

It will be particularly observed that although the distribution of the Hexactinellida is characteristically deep water, and of the Monaxonida just as characteristically shallow water, yet that the Monaxonida are really commoner in deep water of from 201 to 1000 fathoms (in which depths the Hexactinellida reach their maximum) than the Hexactinellida themselves, and it is not till the depth of 1000 fathoms is passed that the Hexactinellids begin to prevail over the Monaxonids, finally, however, becoming much more numerous, in a little over the ratio of 2 : 1. It may here be added that the following proportion approximately represents the distribution of the Sponges at abyssal depths (over 1000 fathoms):—Number of Spongiæ : number of Hexactinellida : number of Monaxonida : number of Tetractinellida = 11 : 7 : 3 : 1.

It is obvious that if the bathymetrical distribution of groups of organisms remained constant throughout all time (and it is too frequently assumed that this is the case), the value of such a table of curves as that given on p. 397 as a means for determining the depth at which strata containing sponge remains had been deposited would be very great. Zittel evidently assumes that the depth at which ancient sediments were deposited may be inferred from the nature of the associated fossil Sponges, and even Schulze, speculating on the sudden appearance of the Lithistida and Hexactinellida, argues that as:—“Both groups are especially inhabitants of the deep sea [so] only in the former deep-sea deposits can one hope to find their fossil remains in any abundance.” When Vosmaer, however, supposes that the ancestral forms of Sponges originated in deep water he evidently assumes a change in bathymetrical distribution but in the contrary direction to that in which it has taken place.

The question is evidently important enough to demand a few words of inquiry, and as the Hexactinellida are pre-eminently a deep-water group at present, they will best serve for investigation. The oldest known Hexactinellid is the Lyssacine *Protospongia*, which occurs in Cambrian slates, and though we have no evidence as to the depth at which the mud, out of which the slate originated, was deposited, one would probably not regard it as very great; but leaving an instance so doubtful, we pass on to the Silurian, and there encounter a remarkable group of Hexactinellids, known as the Dictyospongiæ; the individuals of this group are not, for fossil Hexactinellids, rare; many of them are of large size, and evidently lived under favourable conditions; the group ranges from the Silurian into the Carboniferous system, and is usually associated with sandstones or sandy shales. The beautiful examples from the Chemung sandstone of Devonian age occurring in North America attain a height of nearly a foot and a diameter of 5 or 6 inches. Here then we have an instance of an abundant group of Hexactinellids (*Lyssacina* according to James Hall) associated with rocks which were undeniably deposited in shallow water at no great distance from land, and such a plain instance to my mind altogether upsets the hypothesis that the existing bathymetrical distribution of this group is the same or even in a general way similar to that which it possessed in the past.