

certainly most wonderful results, and greater than those of any machine man has yet been able to construct. But why "vital"? If there is no such thing as life, surely they are merely physical results. Can mechanical causes produce other than physical effects? To Aristotle life was "the cause of form in organisms." Is not this quite as likely to be true as the converse proposition? If the vital phenomena depend on the "construction" of the machine, and the "energy supplied to it," whence this construction and whence this energy? The illustration of the clock does not help us to answer this question. The construction of the clock depends on its maker, and its energy is derived from the hand that winds it up. If we can think of a clock which no one has made, and which no one winds, a clock constructed by chance, set in harmony with the universe by chance, wound up periodically by chance, we shall then have an idea parallel to that of an organism living, yet without any vital energy or creative law; but in such a case we should certainly have to assume some antecedent cause, whether we call it "horology" or by some other name. Perhaps the term evolution would serve as well as any other, were it not that common sense teaches that nothing can be spontaneously evolved out of that in which it did not previously exist.

There is one other unsolved problem in the study of life by the geologist to which it is still necessary to advert. This is the inability of palæontology to fill up the gaps in the chain of being. In this respect we are constantly taunted with the imperfection of the record, a matter so important that it merits a separate treatment; but facts show that this is much more complete than is generally supposed. Over long periods of time and many lines of being we have a nearly continuous chain, and if this does not show the tendency desired, the fault is as likely to be in the theory as in the record. On the other hand, the abrupt and simultaneous appearance of new types in many specific and generic forms and over wide and