varying from 4,000, to 14,000 feet in height, this alone affords ground for concluding that, in the present state of things, the mean heat of the climate is below that which the earth's surface, in its more ordinary state, would enjoy. This presumption is heightened when we reflect on the results of the recent soundings made by Sir James Ross, in the Southern Ocean, and continued for four successive years, ending 1844, which seem to prove that the mean depth of the Atlantic and Pacific is as great as Laplace and other eminent astronomers had imagined[*] ; for then we might look not only for more than two-thirds sea in the frigid zones, but for water of great depth, which could not readily be reduced to the freezing point. The same opinion is confirmed, when we compare the quantity of land lying between the poles and the 30th parallels of north and south latitude, with the quantity placed between those parallels and the equator ; for, it is clear, that we have at present not only more than the usual degree of cold in the polar regions, but also less than the average quantity of heat within the tropics.

Position of land and sea which might produce the extreme of cold of which the earth's surface is susceptible.—To simplify our view of the various changes in climate, which different combinations of geographical circumstances may produce, we shall first consider the conditions necessary for bringing about the extreme of cold, or what would have been termed in the language of the old writers the winter of the "great year," or geological cycle, and afterwards, the conditions requisite to produce the maximum of heat, or the summer of the same year.

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[*] It appears from the observations of Sir James Ross, communicated to me by himself and his fellow-voyager, Dr. Joseph Hooker, that in latitude 15° 3′ S., longitude 23° 14′ W. (the island of Trinidad, the nearest land, being 486 miles distant, and bearing S. 47 W.), they sounded with 4600 fathoms of line, which ran out to the very end, without finding bottom. Here therefore in mid-ocean the depth exceeded 27,600 feet! One of the shallowest soundings ever obtained in the open sea during the same survey, struck bottom with 2677 fathoms, or 16,062 feet, latitude 33° 21′ S., longitude 9° 4′ E. The surveyors arrived at the conclusion, that at a moderate distance from the shore, the depth of the great ocean always exceeds 4000 feet. For calculations founded on astronomical data, see Young's Nat. Phil., Lect. xlvii.; Mrs. Somerville's Connex. of Phys. Sci., sect. 14. p. 110. Laplace, endeavouring to estimate the probable depth of the sea from some of the phenomena of the tides, says of the ocean generally, " que sa profondeur moyenne est du même ordre que la hauteur moyenne des continens et des îles au-dessus de son niveau, hauteur qui ne surpasse pas mille mètres (3280 ft.)." Mec. Céleste, tom. xi. et Syst. du Monde, p. 254. The expression " du même ordre" admits in mathematical language of considerable latitude of signification, and does not mean that the depth of the water below the level of the sea corresponds exactly to the height of the land above it. I endeavoured, in vain, in March 1835, after consulting several eminent mathematicians, among others Professor Airy, Mr. Lubbock, and Mr. Whewell, to arrive at some conclusion as to the absolute depth of the ocean. My informants all agree in declaring that the hypothetical data on which the calculations of Laplace necessarily proceeded cannot give even an approximation to a solution of the problem. Neither does Mr. Whewell believe in the alleged approach to uniformity in the depth of the ocean, which some have wished to deduce from the supposed smallness of the difference of the two tides occurring on the same day.