

ever. I may remark that, even apart from the evidence which the most eminent biologists have brought to bear on this question, it seems to me illogical to accept evolution as sufficient to explain the history of our earth during the millions of years prior to the existence of life, and to deny its sufficiency to explain the development of life (if one may so speak), upon the earth. It seems even more illogical to admit its operation up to any given stage in the development of life, and there to draw a hard and fast line beyond which its action cannot be supposed to have extended.* Nor can I understand why it should be considered a comforting thought, that at this or that epoch in the history of the complex machine of life, some imperfection in the machinery compelled the intervention of God,—thus presented to our contemplation as Almighty, but very far from being All-wise.

There is, however, one aspect in which the existence of life has to be considered as intimately associated with the future history of our earth. We perceive that the abundance of primeval vegetation during long ages, aided by other processes tending gradually to reduce the amount of carbonic acid gas in the air, must have led to a gradual change in the constitution of the atmosphere. At a later epoch, when animal life and vegetable life were more equally proportioned, a state of things existed which, so far as can be judged, might have lasted many times as long as it has already lasted had not man appeared upon the scene. But it seems to me impossible to consider what is actually taking place on the earth at present, without perceiving that within periods short indeed by comparison with geological eras, and still shorter compared with the intervals to which the astronomical history of our earth has introduced us, the condition of the earth as an abode of life will be seriously modified by the ways and works of man. It

is only in the savage state that man is content to live upon the produce of the earth, taking his share, as it were, of what the earth (under the fruitful heat of the sun, which is her life) brings forth,—day by day, month by month, year by year, and century by century. But civilized man is not content to take his share of the earth's *income*, he uses the garnered wealth which is the earth's *capital*—and this at a rate which is not only ever increasing, but is increasing at an increasing rate. The rapid consumption of coal is but a single instance of his wasteful expenditure of the stores which during countless ages have been gathered together, seemingly for the use of man. In this country (America), I need not dwell upon the fact that, in many other ways, man is consuming, if not wasting, supplies of earth-wealth which cannot be replaced. It is not merely what is found within the earth, but the store of wealth which clothes the earth's surface, which is thus being exhausted. Your mighty forests seem capable of supplying all the timber that the whole race of man could need for ages; yet a very moderate computation of the rate at which they are being cut down, and will presumably continue to be, by a population increasing rapidly in numbers and in the destructive capabilities which characterize modern civilization, would show that this country will be denuded of its forest-wealth in about the same period which we in England have calculated as probably limiting the effective duration of our stores of coal. That period—a thousand or twelve hundred years—may seem long compared with the life of individual men, long even compared with the duration of any nation in the height of power; but though men and nations pass away the human race continues, and a thousand years are as less than a day in the history of that race. Looking forward to that future day, seemingly so remote, but (on the scale upon which we are at present tracing our earth's history) in reality the *to-morrow* of our earth, we see that either a change in their mode of civilization will be forced on the human race, or else it will then have become possible, as your Ericson has already suggested, to make the sun's daily heat the mainspring of the machinery of civilization.

But turning from those portions of the past and future of our earth which, by com-

* Since I thus spoke, a new and as it seems to me an even more illogical limit has been suggested for the operation of the process of evolution as affecting the development of life, and this by an advocate of the general doctrine of evolution. I refer to the opinion advanced by Mr. J. Fiske, of Harvard College (U.S.), "that no race of organisms can in future be produced through the agency of natural selection and direct adaptation, which shall be zoologically distinct from, and superior to, the human race."