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III. *Part of a Letter from Mr Anthony Van Leeuwenhoek, F. R. S. to John Chamberlayne, Esq; F. R. S. concerning the Vitrified Salts of Calcin'd Hay.*

Delft, March 3. 1705.

I Have receiv'd your Letter, wherein you relate that a great Hay-rick upon *Salisbury Plain*, after some Reaking and Fermentation took fire, and was wholly consum'd; but that whereas the Ashes commonly lye loose and scatter'd abroad, they were Condens'd into a firm, but very light substance, and that there were several Cart-loads of it; whereof you carried a piece to the Royal Society, who judg'd that the same was Vitrified and Calcin'd together by a particular Heat. When I had view'd a piece of the said substance, which you were pleas'd to transmit to me, my Opinion was the same as the Royal Society's, and I hope they will not take it amiss if I add my Thoughts and Observations thereupon: I imagine then that this Vitrified Matter was mostly fixt Salt, which being render'd Fluid by the great Heat, the Vapours or Moisture that rise from the Bottom of the Hay, or from the Particles thereof, which were not as yet Vitrified, had insinuated themselves into the Fluid Matter, and that upon the diminution of the Heat the said Vapours being Congealed and Imprison'd in the Vitrify'd Matter, was the cause of its Lightness; as we find by Experience, that a very small Particle of Moisture, being rarified by Heat, fills a much greater space than it did

did before. For my farther satisfaction, whether it was not mostly fixt Salt, I have made two Experiments, by putting about the bigness of a Pea of this Matter on a piece of Charcoal, upon which I blew the Flame of a thick Candle, till the said Vitrified Substance began to melt, and then I let it drop into a small Copper Vessel, wherein there was about half a Thimble-full of clean Rain Water. This stuff coming into the Water, with a little stirring dissolved like Powder or Brick Dust. Whereupon I thought that a great many Salt Particles would Incorporate themselves with the Water. After the Water had stood some minutes, I skimm'd off some of the top of the Water, and placed it on eight or ten several very clear Glasses, and not above a drop of Water upon each of them; and I saw, when the Water was very near wasted, a great many Salt Particles remaining, of very various figures; among which there were several whose Superficies was an exact Square, a few others were Triangular, and others again were Hexangular and Long, which, in proportion to their exceeding smallness, were very thick; so that they look'd like little pieces of Crystal, as they appeared to us with the naked Eye, which was no unpleasant spectacle. I saw moreover long Particles, but very few, which resembled the small Particles of Salt Petre. I saw also several Particles which were broad in the middle and narrow at both ends; but I did not always see of this last sort, which were so thin, that they appeared like shadows to my Eyes. Besides the abovementioned Salt Particles, there were an unspeakable great number of others, which were so small, that I could not discover their figure; but those that were a little bigger than the rest had some sort of figures: From whence I concluded, that the remainder also were Salt Particles, besides, where we saw one of these * Great Salts lying, [*Understand by the Great Salt Particles that we mean only such a magnitude as amounts to the Thousandth part of

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a course grain of Sand.] we could perceive no others round about them for the space of a hairs breadth; and as we could also discover about the said Salt Particles divers Circles, which we judged to be Coagulated Salts, and which by such an accrescence grew still greater and greater, we were confirmed in our belief, that the small Particles were also mostly Salts. I told you before that I had put the abovementioned vitrify'd Matter into such a glowing heat, that it was ready to melt; since that I took a small Particle of the same and put it into a strong Fire, which being melted, began to change it self into a globular figure, whereupon several Air-Bubbles appeared after one another, forcing themselves a passage, which shut up again after they were broken out; and this I continued so long till that little Matter became perfectly globular. After this I spoke with a Gentleman, who lives a little way out of our City, whom I asked, If ever he had heard of a Hay-rick that had taken fire? Who named me the place, being about an hours distance from the Town, and promised to send the Man to me whose Hay-rick it was, or else his Neighbour, which he did accordingly.

I ask'd the Man what remained on the Ground where this Hay-rick had stood; who answered me, a light glazy Stuff and very brittle, which when we walked over it, crack'd and broke under our Feet, and when we put a bit of it in our Mouths, we could perceive the Saltness in it.

This was a great Hay-rick, which they reckoned contained more than 100 Load, and each Load was reckoned to weigh one thousand weight. This Countryman told me that there is great danger of such Hay-ricks taking Fire, if it be put up before the Hay be dry, and there is no remedy for it, but to spread it abroad again over the Ground. He gave me an instance of one that did not take Fire so as to break out into a flame, but smoked very much, and which being pulled down, when they came

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came to about the middle of it, they found some of the Hay to be burnt, some part clear Ashes, and a Globe of Vitrified Matter; but he added, that the Fire was quenched, as he supposed, for want of Air.

IV. *An Account of Insects in the Barks of decaying Elms and Ashes. In a Letter from Sir Matthew Dudley, Knight, F. R. S.*

Clapton in Northamptonshire, October, 15. 1704

A Bout 5 or 6 years since, I removed divers Elms, more than six inches Diameter, which for the first two or three years all thrived very well; but two or three years ago there happening a very dry time in *July* or *August*, I observed one of those Elms, which stood very shallow, and on pretty high ground, looked very sick; the Leaves turned yellow, and began to fall off; which made me with a Knife examine the Bark. I found the inside thereof not so green, but of a more reddish colour than the others; and between it and the Tree not so moist, and the Bark sticking very close to the Wood: But what was most remarkable, I discerned a great many little black Flies of the Beetle kind (*viz.* having a hard Case, under which their thin long Wings were contracted, and therewith covered) between the Bark and the Tree: And looking more carefully, I observed these Flies had made their way thither by piercing the Bark in innumerable places, easily discernable on the outside and was about the bigness of a large Pin hole, or rather such as a large Pins head would go into; some I found

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