to say with certainty whether the smallest stars we can photograph are at the boundary of the system. Before we decide this point we must have some idea of the form and distance of the cloud-like masses of stars which form our great celestial girdle. A most curious fact is that our solar system seems to be in the centre of this galactic universe, because the Milky Way divides the heavens into two equal parts, and seems equally broad at all points. Were we looking at such a girdle as this from one side or the other, this appearance would not be presented. But let us not be too bold. Perhaps we are the victims of some fallacy, as Ptolemy was when he proved, by what looked like sound reasoning, based on undeniable facts, that this earth of ours stood at rest in the centre of the heavens!

A related problem, and one which may be of supreme importance to the future of our race, is, What is the source of the heat radiated by the sun and stars? We know that life on the earth is dependent on the heat which the sun sends it. If we were deprived of this heat, we should in a few days be enveloped in a frost which would destroy nearly all vegetation, and in a few weeks neither man nor animal would be alive, unless crouching over fires soon to expire for want of fuel. We also know that, at a time which is geologically recent, the whole of New England was covered with a sheet of ice, hundreds or even thousands of feet thick, above which no mountain but Washington raised its head. It is quite possible that a small diminution in the supply of heat sent us by the sun would gradually reproduce the great glacier, and once more make the Eastern States like the pole.

To the question of our world-supply of heat science has an answer, but not a very confident one. The sun is supposed to be growing smaller, and its contraction constantly generates the heat which it so lavishly radiates to earth and planets. What is true of the sun we may suppose to be true of the stars and nebulæ. All are supposed to be contracting into a smaller volume in consequence of the mutual gravitation of their parts, and this contraction generates the heat which they give off and the light by which we see them. This theory has the great merit that it may be made the subject of exact mathematical calculation. Knowing the size of a body, no matter whether star or nebulæ, and the quantity of matter which it contains, we can calculate exactly how much it must contract in order to generate a given amount of heat. We know this in the case of the sun, and find that the contraction necessary to produce all the heat it gives off is very slow indeed; it would have to go on for thousands of years before astronomers could find, by comparing its size at various times, that it had grown any smaller. Contracting at this slow rate, it will be millions of years before it gets as dense as the earth. Still, it does not follow that the amount of heat given off will remain exactly the same during all this period. What we can say with confidence is that observations of temperature in various countries for the last two or three hundred years do not show any change in climate which can be attributed to a variation in the amount of heat received from the sun.

The acceptance of this theory of the heat of those heavenly bodies which shine by their own light—sun, stars, and nebulæ—still leaves open a problem that looks insoluble with our present knowledge. What becomes of the great flood of heat and light which the sun and stars radiate into empty space with a velocity of 180,000 miles a second? Only a very small fraction of it can be received by the planets or by other stars, because these are mere points compared with