former envelope, and the chaotic mass from which, under the influence of heat from below and of air and water from above, the world of geologic and of human history was to be evolved.

As we descend in the sedimentary crust of the earth, we observe a regular increase of temperature, due, as is supposed, to the slow upward passage of the central heat. In the present state of refrigeration this process is so slow that the increase of temperature in descending is only about one degree Centigrade for each hundred feet; but if we admit the hypothesis of a cooling globe, it can be shown that in early geologic ages this increase must have been tenfold, or even twenty-fold greater than at present. As this augmentation of temperature in depth obeys the same law alike in the newest and the oldest formations, it follows that the accumulation of sediment at any time and place will result in a slow rise in temperature of the portion covered thereby, so that a deposit of a few miles in thickness in comparatively recent ages, and probably one of as many thousands of feet in the Laurentian or even the paleozoic period, would, after a lapse of time, so elevate the temperature of the buried portions as to produce new chemical and mechanical arrangements of the sediments. The expansive action of heat upon these porous materials, which generally include several hundredths of water, would soon be counteracted by the great contraction following chemical combination, resulting in the formation of new and denser compounds, which constitute the crystalline and metamorphic rocks. The action of silicious matters in the presence of water, aided by heat, upon the various carbonates, chlorides, sulphates, and organic matters which abound in most sedimentary formations, would generate the acid gases which are so often evolved in volcanic eruptions. It must be borne in mind that water under pressure, and at high temperatures, develops extraordinary solvent powers; while from what has already been said of the influence of pressure in favoring solution, it will be seen that the weight of the overlying mass becomes an efficient cause of the liquefaction of the lower portions of the sedimentary material. Time is wanting to discuss the great forces which from early geologic periods have been active in transferring sediments, alternately wasting and building up continents. By the depression of the yielding crust beneath regions of great accumulation there follows a softening of the lower and of the more fusible strata, while the great mass of more silicious rocks becomes cemented into com-