

thermometer in moderate temperatures; though at very elevated ones they exhibit a sensible, and even considerable deviation. By this instrument, which owes its present convenience and utility to the happy idea of Newton, who first thought of fixing determinate points on its scale, we are enabled to estimate, or at least identify, the degrees of heat; and thereby to investigate with accuracy the laws of its communication and its other properties. Were we sure that equal additions of heat produced equal increments of dimension in any substance, the indications of a thermometer would afford a true and secure *measure* of the quantity present; but this is so far from being the case, that we are nearly in total ignorance on this important point; a circumstance which throws the greatest difficulty in the way of all theoretical reasoning, and even of experimental inquiry. The laws of the dilatation of liquids, in consequence of this deficiency of necessary preliminary knowledge, are still involved in great obscurity, notwithstanding the pains which have been bestowed on them by the elaborate experiments and calculations of Gilpin, Blagden, Deluc, Dalton, Gay-Lussac, and Biot.

(357.) The most striking and important of the effects of heat consist, however, in the liquefaction of solid substances, and the conversion of the liquids, so produced, into vapor. There is no solid substance known which, by a sufficiently intense heat, may not be melted, and finally dissipated in vapor; and this analogy is so extensive and cogent, that we cannot but suppose that all those bodies which are liquid under ordinary circumstances, owe their liquidity to heat, and would freeze or become solid if their heat could be sufficiently reduced. In many we see this to be the case in ordinary winters; for some, severe frosts are requisite; others freeze only with the most intense artificial colds; and some have hitherto resisted all our endeavors; yet the number of these last is few, and they will probably cease to be exceptions as our means of producing cold become enlarged.