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

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There form also like bubbles in water when it freezeth: and because ye [[heterogenous?]] matter wch I call [[aevine?]] occupies greater place when it is reduced into bubbles of air, it endeavors to extend it selfe, and being not able to pass cross ye ice it breaks it and also ye vessel wch if it is narrower at ye top then towards ye middle.

To explain how it comes to pass that ye matter wch is in ye water possesseth a larger place when it is restored to air: we must suppose that ye air is a mass of infinite small filaments interwoven and mixed one with another like ye small filaments of cotton. Now if you dip into a glass half full of water a mass of prest cotton it will in ye beginning possess a ~~[[striketthrough]]~~ prest cotton ~~[/striketthrough]]~~ place proportion-able to its bulk and will considerably elevate ye water towards ye of ye glass, but if you separate by little and little ye small filaments of ye cotton so that ye water may run between them, then ye upper surface of ye water redescends by little and little to ye same mark where it was when you put into ye cotton.

By this experiment you may know that ye air doth insinuate it self by little and little into ye water and that it possesseth much less place than when it is in small bubbles, and before it is mixed and as it were absorbed by ye water, it is restored into small bubbles by ye motion wch heat or some other cause gives it, and posseseth much more place than before.

That ye air doth insinuate it self into water may be known by ye following experiment. Boyl water ye space of two hours and when it tis cold, fill with it a small glass bottle, stop ye neck with your fingers and immerse it into a glasse full of water with its necks downwards, in such sort that there may be about ye quantity of a hazel nut of ye gross air: ye may observe that in 24 hours that air will disappear. but in like manner another buble of air as gross, it also will enter by little and little into ye water but it will require more time to absorb it entirely: one may make also severall others of ye same thickness to enter one after another: but at last when ye water is sufficiently impregnated, no more will enter, and a small buble of air of two lines diameter will keep its self above ye water in ye bottle without entering, for more than 15 days. this effect is yet more [remerkeable?] in spirit of wine, for if you put into a wind pump a glass half full after you have pumped a good part of ye inclosed air into ye recipient there will come out a great quantity of this aevine matter in gross bubbles; but in a little while there will no more come out, and if you fill a small bottle with that spirit of wine from whence ye aevine matter is separated, and then permit ye gross air to enter and about an inch to stay on ye top of ye bottle after it has been [reversed?] into other spirit of wine, as was above said of boyled water, that air will insinuate it self into ye spirit of wine in less than two hours: and if for two or 3 times you put a like quantity it will also enter; but if you that bottle into ye air pump, that air as it [strikethrough]] [?]] [strikethrough]] dissolved and mixed invisibly with ye spirit of wine, will come out in gross bubbles as soon as you have pumped a little of ye air in ye recipient, wch manifests that it is [pure?] air that comes out of ye water and many other liquors when they freeze, boyl, or when ye spring of ye air which presses them if a little diminished by ye wind pump which I explain more fully in ye treatise of ye of ye air

I knew what happened to water when it freezeth by ye following experiments.

During a great frost I put water wch was already sufficiently cold into a cylindric vessel of seven or eight inches hight and six inches wide, till it was within two inches of ye top, and I attentively considered ye whole



progress of iits freezing. It began presently to congeal in ye upper surface of ye water into a long and pinnacle like blades having between intervals not frozen, which froze also by little and little leaving a small space towards ye middle wch was not as yet frozen, when ye rest of ye surface was frozen two inches thick I observed in ye bottom and aver against ye sides of ye vessel small ~~ice~~ ice bubbles of air would form themselves in ye ice which beginning to form, some would elevate themselves and others remaining engaged in ye water, whence I supposed that ye small bubbles coming to possess much more place in ye water than when their matter was as it were dissolved, might drive a little water up to ye hole which was above after ye same manner, as a cask full of new wine drives out a little at ye bunk hole, when ye wine begins to ferment; and that little water which go's out thorough ye hole spreads it selfe upon what is nex't it  
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