changes we assume that the modes in which nature operates now have not changed—that the laws of nature by which these changes have been brought about are unchanging. If we do not make this assumption, if we assume on the other hand that the laws of nature or the modes in which we see nature now operating are themselves subject to change or are themselves undergoing evolution, then we must know the manner of change or the law of change of the laws—either that or we must be free to postulate any law of change that we please, in which case we can build up any theory of evolution that suits us.

For example, has matter recently acquired the property of attracting to itself other matter, has an electric charge gradually taken on the power of attracting or repelling other charges, has energy recently acquired its characteristics? Or did Newton when he stated the law of gravitation state a property of matter, which, so far as this little mind of ours can picture the universe of time and space, holds forever and forever? We may find that Newton's statement was incomplete, but such a discovery, if made, will not point to evolution in gravitation but to evolution in our comprehension of the phenomenon. So we come to view our universe as one of constant change subject to unchanging law. In physics we are dealing with the eternal verities.

Another view which is ordinarily not presented in discussions on evolution is that our universe is like a clock which having been wound up is now running down. For it is a clearly established law in physics that when transformations of energy take place—and they are always taking place—energy, though conserved, becomes unavailable. Thus in accounting for our universe we must start with it already wound up—filled with a vast quantity of high-grade energy—then with a suitable hypothesis, we may acquiesce in the nebular theory according to Laplace or the planetesimal according to Chamberlain or the spirally nebular according to Jeans and thus we may account for the so-called growth of worlds. It is true that going back only a few hundred million years we can joggle along comfortably, flinging off spiral nebulae here and there, on the way down. But we don't care to be questioned too closely regarding events before that time. I think that the opponents of evolution are justified in saying that we do not know what happened long ago, but while they would mean by that term a few thousand we would mean many million years.

The idea that there has been evolution in the physical world is not new. Many philosophers have proposed it. The clearest enunciation probably was given by Descartes three hundred years ago—"the physical world and all things in it whether living or dead have originated out of primitive formless matter by a process of evolution due to the continuous operation of physical laws." But at that time practically nothing was known about physical laws. Not even the law of gravitation was known; nothing was known about electricity or light. Yet vast ignorance of all nature's operations did not prevent Descartes from propounding his broad philosophy. Philosophers are not disturbed by ignorance of facts, but scientists have no other basis for their generalizations.

The teachers of evolution are, I am afraid, apt to extend the meaning of the word beyond the original and to see *evolution* in the illumination produced by the striking of a match. This phenomenon is not unlike that associated with the so-called birth of a star. But if we want to know what happens when a match is struck or a star is born we must study physics and chemistry not evolution.

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## NOTE ON THE SEPARATION OF THE DEPRESSOR PRINCIPLE FROM HEPATIC TISSUE

THE action of water soluble substances prepared from hepatic tissue in lowering the blood pressure of normal animals has been noted in the literature many years previous. Investigations as to the chemical nature of this principle which were initiated in this laboratory and the department of physiology eighteen months ago by Drs. James and Laughton have yielded the following results.

The active principle is non-protein in character and is found in the abiuret fraction. It is soluble in water alcohol solutions up to 80 per cent. strength. It is precipitated from aqueous solutions by phosphotungstic acid along with the diamino acid fraction, and the material recovered in aqueous solution can be further purified by extraction with ether, which has the capacity for dissolving out a very active principle which depresses the arterial tension and maintains it at sub-normal levels for long periods.

The depressor substance is associated with a pressor principle in the abiuret fraction. These two are separated during the treatment with phosphotungstic acid, since practically all the pressor element remains in solution.

Not only is the normal pressure reduced to subnormal levels, but artificial hypertension induced by various well-known pressor substances is similarly reduced to any desired level depending on the dose employed.

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