

6. *The Contents of some Letters from Two learned and curious Observers in Staffordshire , concerning the Sand found in the Brine of the Saltworks of that Country &c. sent to the Royal Society by Dr. Rob. Plot. S. R. S.*

HAVING had occasion about half a year since to consider the *Brines* whereof we make our *white Salt* here in *England*, and more particularly those of *Staffordshire* ; I consulted amongst others that instructive discourse of Mr. *John Collins* concerning *Salt and Fishery* then newly published ; wherein finding *Pag. 52.* that those great quantities of *Sand* met with in all *Brines*, whether of *Pits*, made of *Sea liquor*, or by melting of *forreign Salts*, are not in the *Brines* before they are boyled, but produced by a sort of *petrification* during the *Evaporation* ; which He confirms by the Experiment of strong *Brines* having been dreyned or squeezed through most pure fine *Holland* of eight foldings, and no symptoms of any *Sand* being left in the *Filtre* : I thought it of concern to me (though then at a great distance myself) to have the *Experiment* repeated upon the *Staffordshire Brine*, not only because of the particular account I was then giving of it, but rather for the sake of the great quantities of *Sand* I knew to come from that *Brine*, which I was inclin'd to believe would either quite overthrow, or mightily confirm the truth of that odd *Phænomenon*. Whereupon I made bold to request the assistance of two *Curious Observers*, Neighbors to

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to these *Brine-pits*, to make the *Experiment*, who were so very nice in performing it, that to the eight folds of fine *Holland*, they added as many more of finest *Cambrick*, through both which though they strained a competent Quantity of the *brine*, yet found nothing left in this very close *Colander*, but a little black *dust*, which they imputed only to the foulness of the *Water*, it being nothing like *Sand*; for having examin'd the *Cloth* both with their *fingers* and the *Microscope*, they could feel or see no more of *Sand* than if they had percolated the clearest Spring water; and yet this *brine* is found to hold in boiling at least  $\frac{1}{4}$  of as much *sand* as *Salt*. i. e. the *Brine* that suffices to make a bushel of *Salt*, yeilds also at least a Peck of *Sand*.

But notwithstanding this *Experiment*, it did not seem to their apprehensions necessary that the *Sand* should be generated in the boiling, but might rather be originally there; for before they strained it, they observed in the water (by the help of a *Microscope*) a great multitude of very minute *Animals* (much smaller than those in *pepper-water*) swimming about in it, together with many small transparent *plates*, some of them a little bigger than the *Animalcle's*, and some less, but all of a rectangular oblong figure, though some indeed seem'd very near a *square*, which they found also in the *water* after straining as thick as before. Nor did they wonder at it, because the pores or rather interstices between the threads of the *Holland* and *Cambrick*, though they were extremely *fine*, appear'd in the *Microscope* to be exceedingly (they affirm'd they might safely say twenty times) greater than either the *Animalcle's* or *Plates*. And these they judg'd to be the original *particles* both of the *salt* and *Sand*, which as the *Water* evaporates in boiling they thought might gather together till they made up such a visible coarse body as we see the greater *Cornes* of each are. Wherein they were confirmed in a little time, for observing with an excellent *Microscope*

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Some of the strong *Brine* which drops from the *Baskets* or *Barrons* when the *Salt* is first put into them, though at first it look't like clear water, yet upon a more accurate observation it appeared exceeding full of these *oblong particles*, which as they look't on them, they could sensibly perceive to gather together and club to make greater parts, and as the water dried off from the *glass* to grow far larger and larger till they appeared as big, and not much unlike a large sized *Table Diamond*: Which made them guess that the *Sand* might be also generated (if I may so say) after the same manner, it appearing to them to be nothing (pardon the expression) but an insipid *Salt* composed of parts not so *sharp pointed* as the other, but rounder and blunter angled, and consequently not so *pungent* on the *Tongue*. Which point they believed might be cleared perfectly if some of the *Sand* were dissolved in fair water, and that water examined afterwards by straining or otherwise to see if any, or all the *sand*, would be left behind &c.

Whereupon having some of the *Sand* by me I endeavoured accordingly to dissolve it in fair water, to see whether I could reduce it again into its former state, but without success; its parts being so inseparably fix't that they would by no means dissolve: I also tryed the *Salt*, which though it dissolved yet would not render it self again into *plates*. Whereof sending an account to my friends in *Staffordshire*: they were pleased also to make a further trial of dissolving the *sand* separated from the *Salt* in boiling; which though they confess they could not do to any considerable Quantity, yet they found that after the straining, it was not so *heavy* by a great deal as before, the water that came from it being very clear, which made them believe that it did dissolve in some measure, unless (as is very probable) there were in the *Sand* some particles of *Salt*, which upon dissolution were separated from  
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it, and so render'd it lighter : Nevertheless they did not doubt but a great part of the *Sand* might also be dissolved though perhaps no great quantity in *Pump-water* in which it seems they tryed it. But there has no further *Experiment* yet been made, wherefore if the *Royal Society* please to send me any *instructions* for a further tryal, they shall be carefully transmitted, and I dare promise them as carefully executed. What those *Gentlemen's* opinions are concerning the *Animalcula* they do not tell me, what my own is concerning those matters, it shall suffice in general to acquaint you that I think they may perhaps may be analogous to the *Eeles* in Vinegar, the rest you must expect in my *Natural History* of *Staffordshire* now in the Press. I shall add no more but that one of the aforesaid *Gentlemen* since the account above mentioned casually looking upon some of the *Salt* made at those *pits* before it was dryed and beaten small, observed that many of the larger *Cornes* were of the same shape to the naked Eye, as the minute ones appear'd of in the *Microscope*, and that they were visibly made up of a great number of small *plates*, shooting up from a quadrangular oblong *Base* into a very obtuse *Pyramid*, hollowed within. Which is all at present but my duty to the *Society*, and that I am

Their most

Faithful

Servant,

R. P.

I. Hor.