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SOME CONDITIONS OF PROGRESS IN THE PLANT WORLD.*

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There is no unanimity as to the meaning of the term *progress*, but I shall use it in the ordinary sense of change, from simplicity of structure to complexity, that is from uniformity of parts to specialization of parts, from every part doing all kinds of work to complete division of labor.

I shall ask you to imagine first a lifeless world in which the only changes were physical and chemical. Condensation, solution, diffusion, combinations, and decompositions all went on vigorously in warm moist surroundings. This may have gone on for ages, but finally, in all probability, as the climax of a long series of combinations and rearrangements, some of these chemical changes resulted in the formation of an unstable, gelatinous substance which we call *Protoplasm*. In spite of much serious study and long continued experimentation man has not yet quite mastered the chemical processes involved in the building up of protoplasm. We know that it is made of carbon, hydrogen, oxygen, nitrogen, phosphorus and sulphur—"the dust of the earth"—and that it is probably a water solution of proteids. Well, this translucent semifluid substance protoplasm was siezed upon by a new force which gave the protoplasm qualities in which it differed in a marked way from any other chemical compound. One of these qualities is the ability of protoplasm to change many other substances into its own substance, thus increasing the quantity of protoplasm. This ability is not possessed by any other kind of matter known to man. We call this new force *Life*, and one of the notable powers of Life is this,—of giving to protoplasm the power to assimilate food, to grow thereby and also to divide itself into two or even many parts, each of which retains all the distinguishing qualities of the parent mass.

*Lecture given before the Ottawa Field-Naturalists' Club, Feb. 25th, 1913.