

which may be easily proved by filling three equal thermometer tubes to the same height with three different substances, mercury, water, and alcohol for instance, and plunging them into water heated to about 150° ; the degree of dilatation will not be the same in either two.

To determine the dilatation of a liquid is a very simple experiment, though the method to which we refer is subject to several minute errors. If a thermometer tube, that is, a tube having a bulb at one end, be partly filled with a liquid, it may be submitted to any degree of heat, and the difference of level between the commencement and close of the experiment will give the dilatation. But, in making this experiment, it is necessary that the air contained in the liquid and the tube should be first expelled, or its expansion will give a false result; and not only so, but as liquids become vapours at all temperatures when exposed to the atmosphere, and more abundantly as the temperature is raised, the quantity of the liquid will be diminished, and an erroneous opinion might be deduced. To prevent these two sources of error, the tube should be about half filled with water, and boiled for some time to expel the air; and when this has been done, the open end of the tube should be hermetically sealed.

Liquids, generally, have a uniform expansion or contraction, except when the temperatures approach those degrees at which they boil and freeze, and then their degree of dilatation is changed. Water is a most remarkable exception to this law. As its temperature is lowered, it continues to contract until it reaches about 39° of Fahrenheit's thermometer, and then the contraction ceases; but when its temperature is lowered to nearly the freezing point, it begins to expand, and continues to do so until it is frozen. This fact is one of considerable importance, for the expansion of water when in the act of freezing must in many cases be an active cause in the destruction of rocks, and will explain many results which are witnessed in regions subject to extreme cold. A lake, when frozen over, must, by its expansion, tend to destroy its banks, and form a considerable mass of detritus, and in this way extend by degrees the surface of its waters. But it is in elevated countries, which are for a large portion of the year covered by immense bodies of ice, that the effects are most frequently observed. Fissures are filled with water, which when congealed, expands so violently as to rend rocks asun