

- 3d, Its effects on our senses, and on the bodies to which it is communicated in its various degrees of intensity, by which, means are afforded us of measuring these degrees.
- 4th, Its intimate relations to the atoms of matter, as exhibited in its capability of acquiring a latent state under certain circumstances, and of entering into something like chemical combination.

(347.) The most obvious sources of heat are, the sun, fire, animal life, fermentations, violent chemical actions of all kinds, friction, percussion, lightning, or the electric discharge, in whatever manner produced, the sudden condensation of air, and others, so numerous, and so varied, as to show the extensive and important part it has to perform in the economy of nature. The discoveries of chemists, however, have referred most of these to the general head of chemical combination. Thus fire, or the combustion of inflammable bodies, is nothing more than a violent chemical action attending the combination of their ingredients with the oxygen of the air. Animal heat is, in like manner, referable to a process bearing no remote analogy to a slow combustion, by which a portion of *carbon*, an inflammable principle existing in the blood, is united with the oxygen of the air in respiration and thus carried off from the system; fermentation is nothing more than a decomposition of chemical elements loosely united, and their re-union in a more permanent state of combination. The analogy between the sun and terrestrial fire is so natural as to have been chosen by Newton to exemplify the irresistible force of an inference derived from that principle. But the nature of the sun, and the mode in which its wonderful supply of light and heat is maintained, are involved in a mystery which every discovery that has been made either in chemistry or optics, so far from elucidating, seems only to render more profound. Friction as a source of heat is well known: we rub our hands to warm them, and we grease the axles of carriage-wheels to prevent their