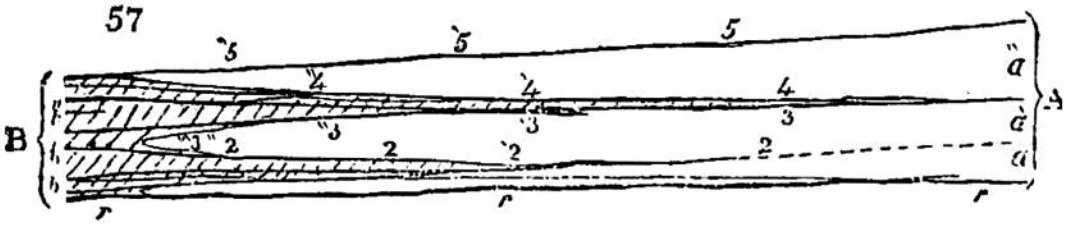
followed by calcareous accumulations from the oceanic waters, and closed by a local rush from some parts of the land. But analysis of these groups shows the effects of many alternations of oceanic rest and littoral movement, prevailing in the same parts of the sea, and producing at one time limestone with quietly imbedded shells and attached corals; at another, sandstones; at a third, clays. If we admit—what is perhaps impossible to be denied—that the production of each sort of rock spread from some centre, and that these centres were not coincident for different rocks, it becomes a very curious problem to determine what are *the lines of contemporaneity* in the oolitic system.

For let A be a point from whence a deposition of carbonate of lime spreads slowly through the ocean, but not reaching to B, a point from which depositions of sand happen, not reaching to A—the general basis *r*, *r*, *r*, being red marl and sandstone. The surfaces of strati-



fication *r*, *r*, *r*,— 1, 1, 1,—2, 2, 2, &c., are usually spoken of in geological works as marking distinct periods in the deposition of the beds, and the matter at any point on one of the three surfaces is usually supposed to have been *contemporaneously* deposited. In the diagram referred to, five lines of contemporaneity thus appear to be designated, but this inference is by no means perfectly correct. If the calcareous and arenaceous deposits were supposed to happen in alternate periods, those parts of the former which were furthest from A, on the planes 1, 1, 1, 3, 3, 3, and 5, 5, 5, would be of somewhat later date than the others, though exactly similar in substance, organic contents, &c.; and the like reasoning with reference to the point B, applies to the arenaceous deposits on the planes 2, 2, 2, and 4, 4, 4. Yet the beds *a*, *a'*, *a''*,