The operation of latent heat in changing the forms of bodies produces some very paradoxical results. Thus, in freezing, water gives out 140° of heat, which becomes sensible; and the great amount of congelation in cold climates is doubtless one of the principal causes that render them habitable and comfortable; for the harder the frost, the greater the amount of heat given out. On the other hand, when water evaporates, it takes up into a latent state nearly 1000° of heat; and this probably it is, chiefly, that renders the torrid zone tolerable, since the heat of a vertical sun must produce a vast amount of evaporation. Once more, by a singular exception to a general law, that cold contracts all bodies, it is well known that water, in freezing, expands, so that the ice swims in it; and being an almost perfect non-conductor of heat, it prevents the water beneath from giving off its heat, and so it will not freeze.* Were it not for this singular anomaly, — this interference of one law with another, — all the streams and lakes in such a climate as ours would be frozen to their bottoms, and the summer would hardly suffice to thaw them out.

Not less wonderful are the effects of affinity, or the power by which the elements are combined, so as to form compound substances. In these combinations it has been found that the elements unite only in definite quantities, and each substance has its peculiar combining proportion, — a law which forms a mathematical basis for chemistry, — and exhibits strikingly the wisdom of the Deity, showing us that perfect system prevails in the minute, as well as in the most extensive operations of nature. But it is impossible for me to do any justice at this time to a subject so difficult as that of definite proportions. He only can fully appreciate its beauty who has long

* This is rather a new law coming in than an exception to a law; for it is not confined to water, and seems to be the result of a new arrangement of the particles in the act of crystallization.