

pods and Bryozoans; Mollusks of all the divisions; Articulates, or Worms and Arthropods, very sparingly; and sparingly, Fishes among Vertebrates, and very sparingly, other Vertebrates.

Siliceous material: through Radiolarians among Protozoans; and extensively, Spongiozoans having siliceous spicules or skeleton.

Carbonaceous materials: sparingly through the decomposition of aquatic species and the dissemination of organic matters in bottom muds.

Phosphatic materials: chiefly through excrementitious matters; sparingly from shells of some of the lower Brachiopods, and of Pteropods; sparingly from tests of Trilobites, Crustaceans, and other Arthropods, and bones of Vertebrates; and animal tissues. For analyses see page 72.

2. Relations of the Kinds of Life to Rock-making.

The fitness of species for rock-making depends not only on the amount and character of their stony secretions, but also on their geographical distribution, and this on their relations, as regards growth, to temperature, light, moisture, and the composition and mechanical condition of the air, waters, or soil inhabited; the height over the land, the depth in the water, and all conditions affecting growth and burial.

Marine species of plants and animals are those most likely to become fossils, and so to contribute to rock-formations; and, among terrestrial species, those that live in lakes or marshes, or along their shores or borders. The reasons are two: (1) Because almost all fossiliferous rocks are of marine origin; and (2) because organisms buried under water, or in wet deposits, are preserved from that complete decomposition to which many are liable when exposed on the dry soil, and are also protected from other sources of destruction.

Over the land, the chance of burial is very small. Plants and all animal matter pass off in gases, when exposed in the atmosphere or in dry earth; and bones and shells become slowly removed in solution, when buried in sands through which waters may percolate. Vertebrate animals, as Fishes, Reptiles, etc., which fall to pieces when the animal portion is removed, require speedy burial after death, to escape destruction from this source as well as from animals that would prey upon them.

Among Insects the species that frequent marshy regions, and especially those whose larves live in the water, are the most common fossils, as the Neuropters; while Spiders, and the Insects that live about the flowers of the land, are of rare occurrence. Waders, among Birds, are more likely to become buried and preserved, than those which frequent dry forests. But, whatever their habits, Birds are among the rarest of fossils, because they usually die on the land, are sought for as food by numberless other species, and have slender hollow bones that are easily destroyed. Mastodons have been mired in marshes, and thus have been preserved to the present time; while the thousands that died over the dry plains and hills have left no relics.