The Hypothesis of Formative Causation: (according to Rupert Sheldake)

The concept of morphogenesis involves such topics as ‘what causes plant embryos to develop into the characteristic shapes of their species?’ The word morphogenesis comes from the Greek word *morph* (form) and *genesis* (coming into being). This, as unusual and surprising as it may seem, is something science cannot explain –for now. The unproven belief that modern mechanist scientists would have you believe is that all morphogenesis is genetically programmed. Some say that the inadequacy of this explication is two-fold: (1) All the cells of the body have the same genetic makeup –nevertheless something is causing differentiation of their structure and function– if they are all programmed the same way, why do they develop so differently? And (2) the genetic makeup of any cell was explored to the utmost in the human genome project where the simplicity of the 4 base cipher that codes only for the primary structure of the protein molecules of an organism was evident. These are two points that shall be elaborated on further during the course of this section. Some genes code for the sequence of amino acids in the primary structure of proteins, others code for the control of protein synthesis. But this alone cannot account for form as we see it around us today. Something over and above genes and the proteins they code for is needed to explain form. An example given is that of a the buildings of a city whose structural makeup is identical (i.e.: concrete, steel, etc) but whose design is quite different and whose shape was determined by the blueprints of an architect. Demolishing the building and analyzing it’s parts would yield no evidence of the architectural blueprints. The same is with the human form (the buildings design) and the structural constituents (DNA), the blueprints are elsewhere; and this search for these ‘blueprints’ has characterized the science of morphogenetics since the mid 1920’s. These scientists came up with a theory of *morphogenetic fields.* These fields underlying the development of form in organisms are not designed by a conscious architect-like entity, but rather are self-organizing fields of influence analogous to magnetic fields and other such recognized fields in nature. (Self-organizing in the same sense that natural selection is self-organizing) . We seemed to have exhausted the depths of the DNA molecule and uncovered anything that mechanists could have used as a cause for morphogenesis. With the completion of The Human Genome Project there are astronomical implications, not because of what they found, but because of what they didn’t find and because of what they now proved does not exist. There is no physical mechanism that might be the cause of morphogenesis. Sheldrake’s theory of morphogenetic fields arises from this, and has three key concepts, (1) Morphogenetic fields are a new ‘kind’ of field so far unrecognized by physics, (2) These fields evolve, have history and an inherent memory and are given by a process he has named *Morphic Resonance,* and (3) they are part of a larger family called *Morphic Fields*. There is a wholeness defined by the characteristics of the Morphic filed established in and around a system. This wholeness is greater than the sum of it’s parts, which are themselves aggregates greater than the sum of it’s smaller parts, and so. Regions of influence in space-time, in and around systems they organize. Some important things to note are that these fields work probabilistically, restricting and imposing order upon the inherent indeterminism of the fields they organize. Acting by canalizing morphogenesis towards a characteristic endpoint, a common goal, these fields exercise embryonic regulation. An analogy which best describes this process is given by the British biologist C. H. Waddington: He visualized canals down which balls could roll, toward a characteristic endpoint. The rolling ball represents the development of a particular part of the embryo toward its characteristic mature form. Disturbances in the canal and the rolling (development) of the ball (embryo) may push the ball up the side walls of the canal, but unless the ball is pushed over the top of the side wall it will return to the original course heading toward the same endpoint. It will not return to the same location from which it left, but rather it will pick up development further down the canal. This describes the process of embryonic regulation, by which a developing organism can reach a normal mature form despite disturbances in its development. The most controversial aspect of this hypothesis is that these fields themselves evolve. Through repetition the patterns they organize become increasingly probable, increasingly habitual. And so we say these fields have a type of memory.