

setting fire to the wood ; an accident which, in spite of this precaution, does sometimes happen. But the effect of friction, as a means of producing heat with little or no consumption of materials, was not fully understood till made the subject of direct experiment by count Rumford, whose results appear to have established the extraordinary fact, that an unlimited supply of heat may be derived by friction from the same materials. Condensation, whether of air by pressure, or of metals by percussion, is another powerful source of heat. Thus, iron may be so dexterously hammered as to become red-hot, and the rapid condensation of a confined portion of air will set tinder on fire.

(348.) The most violent heats known are produced by the concentration of the solar rays by burning-glasses,—by the combustion of oxygen and hydrogen gases mixed in the exact proportion in which they combine to produce water,—and by the discharge of a continued and copious current of electricity through a small conductor. As these three sources of heat are independent of each other, and each capable of being brought into action in a very confined space, there seems no reason why they might not all three be applied at once at the same point, by which means, probably, effects would be produced infinitely surpassing any hitherto witnessed.

(349.) Heat is communicated either by *radiation* between bodies at a distance, or by *conduction* between bodies in contact, or between the contiguous parts of one and the same body. The laws of the radiation of heat have been studied with great attention, and have been found to present strong analogies with that of light in some points, and singular differences in others. Thus, the heat which accompanies the sun's rays comports itself, in all respects, like light ; being subject to similar laws of reflection, refraction, and even of polarization, as has been shown by Berard. Yet they are not identical with each other ; Sir William Herschel having shown, by decisive experiments, verified by those of