ble of vapour which may be in it, and this vapour will drive the water into B, and then will blow up through it for a long while, keeping it in a ſtate of violent ebul­lition, as long as there remains a drop or film of water in A. But care muſt be taken that B is all the while kept cold, that it may condenſe the vapour as faſt as it riſes through the water. Touching B with the hand, or breathing warm on it, will immediately ſtop the ebul­lition in it. When the water in A has thus been diſſipated, graſp B in the hard ; the water will be driven in­to A, and the ebullition will take place there as it did in B. Putting one of the balls into the mouth will make the ebullition more violent in the other, and the one in the mouth will feel very cold. This is a pretty illuſtration of the rapid abſorption of the heat by the particles of water which are thus converted into elaſtic vapour. We have ſeen this little toy ſuſpended by the middle of the tube like a balance, and thus placed in the inſide of a window, having two holes *a* and *b* cut in the pane, in ſuch a ſituation that when A is full of water and preponderates, B is oppoſite to the hole *b.* Whenever the room became ſufficiently warm, the va­pour was formed in A, and immediately drove the wa­ter into B, which was kept cool by the air coming in­to the room through the hole *b.* By this means B was made to preponderate in its turn, and A was then op­poſite to the hole *a,* and the proceſs was now repeated in the oppoſite direction ; and this amuſement continu­ed as long as the room was warm enough.

We know that liquors differ exceedingly in the tem­peratures neceſſary for their ebullition. This forms the great chemical diſtinction between volatile and fixed bo­dies. But the difference of temperature in which they boil, or are converted into permanently elaſtic vapour, under the preſſure of the atmoſphere, is not a certain meaſure of their differences of volatility. The natural boiling point of a body is that in which it will be con­verted into elaſtic vapour under no pressure, or *in vacuo.* The boiling point in the open air depends on the law of the elaſticity oſ the vapour in relation to its heat. A fluid A may be leſs volatile, that is, may require more heat to make it boil *in vacuo,* than a fluid B : But it the elaſticity of the vapour of A be more increaſed by an increaſe of temperature than that of the vapour of B, A may boil at as low, or even at a lower tempera­ture, in the open air, than B does ; for the increaſed elaſticity of the vapour of A may ſooner overcome the preſſure of the atmoſphere. Few experiments have been made on the relation between the temperature and the elaſticity of different vapours. So long ago as the year 1765, we had occaſion to examine the boiling points of all ſuch liquors as we could manage in an air-pump ; that is, ſuch as did not produce vapours which deſtroyed the valves and the leathers of the piſtons : and we thought that the experiments gave us reaſon to conclude, that the elaſticity of all the vapours was affected by heat nearly in the ſame degree. For we found that the dif­ference between their boiling points in the air and *in vacuo* was nearly the ſame in all, namely, about 120 de­grees lof Fahrenheit’s thermometer. It is exceedingly difficult to make experiments ot this kind : The vapours are ſo condenſible, and change their elaſticity ſo prodigiouſly by a trifling change of temperature, that it is almoſt impoſſible to examine this point with preciſion. It is, however, as we ſhall ſee by and by, a ſubject of conſiderable practical importance in the mechanic arts ; and an accurate knowledge of the relation would be of great uſe alſo to the diſtiller : and it would be no leſs important to diſcover the relation of their elaſtici­ty and denſity, by examining their compreſſibility, in the ſame manner as we have aſcertained the relation in the case of what we call *aerial fluids,* that is, ſuch as we have never obſerved in the form of liquids or ſolids, ex­cept in conſequence of their union with each other or with other bodies. In the article Pneumatics we took notice of it as ſomething like a natural law, that all theſe airs, or gaſes as they are now called, had their elaſtſeity very nearly, if not exactly proportional to their denſity. This appears from the experiments or Achard, of Fontana, and others, on vital air, inflammable air, fixed air, and ſome others. It gives us ſome preſumption to ſuppoſe that it holds in all elaſtic vapours what­ever, and that it is connected with their elaſticity ; and it renders it ſomewhat probable that they are all elaſtic, only becauſe the cauſe of heat (the matter of fire if you will) is elaſtic, and that their law of elaſticity, in reſpect of denſity, is the ſame with that of fire. But it muſt be obſerved, that although we thus aſſign the elaſticity of fire as the immediate cauſe of the elaſticity of vapour, in the ſame way, and on the ſame grounds, that we aſcribe the fluidity of brine to the fluidity of the water which holds the ſolid salt in ſolution, it does not follow that this is owing, as is commonly ſuppoſed, to a repulſion or tendency to recede from each other exerted by the particles of fire. We are as much entitled to infer a repulſion of unlimited extent between the particles of water ; for we ſee that by its means a ſingle particle of ſea-ſalt becomes diſſeminated through the whole of a very large vessel. If water had not been a viſible and palpable ſubſtance, and the ſalt only had been viſible and palpable, we might have formed a ſimilar notion of chemical ſolution. But we, on the contrary, have conſidered the *quaquaverſum* motion or expanſion of the ſalt as a diſſemination among the particles of water; and we have aſcribed it to the ſtrong attraction of the atoms of ſalt for the atoms of water, and the attraction of theſe laſt for each other, thinking that each atom of ſalt accumulates round itſelf a multitude of watery atoms, and by ſo doing muſt recede from the other ſaline atoms. Nay, we farther ſee, that by forces which we naturally conſider as attractions, an expanſion may be prodiiced of the whole maſs, which will act againſt ex­ternal mechanical forces. It is thus that wood ſwells with almoſt insuperable force by imbibing moiſture ; it is thus that a ſponge immerſed in water becomes really an elaſtic compreſſible body, reſembling a blown bladder; and there are appearances which warrant us to apply this mode of conception to elaſtic fluids.— When air is ſuddenly compreſſed, a thermometer in­cluded in it ſhows a rise of temperature ; that is, an appearance of heat now redundant which was former­ly combined. The heat ſeems to be ſqueezed out as the water from the sponge.

Accordingly this opinion, that the elaſticity of ſteam and other vapours is owing merely to the attraction for fire, and the consequent diſſemination of their particles through the whole maſs of fire, has been entertained by many naturaliſts, and it has been aſcribed entirely to attraction. We by no means pretend to decide ; but we think the analogy by far too flight to found any