

— a supposition confirmed by some astronomical considerations, and sanctioned by Fourier and Swanberg.

Preserving between their joint effects a variable equilibrium of temperature at the surface of the earth, the caloric power of the sun and the refrigerating influence of the planetary spaces affect every point on the terraqueous globe; and, as far as geographical position with respect to the poles and equator is concerned, the result may be nearly calculated. The mean temperature of any zone of land and sea is, in fact, nearly proportional to the cosine of its latitude.\*

But the globe is enveloped in an atmosphere, which produces further modifications of climate, according to the elevation of places above the level of the sea. The sun's rays traverse this atmosphere without heating it; the warmth which it possesses is derived from the earth by conduction, and dissipated by radiation. Owing to the diminution of density in the upper regions of the atmosphere, the air heated near the earth's surface expands into larger and still larger spaces as it rises, and thus the upper parts of the atmosphere have a temperature always growing lower and lower as the density grows less and less. The variations of heat in the atmosphere are greatest at and near the earth's surface; they may become insensible in the upper aërial regions, above the clouds. The cold, thus permanently fixed in the high atmospheric spaces, necessarily reacts upon the land which is raised above the general level of the sea. The temperature of the surface of such land is the resultant of the general influence of the sun, planetary spaces, atmospheric modifications, and conducting power of the ground. In general, the effect of elevation above the sea level in diminishing the heat of the surface of the ground, is nearly in proportion to the

\* The mean annual temperature of the equator being taken at  $81.5^{\circ}$ , that of any other lat. =  $81.5^{\circ} \times \text{nat. cosine lat.}$  This is in error toward the north pole, owing to the distribution of land and water, which makes two poles of maximum cold in Asia and America, nearly coincident with the magnetic poles. See a paper by sir D. Brewster (Transactions of the Royal Society of Edinburgh).