calculations of the mathematicians would indicate. It seems inevitable, therefore, that the earth should have expended sufficient heat in 2500 years to effect a sensible reduction in the length of the day.

Thanks to the mathematicians, they have again come to our aid. The tide-wave is a protuberance of the ocean-waters raised by the moon, and following the moon around the earth from east to west. This motion is *contrary* to the earth's diurnal rotation, and the friction of the tidal waters against the shore and the standing waters must necessarily tend to retard the rotary motion of the earth. Now it has been calculated that this retardation must have amounted to one sixteenth of a second in 2500 years. If, therefore, no counteracting tendency has been experienced, the sidereal day is one sixteenth of a second longer than it was in the time of Hipparchus. But Laplace has shown that the sidereal day has not varied in length. It follows, therefore, that the shrinkage of the earth from loss of heat has tended to accelerate its rotation to the extent of one sixteenth of a second in twenty-five centuries. Such an acceleration corresponds to a shortening of the diameter about sixty feet, and a reduction of the temperature of the whole mass of the earth one fourteenth of a degree.

When the earth was in its youth, just emerging from a molten state, the loss of heat and consequent contraction must necessarily have been rapid. During this period the sidereal day underwent a much more rapid shortening than at present. In the distant future, on the contrary, the loss of heat will become diminished to an extreme extent, and, as a consequence, the retardation caused by the tide-wave will gain the ascendency, and the day will eventually be lengthened to such an extent that the earth will always turn the same side toward the sun, as the moon always turns the same side toward the earth. The historic period