

side of Upolu, Lieutenant Emmons found no coral, although the depth was but eighteen fathoms. About the outer capes of Fungasa harbour, Tutuila, there was no coral, with a depth of fifteen to twenty fathoms; and a line of soundings across from cape to cape afforded a bottom of sand and shells, in fifteen to twenty-one and a half fathoms. About the capes of Oafonu harbour, on the same island, there was no coral, with a depth of fifteen fathoms.

Similar results were obtained about all the islands surveyed, as the charts satisfactorily show. There is hence little room to doubt that *twenty fathoms* may be received as the ordinary limit in depth of reef corals in the tropics.

It may however be much less, possibly not over half this, on the colder border of the coral-reef seas, as, for example, at the Hawaiian Islands and the atolls northwest of that group. It is natural that regions so little favourable for corals on account of the temperature should differ in this respect from those in the warmer tropics.

It may be here remarked, that soundings with reference to this subject are liable to be incorrectly reported, by persons who have not particularly studied living zoöphytes. It is of the utmost importance, in order that an observation supposed to prove the occurrence of living coral should be of any value, that fragments should be brought up for examination, in order that it may be unequivocally determined whether the corals are living or not. Dead corals may make impressions on a lead as perfectly as living ones.

As to the origin of this small range in depth—about 120 feet—temperature must be admitted as one cause, it having been proved to be predominant with regard to distribution of life throughout the extent and depths of the ocean. Yet it can hardly in this case be the only cause. The range of temperature  $85^{\circ}$  to  $74^{\circ}$  gives sufficient heat for the development of the greater part of coral-reef species; and yet the temperature at the 100 foot plane in the middle Pacific is mostly above  $74^{\circ}$ .