in regard to the distance of the sun from the earth, or the velocity of light, and yet the nearest of the fixed stars is so remote that its light has consumed ten years in passing to our earth; and there are visible stars so distant that their light has occupied the lifetime of our race in darting over the measureless void. In each second of that interval it has traveled a distance measured by seven times the circumference of the earth. Nay, I may gaze through the telescope on any star-lit night, and gather into my eye rays which set out from a distant nebula ages before even the race was called into being whose slowly-developing science has enabled me to make these calculations and gather up this feeble light.

These are values which the positive science of astronomy affords us. Nor are the wonders of physics less overwhelming. The amount of heat sent off from the sun in one minute is, according to Mayer, 12,650 millions of "cubic miles of heat." Now what is a cubic mile of heat? In the conventional language of the physicists, it is the quantity of heat necessary to raise the temperature of a cubic mile of water one degree Centigrade. Have we any conception of the amount of heat required to do this work? In order to subdivide the quantity till we reach a limit which our intellects can grasp, let me state that one cubic mile of heat contains 408 billions of units of heat; and a unit of heat is the quantity of heat required to raise one kilogramme—or about one quart—of water one Centigrade degree, which is one and four fifths degree of our scale. In other words, then, the sun emits more than five septillions, or five thousand millions of millions of units of heat every minute. In a year the amount is 522,000 times as great; and in the brief duration of our race it has been more than three thousand million times seven septillions of units of heat. These, let the reader remember, are the data of exact science. They