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Edme Mariotte Manuscript: A Treatise of the motion of water and other fluid bodyes

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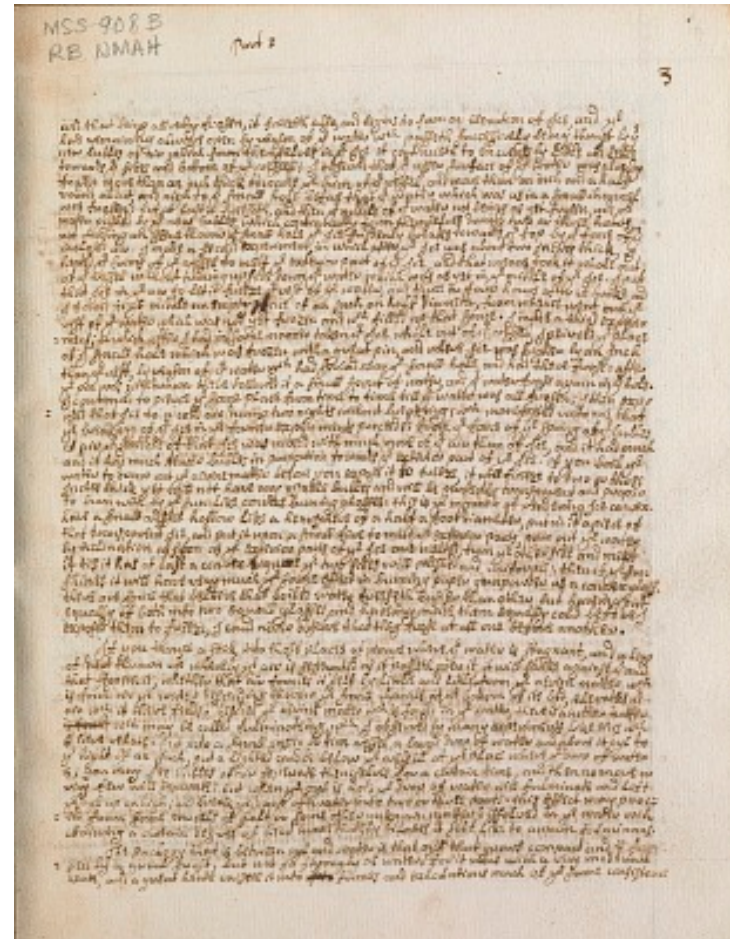
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Part I

and that being already frozen, it freezeth also, and begins to form an elevation of ice, and ye hole remaining always open by reason of ye water wch passeth successively being thrust by ye new bubbles of air which form themselves in ye ice it continueth to increase by little and little towards the sides and bottom of ye vessel; I observed that ye upper surface of ye water was already frozen more than an inch thick towards the brim of ye vessel, and more than an inch and a half round about, and nigh to a small hole before that ye water which was as in a small channel was frozen: but at last it freezeth, and then ye middle of ye water not being as yet frozen, and ye water pushed by ye new bubbles which continually form themselves during two or three hours, not finding an issue thorow ye small hole ye ice suddenly breaks towards the top by ye force of ye inclosed air. I made a second experiment, in which after ye ice was about two inches thick, I heated ye brim of ye vessel to melt ye exterior part of ye ice, and that means took it whole out of ye vessel without turning upside down ye water which was as yet in ye middle of ye ice. I put that ice in ye air to let it freeze ye rest of ye water, and three or four hours after it froze, and I found in ye middle an empty space of an inch an half diameter, from whence went out ye rest of ye water which was not yet frozen and wch filled up that space. I made a third experiment, in which after I had in same manner taken ye ice whole out of ye vessel, I pierced ye place of ye small hole which was frozen with a great pin, and where ice was higher by an inch than ye rest, by reason of ye water wch had spread near ye small hole and had there froze: after ye pin was withdrawn there followed it a small spot of water, and ye water froze again in ye hole. I continued to pierce ye same place from time to time till ye water was all frozen; I then exposed that ice to a cold air during two nights without breaking; wch manifested unto me that ye breaking of ye ice in ye former experiments proceeded from ye force of ye spring of ye bubbles of air ye middle of that ice was mixed with much more of ye air than of ice, and it had much and it had much fewer bubbles in proportion towards ye exterior part of ye ice. if you boil ye water to draw out ye aevine matter before you expose it to freeze, it will freeze to two or three inches thick yet will not have any visable bubbles and will be perfectly transparent and proper to burn with by ye sun like convexe burning glasses: this is ye manner of rendering ice convexe. Have a small vessel hollow like a hemisphere of a half foot diameter, put in it a piece of that transparent ice, and put it upon a small fire to melt ye exterior parts, pour out ye water by inclination as soon as ye exterior parts of ye ice are melted, turn ye other side and melt it till it has at last a convexe figure ye two sides well polished and uniforme: then if ye sun shines it will have very much ye same effect in burning paper gunpowder as a convexe glass there are some that believe that boiled water freezeth easier than other but having put equally of both into two equall glasses, and having made them equally cold before I exposed them to freeze, I could never observe that they froze at all one before another.

If you thrust a stick into those places of rivers where ye water is stagnant, and a heap of dust thrown up whereby ye air is separated as it passeth over it, it will strike against ye mud that stopeth it, whether that air forms it self by little and little from ye aevine matter wch is found in ye water descending thorow ye small chanel at ye bottom of its bed,



elevates ye air wch it there finds. besides ye aevine matter wch is found in ye water, there is another matter ~~is found~~ wch may be called fulminateing wch I observed by many experiments like this wch I here relate. put into a small copper or tinn vessel a large drop of water and above it oyl to ye hight of an inch, put a lighted candle below ye vessel at ye place where ye drop of water is; you may see bubbles of air separate themselves for a certain time, and then no more or very few will separate; but when ye oyl is hot; ye drop of water will fulminate and lift ye oyl up on high; and break ye drop of water into two or three parts. this effect may proceed from some parcels of salt or some other unknown matters dissolved in ye water wch attaining a certain degree of heat immediately dilates it self like to aurum fulminans.

The Analogy that is between oyl and water is that oyl that grows compact and is frozen by a great frost, but not so strongly as water; for it runs with a very moderate heate, and a great heate raiseth it into ~~?~~ fumes and exhalations much of ye same consistence

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