

the entire cell. Here, then, we have in the conditions necessary to the germination and growth of a vegetable, an exhibition of the very important part which physical forces have in the production or origination of the vital force. Omit the stimuli, as they have been heretofore called, of light and heat, and no manifestation of vitality will take place; or, as the advocates of the correlation theory would say, the forces, light and heat, are succeeded in the germ by vital force, and in the absence of the former there can be no manifestation of the latter. Heat and light received the name of stimuli from the supposition that in seeds of various kinds, vitality existed in a *latent* or *dormant* condition. This supposition being based on the fact, that seeds may be kept for an indefinite period, even for ages, without evincing any signs of vitality, and yet germinate when placed in favorable circumstances, and acted on by light and heat. In the *Jardin des Plantes*, of Paris, seeds obtained from the cerements of Egyptian mummies, which must have lain there for thousands of years, germinated when placed in the soil, and ultimately yielded increase. And after the great fire in London, in 1666, so luxuriant was the growth of a cruciferous plant, the *Sisymbrium Iris*, of Linnæus, that almost the entire surface of the burnt district was covered with them.

According to the new ideas, however, there can be no such thing as "dormant life," or "latent vitality." As we can judge of the presence of life only by observing *changes* to ensue in the body observed, *change* becomes an essential in our idea of life. To talk, then, of *dormant life* in a seed, is to say, that changes are going on in a body, where no change is taking place, which to say the least, is a very palpable contradiction. For the manifestation of vital action in seeds or plants, certain determinate physical conditions are required. So long as these conditions remain unaltered, there will exist *the proper and necessary substance* for vital force to manifest itself through, when originated by the operation of the forces, heat and light; and the *only* form of matter in which these forces can be succeeded by vital force. In the seeds, then, which have germinated after lying inactive during the lapse of some centuries, there is not a waking up of something already existing in the seed; but there is the development of vital force, by the action of heat, light, and so forth, the necessary physical conditions having remained undisturbed for so long a period in the seed.

(Conclusion in our next.)

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