

the transition is almost insensible; and from the Spiroloculine we pass by easy steps to all the other forms of the Milioline types." Again, a subdivision of the widely-expanded spire of *Cornuspira* into segmental chambers, gives us *Peneroplis*, with its septal planes perforated by a row of separate pores; while from this, it was again pointed out, the spiral *Orbiculina* might be derived by a further division of the sarcodic body into sub-segments, with a corresponding division of the primary chambers of the shell into chamberlets.

It was therefore with no small satisfaction that I recognised, among the products of the deep-sea dredgings carried on in the "Porcupine" expedition of 1869, a "missing link" that reproduces the whole of this genetic series in its own single organism, namely, a chambered calcareous disk, of which, though nearly the whole is constructed on the typically Orbitoline plan, the central (or youngest) part shows, in the first place, the simple undivided tubular coil of a young *Cornuspira*; then the partial interruption of that coil by incomplete septa, as in *Spiroloculina*; then the flattening-out of the spire, and its partitioning into chambers by perforated septa, as in *Peneroplis*; then the subdivision of the spirally-growing chambers into chamberlets, as in *Orbiculina*; and finally, the substitution of the cyclical for the spiral plan of growth, constituting it a true *Orbitolites*,—as will be presently set forth in detail in the description of *Orbitolites tenuissima*.

I had pointed out (Phil. Trans., 1860, p. 574) that the shells of the whole of this series—together with that of the fusiform *Alveolina*, which I regarded as another derivative from the same fundamental type—have that *porcellanous* character, whose distinctive importance was first indicated by Prof. W. C. Williamson, though he did not venture to adopt it as a basis of the primary subdivision of the group; and that a precisely parallel relation exists among those generic types of the series forming *vitreous* shells, which present the most highly specialised forms of Foraminiferal organisation. For whilst *Operculina* is (so to speak) a "vitreous" *Peneroplis*, and *Heterostegina* a "vitreous" *Orbiculina*, we have in *Cycloclypeus*, which shows a perfectly cyclical mode of growth in a finely tubulated shell, the "vitreous" parallel of *Orbitolites*; the parallelism being completed by the existence, in the probably "vitreous" *Fusulina*,¹ of the same plan of growth around an elongated axis as is shown in the "porcellanous" *Alveolina*.

In the same concluding summary (1860) I presented, as results of my researches, certain "general propositions" (p. 584), which I think it desirable here to reproduce; because, as my original investigation of the forms of the genus *Orbitolites* then known to

¹ I was obliged at that time to speak with hesitation of the place thus assigned to *Fusulina* (whose fossil shells make up the bulk of certain beds of Carboniferous limestone in Russia and elsewhere), "the metamorphic condition of its shell interfering with the minute study of its structure"; but a subsequent examination of specimens well preserved in the clays of the Carboniferous limestone of Iowa has satisfied me that my original interpretation of its microscopic appearances was correct (*Monthly Micr. Journ.*, vol. iii. 1870, p. 180). By previous systematists, *Fusulina* had been generally associated with *Alveolina*, to which its external resemblance is most remarkable.