

ture as the beginning, while both the other makers used the freezing point as their zero.

In the transformation of water into steam a very much greater amount of heat is consumed (about $6\frac{1}{2}$ times as much) than by melting ice. This is illustrated to some extent by the comparatively long time required to vaporize water after it has reached the boiling point. Since the steam generated has the same temperature as the water from which it has been formed, the length of time required to vaporize the latter compared with that necessary to bring it to the ebullition point indicates to some extent the heat rendered latent. If this latent heat in steam did not exist we should be unable to use boiling water, as at present, for the preparation of our food; for as soon as it had reached this point it would immediately vaporize to be almost instantly deposited again as water on the somewhat cooler materials with which it would come in contact.

Although the boiling point like the freezing point serves as a standard in the manufacture of thermometers, it is not constant under all circumstances. On the top of mountains it is much lower than at the sea level; in fact so material is this variation that comparatively small differences in altitude can be determined by it. Thus it may be made to partially serve the purpose of a barometer; for, like the height of the mercuric column in that instrument, its height is dependent upon the weight of the atmosphere. That by an increased pressure this point is also increased is often seen in the boilers of steam engines; and that low pressures have the opposite effect is strikingly illustrated by numerous simple experiments. If, for example, a flask containing some water be heated till it is entirely filled by steam and the residual water, and then tightly corked, the water in it can be made to boil by cooling the flask. The steam being condensed the pressure would be reduced and the vapour developed finding less resistance could pass through the water to the surface and cause what is known as boiling. Water contained in a tube enclosing a partial vacuum can reach this stage when heated by the hand.

The temperature at which water, or rather watery solutions, disengage steam, is, in addition to pressure, considerably influenced by the nature and quantity of the materials dissolved. Many gasses reduce