

other hand, in some families numerous "good species" may be distinguished, since the intermediate connecting forms are no longer present and the forms have become *relatively constant*. As instances of such families may be mentioned, among the SPUMELLARIA, the Astrosphærida, Cyphinida, Porodiscida and Tholonida; among the ACANTHARIA the Quadrilonehida and Dorataspida; among the NASSELLARIA, the Spyroidea and Cyrtoida; among the PHÆODARIA, the Challengerida, Medusettida, Circoporida and Cœlographida. The more carefully the different groups are studied, the more numerous the individuals of each species under comparison, the greater becomes the number of "bad" species among the Radiolaria, and the smaller the number of good ones. Originally, no doubt, all "species bonæ" were "malæ." There may be observed in the manifold skeletal forms of the Radiolaria, on the one hand, the utmost accuracy of configuration, and on the other, the greatest variability, and hence a careful comparative study of them leads to a firm conviction of the gradual "Transformation of Species," and of the truth of the "Theory of Descent."

157. *Palæontological Development.*—The palæontology of the Radiolaria already offers very considerable material for study; but in consequence of its incompleteness this is of little value for the study of the phylogeny of the class. By far the larger portion of the fossil Radiolaria belong to the Tertiary period; only quite recently have numerous well-preserved fossil Radiolaria been described from the Mesozoic period, and especially from the Jura. Of Palæozoic Radiolaria (from the coal measures) only slight traces are known. Moreover, the fossil Radiolaria hitherto known have been found only in very circumscribed and widely separated localities. The majority of all the species belong to the small island of Barbados. Although our palæontological acquaintance with the Radiolaria must necessarily be incomplete for this reason, it is still more so since at least thirty out of the eighty-five families (that is more than a third) could not possibly leave any fossil remains, either because they possess no skeleton, or because of its chemical composition.

Of the four legions of the Radiolaria, the ACANTHARIA (on account of the solubility of their astroid acanthin skeletons) have entirely vanished and have never been found fossil. Of the PHÆODARIA, whose silicate skeleton is not as a rule capable of fossilisation, only one section (Dictyochida) of a single family (Cannorrhaphida) has been observed fossil. Hence the fossil remains of the Radiolaria belong almost exclusively to the two legions, SPUMELLARIA and NASSELLARIA, which were formerly united under the term "Polycystina." Among these, however, the skeletonless Thalassicollida, Collozoida, and Nassellida could leave no traces. Hence there only remain fifty-five families of which we might expect to find fossil siliceous skeletons. Even of these, however, scarcely the half are certainly known in the fossil condition, whilst of the remainder nothing certain is known; for example, of the large order Larcoida (among the SPUMELLARIA) and of the Stephoidea (among the NASSELLARIA) with a few isolated exceptions, no fossils are known. The great majority of fossil Radiolaria belong to the two NASSELLARIAN orders Cyrtoida and Spyroidea (two relatively very highly developed groups); next to these follow the orders