

The reef is usually to a large extent bare coral rock, swept by the waves at high tide. In some reefs the dry land is confined to a few isolated points, as in Fig. 145; in others, one side is wooded continuously, or nearly so, while the other is mostly bare, as in Fig. 144. The higher or wooded side is that to the windward, unless it happens to be under the lee of another island. On the leeward side, channels often open through to the lagoon (*e*, Fig. 144), which, when deep enough for shipping, make the atoll a harbor; and some of these coral-girt harbors in midocean are large enough to hold all the fleets of the world.

Fig. 146 represents a section of an island, from the ocean (*o*) to the lagoon (*l*). On the ocean side, from *o* to *a*, there is shallow water for some distance out (it may be a quarter or half a mile or more); and, where not too deep (not over 150 feet), the bottom is covered here and there with growing corals. Between *a* and *b* there is a platform of coral rock, mostly bare at low tide, but covered at high, having a width usually of about a

146.

Section of a coral island, from the ocean (*o*) to the lagoon (*l*).

hundred yards: there are shallow pools in many parts of it, abounding in living corals and other kinds of tropical life: toward the outer margin, it is quite cavernous; and the holes are frequented by Crabs, Fishes, etc. At *b* is the white beach, six or eight feet high, made of coral sand or pebbles and worn shells: *b* to *d* is the wooded portion of the island. The whole width, from the beach (*b*) to the lagoon (*c*), is commonly not over 300 or 400 yards. At *c* is the beach on the lagoon side, and the commencement of the lagoon. Corals grow over portions of the lagoon,—although, in general, a large part of the bottom, both of the lagoon and of the sea outside, is of coral sand.

Beyond a depth of 150 feet there are no growing corals, except some kinds that enter but sparingly into the structure of reefs.

2. *Coral-reef rock*.—The rock forming the coral platform and other parts of the solid reef is a white limestone, made out of corals and shells. In some parts it contains imbedded corals; in others, it is as compact as any Silurian limestone and without a fossil of any kind, unless an occasional shell. The compact non-fossiliferous kinds are formed in the lagoons or sheltered channels; the kinds made of broken corals, on the seashore side, in the face of the waves; those made of corals standing as they grew, in sheltered waters, where the sea has free access. Large portions are a coral and shell conglomerate.

3. *Coral beach-rock*.—The beach-rock is made from the loose coral sands of the shores, which are thrown up by the waves and winds. The sands become