

“With the eccentricity at its superior limit and the winter occurring in the aphelion, the earth would, as we have seen, be 8,736,420 miles further from the sun during that season than at present. The reduction in the amount of heat received from the sun, owing to his increased distance, would lower the midwinter temperature to an enormous extent. In temperate regions the greater portion of the moisture of the air is at present precipitated in the form of rain, and the very small portion which falls as snow disappears in the course of a few weeks at most. But in the circumstances under consideration, the mean winter-temperature would be lowered so much below the freezing-point that what now falls as rain during that season, would then fall as snow. This is not all; the winters would then not only be cooler than now, but they would also be much longer. At present the winters are nearly eight days shorter than the summers; but with the eccentricity at its superior limit and the winter solstice in aphelion, the length of the winters would exceed that of the summers by no fewer than thirty-six days. The lowering of the temperature and the lengthening of the winter would both tend to the same effect, viz. to increase the amount of snow accumulated during the winter; for, other things being equal, the longer the snow-accumulating period, the greater the accumulation. It may be remarked, however, that the absolute quantity of heat received during winter is not affected by the decrease in the sun’s heat, for the additional length of the season compensated for this decrease.” As regards the absolute amount of heat received, increase of the sun’s distance and lengthening of the winter are compensatory, but not so in regard to the amount of snow accumulated. The consequence of this state of things would be that, at the commencement of the short summer, the ground would be covered with the winter’s accumulation of snow. Again, the presence of so much snow would lower the summer temperature, and prevent to a great extent the melting of the snow.

“There are three separate ways whereby accumulated masses of snow and ice tend to lower the summer temperature, viz.:

“*First*, By means of direct radiation. No matter what the intensity of the sun’s rays may be, the temperature of

⁴² When the eccentricity is at its superior limit, the absolute quantity of heat received by the earth during the year is, however, about one three-hundredth part greater than at present. But this does not affect the question at issue.