Years distinguished by the Title of *Sal Catharticum*, is made from what, at the Salt Works, is called *Bittern*, is pretty commonly known; but the particular Manner how this *Bittern* is produced, and from it, these Salts, has not yet, as I know of, been communicated to the World, in such a Manner, as to become intelligible. And the *Opprobrium* unjustly cast upon the Salt, of its being a counterfeit *Epsom Salt*, or something made in Imitation of it, or common Salt dissolved and recrystallized, has

very much sunk its Esteem among the Learned in Physick.

By the Account M. *Bolduc* gives no longer ago, than in the History of the Royal Academy of *Paris*, for the Year 1718, I find he did not succeed according to his Wish in the Experiments he try'd, to find out what this Salt was made from, justly grounding his Reasons for its not being all made from the *Epsom Waters*, or other Springs that afford bitter purging Waters, because of the large Quantities consum'd, and the Cheapness of its Price. After all his curious Endeavours, it still remain'd a Secret, until the Information he received from hence by Dr. *Mendez*, whose Account is as follows, though very imperfect. It comes, says he, from *Lemington* and *Portsea*, both in *Hampshire*, where from Heaps of fossile Salt, there runs a saltish, bitter, sharp, and pungent Liquor. One would judge by its Brackishness and Bitterness, that it contained two Kinds of Salt, the one a Sea Salt, the other a bitter Salt. To separate these Salts, they cause this Liquor to run through hollow Drains on the Ground; there it gets together, and condenses into Salt; this they put into a large Vessel, with a great Quantity of common Water, and boil it as long as is sufficient to dissolve it; then they let it cool and settle for several Days. The Water, impregnated with the Sea Salt, which is the heaviest, sinks to the Bottom of the Vessel with the earthy Parts, and the Water impregnated with the bitter Salt, which is the lightest, swims at Top. They take off this upper Liquor, as long as it retains its bitter Taste, without any Pungency; afterwards they boil it in one or two Waters, then evaporate it, and it yields white and transparent Crystals, which are the counterfeit *Epsom Salt*.

What Experiments M. *Bolduc* made with the *Bittern*, sent him by that Gentleman, I do not remember to have met with, in any of the succeeding Memoirs.

Dr. *Seipp*, in his Description of the *Pymont* Waters, Page 127, says, that the common *English* purging Salt, which is sold in great Quantities in *Germany*, under the Name of *Epsom Salt*, is not prepared from the *Epsom* Waters, but is made in *London* from common Sea Salt, and Oil of Vitriol.

In the same Page he says, that the Salt obtain'd from the *Pymont* Waters will part with its own acid Spirit, upon pouring on the *Ol. Vitriol.* which the *Sal Mirabile* and the *English* purging Salt will not. By this Means he distinguishes the first Salt from the two last.

Dr. *Quincey*, in his *Praelectiones Pharmaceuticæ*, publish'd since his Death, says, there hath lately been contriv'd a Salt from the Mineral Purging Waters, made by Evaporation, Filtration, and Crystallization. It was first entitled *Sal Mirabile*, or *Sal Catharticum Amarum*; but it is now so scandalously counterfeited, that it is little else than common Salt dissolv'd and recrystallized.

Before I enter into the Account how this Salt is made, it may not be amiss, first, to say something of the genuine Salt that has been made from the bitter purging Waters, of which the learned Dr. *Grew* was the first who attempted the making it at *Epsom*. Some Years after, several other bitter purging Springs were found in different Counties, and Salts in small Quantities were boyl'd up from them, but from no Place, nor all the Places put together, in such large Quantities, as from the Springs on one side of *Shooters-Hill* in *Kent*, about the Year 1700, which were then in the Possession of those two ingenious Chymists, Mr. *George* and Mr. *Francis Moulton*; and

and where they made such large *Apparatus* for evaporating the Water, that they have sometimes boyl'd down 200 Barrels in a Week, from which, in a dry Season, and when the Land Waters did not get into their Drains, they have obtain'd 224 Pound of Salt.

After these Works had gone on some time, Dr. *Hoy* found out a more expeditious Way of making a purging Salt so nearly resembling that from the purging Springs, in all its Properties, that it soon pass'd on the World for the other, and continued so to do.

The great Consumption of these Salts (which then went only by the Name of *Epsom Salts*) as well at Home as Abroad, engaged some of our Physicians, (many Years before M. *Bolduc* took Notice of it) to suspect, that even what was made at *Shooters-Hill* was spurious, and received an Addition of something to increase the Quantity. But these Suspicions, I dare positively affirm, were entirely groundless, as to the Salts made there, and readily believe the same of any other Place, where the Spring Waters were boyled down for Salt. But upon a Consideration, that there were greater Quantities of this Salt consumed than all the Places where the Waters were boyl'd could produce, which was the real Fact at that Time of Day, there was sufficient Room to suspect, that some of them were not genuine, as appear'd to be true sometime after.

For the Secret, which was then in a few Hands, of making these Salts cheap, gave those, who had it, an Opportunity of under-selling those who made it from the Waters, and, in a Year or two, render'd them incapable of making it to any Advantage, considering the Price it was sold for by the others: So that the Work on *Shooters-Hill* was thrown up, and I believe there has not been 100 Pound of Salt made from the Waters since that Time, in any Part of the Kingdom.

Some time before this Work at *Shooters-Hill* was broke up, some Pains was taken to discover the Secret those had, who sold the Salt so cheap; and upon examining the several Salts, that were sold about Town, those dispos'd of by Mr. *George* and Mr. *Francis Moul*, were certainly genuine, and were therefore a proper Standard to judge of the rest by. But from all the Experiments then made, there could no material Difference be found between the Salt made from the Waters, and that made by them who were in the Secret. There was indeed a Salt sold by some, which, in the Course of those Tryals, was found to be a *Sal Mirabile*, made from the *Ol. Vitrioli* and common Salt, but shot into such small Crystals, as not at first Sight to be distinguished from the other.

Necessity being the Mother of Invention, it was not long before it was discovered, and the Experiment was try'd at the Lady *Carrington's* Salt-Works near *Portsmouth*; where it was found the same Thing could be done, as at another Work, not far from it, and in which Dr. *Hoy* had been concerned.

It was some Years after this Salt had been made at *Portsmouth*, before the Saltmakers at *Lemington* attempted, or indeed knew the Method of making it; who are now the greatest Traders in it, and have sent several Ton in a Year to *London*, besides what has been directly exported from thence.

I remember it to have been the Opinion of the Proprietors of the Salterns near *Portsmouth*, that this purging Salt could not be made at any other Salt-Works except theirs, and that the bitter Taste in the Salt was communicated from the Earth to the Sea Water, whilst it stood expos'd in their Sun Pans. But Time has

has prov'd this Opinion false; for besides what has been said of its being made at *Lemington*, it was about 4 or 5 Years ago begun to be made near *Newcastle*, where it is still continued to be made; and doubtless may be made at any other Salt-Works, whete the common Salt is made from Sea Water by Evaporation. Whether any Thing of this Kind has been attempted at any of our Inland Salt Springs, either in *Cheeshire*, or *Worcestershire*, I am not yet satisfied.

There is some Difference in the making the common Salt in *Hampshire*, from that about *Newcastle*: At the first of these Places, in the Beginning of the Summer, at Spring Tides, or at New and Full Moon, the Sea Water is let into their feeding Ponds, which are their *Reservoirs* for their Summer's Working, and from hence is convey'd into small square Pans, and again, after some time, from these it is convey'd into larger Pans, or Beds, which they call Brine, or Sun Pans; all which are made of Sea Mud and Earth. In these last Pans, or Beds, it lies expos'd to the Sun and Wind, in order to exhale the weakest Waters; and it is in these Beds, if the Weather prove very favourable, that they can make as good Bay Salt as any we have from *France*, and at such a time they never bring their Brine to the Boilers. But if the Weather is not hot enough for that Purpose, their Brine is expos'd so long in these Pans, till it becomes of such a Strength as to support their Eggs, made of Glas or Wax, to a certain Height above the Surface of the Brine, which from thence is convey'd into large Store Cisterns, and then into Boiling Pans made of Iron, where it is boyl'd down (after having been frequently scumm'd) to a Sea Salt. 'Tis observable, that whilst the Brine is boyling, there precipitates a hard crusty Matter, which is partly taken out by Vessels placed

placed in proper Parts of the Pan for that Purpose, and Part of it fixes on the Bottom of the Iron Pan so hard, as to be afterwards dug off; and this the Workmen call *Scratch*, and is what *Dr. Collins*, in a former Transaction concerning the Sea Water boyl'd at *Skeilds*, calls a Stone Powder. When the Operation for the Sea Salt is finish'd, it is taken out hot, and put into wooden Troughs with Holes at the Bottom, through which runs the superfluous Liquor: Under these Troughs are set other Vessels (with Sticks fixed in them in a perpendicular Posture) to receive what runs through. In these Vessels the Liquor is suffer'd to continue some time, and according to the Quantity of Sea Salt still left in it, will crystalize to the Sticks, something like Sugar-candy, but in much larger Shoots; and this they call *Cat-Salt*, or *Salt-Cats*, and it holds some share of the bitter Salt. When this Salt is broke small, or rather powder'd, it is so white, that some Gentlemen choose it for their Tables; but the greatest Consumption of it is among the Cake Soap-Boylers. The Liquor that will not shoot to these Sticks, is what at these Works, they call the *Bittern*, fit for making the *Sal Catharticum*.

The Remainder of this curious Paper shall be communicated in our next.

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