

forms of vegetable and animal life are very numerous, the former being especially so in the shallower water where there is abundant sunlight. Zoologists have divided this region into several sub-zones, such as Laminarian, Coralline, and Coral zones.

*Deep-Sea Deposits.*—The deposits of this vast zone or region extend from the 100-fathom line down to the greatest depths of the ocean, and they cover considerably more than one-half of the earth's surface. Gravels and sands, which prevail in shallow water, are only accidentally met with in the deep-sea areas. Muds, organic oozes, and clays are the characteristic deposits, and in their physical properties they present great uniformity. In special regions where the surface waters are affected by floating ice a greater diversity is introduced from the varied nature of the transported materials. Tides, currents, and waves produce some mechanical effects at the upper limits of the deep-sea region, but on the whole there is an absence of the phenomena of erosion, and mechanical actions would appear to be absent except in the case of submarine eruptions. The depth is too great for sunlight to penetrate, and vegetable life, if present, is limited to the deposits near the 100-fathom line. Animal life, on the other hand, appears to be present everywhere throughout the deep sea, being more abundant, however, in the shallower depths near continental shores. The temperature is below 40° F. throughout the larger part of the area, and if subject to variation with latitude or change of season, these changes affect only the depths immediately beyond the 100-fathom line. Throughout the whole region there is a very uniform set of conditions. In the shallow-water and littoral zones, owing to the rapid accumulation and the mechanical effects of transport and erosion, the effects of chemical modification are not apparent in the deposits, but in Deep-Sea Deposits, in consequence of the less rapid rate of accumulation, absence of transport, the nature and the small size of the particles, many evident chemical reactions have taken place, resulting in the formation *in situ* of glauconite, phosphatic and manganese nodules, zeolites, and other secondary products. As we descend from the 100-fathom line into deeper water and approach the central regions of the great ocean basins, the deposits undergo a change, arising from a diminution in the number and size of particles derived directly from the land, together with an increasing abundance of amorphous matter arising from the ultimate decomposition of minerals and rocks, and accompanied in all moderate depths by an increase of the remains of pelagic organisms. We thus pass insensibly from those Deep-Sea Deposits of a terrestrial origin, which we call "Terrigenous," to those Deep-Sea Deposits denominated "Pelagic," in which the remains of calcareous and siliceous organisms, clays, and other substances of secondary origin, play the principal role.

With these introductory observations on Marine Deposits in general, we now proceed to consider the special subjects of this Report,—the nature, composition, and distribution of Deep-Sea Deposits.