

up the stone. I made a solution of silicate of lime, put it in a glass vessel, and allowed carbonic acid to bubble through the fluid, upon which chalk was found, and in it were deposits of silicic acid; they dried into little hard bodies like flints, some of which I have still in preservation. Flints, therefore, and chalk might easily have been constructed by the mere ebullition of carbonic acid through a silicate sea, and in a few hours, as compared with millions of centuries as is generally assumed by the learned. The learned, of course, may be right in their surmise, but they are open to correction.

*The Journey Round the Sun.*

I noticed in the first lines of these chapters the journey made round the sun. There is no other such journey that we know of. We all take it, and I humbly submit that medical men ought to know that journey better than any. We ought to understand as far as we can what are the regions we go through; how we are affected on the way, and how we ought to protect ourselves, if we are able, or at any rate prepare ourselves for vicissitudes. Preparation of this kind, which requires common-sense observation, though it may ever be imperfect, may be far more perfect than we expect, and may illuminate the paths of ages yet to come.

CHAPTER XXVII.

VITAL PHOSPHORESCENCE.

THE writing of the last chapters of a book I have often found to be a more anxious task than any other; it is so now, but I think it best to devote them to what has been an all-absorbing study of my life. It has all through seemed to me a duty to accept the new theory which Liebig introduced, namely, that the leading point to remember in regard to the body is the oxidation of carbon, and to hold the idea of that as a producer of animal heat and of the great vital functions. Receiving this, however, I could never forget another element, phosphorus, and another process, phosphorescence. When Frobisher, over one hundred and sixty years ago, at an expense of some £10, first showed phosphorus to the Fellows of the Royal Society and described some of its properties, he could scarcely, I think, have been aware of the enormous fact he was elucidating. He had obtained the element from living structures like bones, and on questions of vitality it has continued to hold a promising place, and the phenomenon called phos-

phorescence of animal matter has more than once been dwelt upon.

I cannot stay to enter upon the many labours of preceding observers, but it is necessary to indicate in a few passages what has most engaged my own attention.

*Luminosity of the Brain and of Nervous Matter.*

I have tried the effects of phosphorus in giving the luminosity of its oxidation to brain-pulp in the dead form, and these experiments, still incomplete, have been most instructive and curious.

Brain-pulp was put into a solution of phosphorus, and the pulp was permitted to receive oxygen from the air at blood-heat, the air passing through and agitating it with steady motion. In other words, phosphorised brain was allowed to breathe, and its immediate luminosity was obvious.

We sometimes see phosphorescence in living tissues, and the late Dr. Stokes of Dublin had a patient who exhibited luminosity in parts of the body, so that they would even light up printed matter. I have seen the same phenomenon exhibited in a still more curious manner. The brain of a deeply anæsthetised animal was once seen by me to be very faintly luminous in the dark for some seconds, suggesting that the nervous structure fed with blood carrying oxygen created an animal fire. I have also seen phosphorescent lines of light on a nervous surface, as on my own retina.

In living nervous matter, centric or diffused, it may be that a kind of phosphorescence is in progress as a source of vibratory motion causing the formation of acids that have to escape from the nervous structures into the blood, and even leading to the evolution of warmth and sensibility. In fact, the old view that warmth of the body is diffused by nervous distribution may, after all, be the correct view, and it is quite possible that since the era of Liebig we have been fundamentally misled in respect to animal heat. I would rather not be dogmatic on this subject, but am certain that the whole of it wants to be re-studied, and that phosphorus as an element of the body calls for a new and great investigation, for we have neglected phosphorus as a vital element in the most serious degree.