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T R A N S A C T I O N S :

**Some Observations Touching the
Nature of Snow, Presented to the R.
Society by Dr. Nehemiah Grew**

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cination, and consequently, that in Mixt Bodies there is no Fixt Alcalifat salt at all, that is originally such, but that all Volatil Salts are fixed by Calcination, by means of which the Earthy parts in them commixed are concoagulated with them; and that upon this ground the Volatilisation of Fixed Salts may be easily perform'd by only separating from them that Fixing Earth, said to be commixed with them. 2. That in the Volatilisation of Salt of Tartar, perform'd by the Fermentation of Dr. *Langelot*, 'tis not chiefly the Fixed Alkali of Tartar, that is again volatilised, but rather the Crude Tartar added for a ferment. 3. That in *Sal Armoniac* there are only those two Salts, which he calls an Urinous and Acid, and both Volatil; whereas 'tis well known, that there is a Sea-salt in it, which contains many parts, that will for a long while endure a strong fire.

Some Observations touching the Nature of Snow, presented to the R. Society by Dr. Nehemiah Grew.

IF those great Philosophers, *Aristotle* and *Cartesius*, and others, of their Followers, who have written of *Meteors*, and amongst them of *Snow*, have not yet given us a full account hereof; it will not be needless to enquire further of it. He that will do this, will do it best, not by the pursuit of his phancy in a Chair, but with his Eyes abroad; where if we use them well fixed, and with good Caution, and this in a thin, calm and still Snow, we may by degrees observe;

First, with Monsieur *Des Cartes*, and Mr. *Hook*, that many parts hereof are of a regular figure; for the most part, as it were, so many little Rowells or Stars of 6 points; being perfect and transparent Ice, as any we see upon a pool or vessel of water. Upon each of these 6 points, are set other collateral points, & those always at the same angles, as are the main points themselves.

Next, amongst these irregular figures, though many of them are large and fair; yet, from these taking our first *Item*, many others, alike regular, but far less, may likewise be discover'd.

Again, amongst these not only regular, but entire parts of Snow, looking still more warily, we shall perceive, that there are divers others, indeed irregular, yet chiefly but the broken points, parcels and fragments of the regular ones.

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Lastly, that, besides the broken parts, there are some others, which seem to have lost their regularity, not so much in being broken, as by various winds, first gently thaw'd, and then froze into little irregular clumpers again.

From whence the true notion and External nature of Snow seemeth to appear, *viz.* That not only some few parts of Snow, but, Originally, the whole body of it or of a Snowy cloud, is an infinite mass of Icicles regularly figur'd; not one particle thereof, I say, *Originally*, not one of so many millions, being indeterminate or irregular: That is to say, a Cloud of Vapours being gathered into drops, the said drops forthwith descend; upon which descent, meeting with a soft freezing wind, or at least passing through a Colder Region of Air, each drop is immediately froze into an Icicle, shooting it self forth into several points or *stiries* on each hand from-ward its Center: But still continuing their descent, and meeting with some sprinkling and intermixed gales of warmer air, or in their continual motion and wastage to and fro touching upon each other; some are a little thaw'd, blunted, frosted, clumper'd, others broken, but the most hanked and clung in several parcels together, which we call Flakes of snow.

It being known what *snow* is, we understand, why, though it seem to be soft, yet 'tis truly hard; because true Ice, the inseparable property whereof is, to be hard; seeming only to be soft, because upon the first touch of the finger upon any of its sharp edges or points, they instantly thaw; or otherwise they would pierce our fingers as so many Lancets.

Why again, though Snow be true Ice, and so an hard and dense body, yet very light; because of the extream thinness of each Icicle in comparison of its breadth. For so Gold, which though of all bodies the most ponderous, yet being beaten into leaves, rides upon the least breath of Air; and so in all other bodies, where there is but little matter contained within large dimensions, and possibly in no other Case.

Also how it is *white*, not because hard; for there are many soft bodies white; but because consistent of parts all of them singly transparent, but being mixed together, appear white; as the parts of Froth, Glass, Ice, and other Transparent bodies, whether soft or hard. Thus

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Thus much for the *External* nature of Snow ; let us next a little enquire into its *Essential* nature.

Now if we would make a judgment of this, I think we may best do it by considering, what the general *Figure* of Snow is, and comparing the same with such regular figures as we see in divers other bodies, in that where we see the like configurations, we may believe there is the like subject *wherein*, or the like efficient *whereby*, both those and these are made.

As for the Figure of Snow, 'tis generally one. *viz.* that which is above described : Rarely of different ones, which may be reduced chiefly to two generals, Circulars and Hexagonals, either simple or compounded together. More rarely, either to be seen of more than 6 points ; but if so, then not of 8 or 10, but 12. Or in single shoots, as so many short slender Cylinders, like those of Nitre. Or by one of these shoots, as the Axle-tree, and touching upon the Centre of a pair of pointed Icicles, Joined together as the two wheels. Or the same hexagonal figure, and of the same usual breadth ; but continued in thickness or profundity, like the stone, which, as I remember, *Boetius* calls *Astroites*. All these, I say, are rare, the first described being the General figure.

As for the Configurations of other bodies, we shall find, that there are divers which have some a less, others a more near resemblance hereunto. *Nitre* is formed, as is commonly known, into long Cylindrical shoots, as also all *Lixivial Salts* for the most part ; resembling, though not perfectly, the several points of each Starry Icicle of Snow. *Salt of Harts horn*, *Sal Armoniac*, and some other volatil Salts, besides their main and longer shoots, have others, shorter branched out from them ; resembling as those the main, so these the Collateral points of Snow. But the Icicles of *Urine* are still more near : For, in *Salt of Harts-horn*, although the Collateral shoots stand at acute Angles with the main, yet not by pairs at equal height : And in *Sal Armoniac*, although they stand diametrically opposite, or at equal height ; yet withall at right, not acute, angles : Whereas in the Icicles of *Urine* they stand at equal height, and at acute angles both ; in both, like those of snow. And it is observable, that the configuration of *Feathers* is likewise the
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same. The reason whereof is, because Fowls having no organs for evacuation of Urine, the Urinous parts of their blood are evacuated by the habit or skin, where they produce and nourish feathers.

From hence it should seem, That every drop of Rain aforesaid, containing in it self some Spirituous particles (as from the height, to which they are advanced, the prolificque virtue of Rain, and its easie tendency to putrefaction above other water, is argued they do,) and meeting with others in their descent, of a Saline, and that partly nitrous, but chiefly urinous, or of an acido-salinous nature; the said Spirituous parts are apprehended by them, and with those the watery, and so the whole drop is fixed; yet not into any indifferent and irregular shape, depriving the spirituous parts of their motion in an instant; but according to the energy of the Spirituous, as the Pencil, and the specifick nature or determinate possibility of the saline parts as the Ruler, 'tis thus figur'd into a little Star. These things somewhat further consider'd and clear'd, may add a little to that great deal of light, which the *Honourable Mr. Boyle* hath given to the nature of Cold, the Air, and the Bodies therein contained, in his excellent Discourses hereof.

A Confirmation, given by Dr. Wallis, of what was deliver'd in Numb. 90. about the Strange Freezing in Somersetshire.

THE Strange Frost (or Freezing rather) you give an account of to have hapned in *Somersetshire* in *December* last (though I remember not the day) was the like with us at *Oxford*. It was rather a Raining of Ice, or at least Rain Freezing as it fell; which made strange Icicles hanging on Trees, and a strange noise by the ratling of them upon the Bows motion by the wind: But not so much as at the places you mention in *Somersetshire*. Yet more in the Country about us (as from several Relators I have heard,) than with us here. And the great Warmth soon after was also with us; insomuch that not only Blossoms, but (as was then certainly affirm'd, though I was not so curious as to get a sight of any,) green Apples on divers trees; particularly in the parish of *Holywell*.

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