

reckoned in the transverse section of a Helmsdale pine-trunk about two feet in diameter, more than a hundred annual rings. And from the rings and roots of some of the others, its contemporaries, I found that curious insight might be derived respecting the state and condition of vegetable life in the old Scotch woods of the Oolite. In the first place, the annual rings themselves told me, when exposed to transmitted light in the microscope, that the winters of that time gave vegetation as decided a check as our winters now. The tender woody cells were first dwarfed and thickened in their formation by the strengthening of the autumnal cold, and then for a season they ceased to form altogether. But then the spring came, and over the hard concentric line drawn by the chill hand of winter they began to form themselves anew in full-sized luxuriance ; and thus, year after year, and for century after century, the process went on. Some of these ancient pine-trees grew in rich sheltered hollows, and acquired bulk so rapidly, that they increased their diameter eight and a half inches in twenty years ; others grew so slowly, that they increased their diameter only two and a half inches in forty years. And it is a curious circumstance, that in both those of slower and of more rapid growth we find alternating groups of broader and narrower annual rings, indicating apparently groups of better and worse seasons. Lord Bacon remarks in one of his Essays,—the Essay on the Vicissitude of Things,—that it was a circumstance first observed in the Low Countries (the provinces of the Netherlands), that there were certain meteorological cycles of seasons,—groups of warmer and groups of colder summers, and of more temperate and of less temperate winters,—which periodically came round again. And we have seen not very successful attempts made in our own times to measure these cycles, and reduce them to a formula, from which the nature of the coming seasons might be determined beforehand. But