

*THE REIGN OF UNIVERSAL WINTER.*

I have stated that the energies of the earth's internal fires are waning. There is a chain of effects which, when we trace them backward, conduct us to an ancient molten condition of the world. At a period comparatively recent, it was still so warm that tropical vegetation flourished within the Arctic circle. At a remoter period, neither animal nor plant could endure the temperature which prevailed, nor the warfare which fire and water were waging with each other. We retain the solid monuments of a terrestrial condition which carries us still deeper into the heart of eternity; when the whole orb was a glowing ocean of incandescent lava, while yet the waters of the earth hung in invisible vapour upon the outskirts of the atmosphere, like a concealed foe meditating a secret attack upon a powerful enemy.

Few who have studied the physics of the globe, and fewer still who have deciphered geological records, doubt that such were once the temperature and conditions of our planet. From that state to this, it has passed by the simple process of cooling. We trace the footsteps of this progress at every stage. Through the ages heat has been gradually wasted in space—the solid crust has been thickening—the surface conditions have been changing.

There are three hundred active volcanoes in existence, from the craters of which enormous quantities of heat are permitted to waste. The ocean, too, carries off vastly larger quantities than the land. The floor of the ocean is generally overlaid by a stratum of ice-cold water setting southward from the polar regions. This cold stream is overlaid by a warmer one moving northward from the tropics. Water being a better conductor of heat than atmospheric air, this cold stratum must necessarily abstract terrestrial heat with vastly greater rapidity than the average atmosphere of the temperate zone. Many observations indicate the temperature of the solid crust beneath the waters of the ocean is much higher than that of continental surfaces, and hence imparts its warmth in larger quantities. Throughout all that part of the Frozen Ocean north of Europe and Asia, the temperature is found to increase at considerable depths, contrary to the well-known laws of hydrostatics. The same phenomenon has been observed on the coast of Australia, in the Adriatic, and Lake Maggiore. Horner asserts that in the deep soundings of the Gulf Stream, off the coast of the United States, the lead when drawn up "used to be hotter than boiling water."