

material frame with which, in our experience, it is always associated. Their theory is that the invisible universe is united by bonds of energy to the visible one, and that the energy which goes out from the visible body during the present life, is preparing an invisible body to be the home and vehicle of consciousness when the present house of our tabernacle is dissolved. In the early part of the book the authors lay down two general conditions of organized life, as follows: "There must, in the first place, be an organ connecting the individual with the past (in other words, a material reservoir of past impressions); and, in the next place, there must be such a frame and such a universe that he has the power of varied action in the present." These conditions they propose to meet by a new use of the principle of the conservation of energy.

There is no more curious problem to natural philosophers than the question—what becomes of all the energy that is continually being lost, to all appearance, from the visible universe? So long as energy remains within the bounds of the visible or material, it seems to be incapable of destruction or diminution. Not only will a pebble thrown into a lake affect every particle of the water which it contains, but it has been ingeniously shown that "if we had power to follow and detect the minutest effects of any disturbance, each particle of existing matter must be a register of all that has happened. The track of every canoe, of every vessel that has yet disturbed the surface of the ocean, whether impelled by manual force or elemental power, remains for ever registered in the future movement of all succeeding particles which may occupy its place. What, then, becomes of all the energy that is constantly going out from the solar system, not only directly from the sun, but in the course of all ordinary action of all natural forces?" For, as our authors say, "if the only real things in the physical universe are matter and energy, and of these matter is simply passive, it is obvious that all the physical changes which take place, including those which are inseparably associated with the thoughts as well as the actions of living beings, are merely transformations of energy." And "if there be any one form of energy less readily or completely transformable than the others, and if transformations constantly go on, more

and more of the energy of the universe will inevitably sink into this lower grade as time advances. Hence the whole possibility of transformation must steadily grow less and less; in scientific language, though the *quantity* of energy remains for ever unchanged, its *availability* steadily decreases." This decrease of transformability, or of *active power* of energy, is constantly being effected through the agency of radiant heat. For "at each transformation of heat-energy into work, a large portion is degraded, while only a small portion is transformed into work. So that while it is very easy to change all of our mechanical or useful energy into heat, it is only possible to transform a portion of this heat-energy back again into work. After each change, too, the heat becomes more and more dissipated or degraded, and less and less available for any future transformation. In other words, the tendency of heat is towards equalization; heat is *par excellence* the communist of our universe, and it will, no doubt, ultimately bring the system to an end. So far as we yet know, the final state of the present universe must be an aggregation (into one mass) of all the matter it contains, *i. e.*, the potential energy gone, and a practically useless state of kinetic energy, *i. e.* uniform temperature throughout that mass." Considering, then, that not only every fire we light, but every expenditure of energy, nay, every breath we draw, is helping to bring about this dismal cessation of life, work, and activity from the material universe, we might well feel like the prisoner shut up in an airtight cell, who knows that every respiration is helping to exhaust his little stock of possible life, or like him who saw the chamber in which he was imprisoned contracting day by day—were it not that the sum of all the energy we can expend in our short span of life is practically as nothing in proportion to the inconceivable quantity contained in the universe.

And, moreover, the energy which is available for work in our system is as nothing compared with the quantity which our sun is sending out, moment by moment, into what we think of as "empty space." When we consider the proportion of the earth's diameter to the extent of its orbit—8,000 miles to nearly 600,000,000—and the fact that the heat radiated from the sun extends not only to every point of that circular or-