

steadily contracted on cooling, so that its point of maximum density fell at the freezing point, it is impossible to say how great would be the disadvantage for living organisms. Certain it is that life upon the earth would be thereby very greatly restricted. For this property, together with the by no means unique phenomenon of expansion upon solidification,<sup>1</sup> is very largely responsible for the permanence in liquid state of many bodies of water in cold climates. In salt water the anomalous contraction disappears, and the lack of paleocrystic ice is due to the density of ice and to the great mass of the ocean and the movement of its waters.<sup>2</sup>

There is an old experiment of Rumford's which well illustrates what conditions must have been had the contraction of water been normal and ice denser than water.<sup>3</sup> He found that in a vessel filled with water, which contains ice confined at the bottom, it is possible to heat and even boil the superficial portion of the water without melting the ice. And so it would be with lakes, streams, and oceans were it not for the anomaly and the

<sup>1</sup> The density of ice at the melting point is 0.91674.

<sup>2</sup> A full discussion of this subject will be found in S. Günther's "Handbuch der Geophysik."

<sup>3</sup> See Whewell's *Bridgewater Treatise*.