

tions of the reefs, and being sometimes increased in force by the contributions of island streams, which add to the detritus and to the weight of accumulating waters.

3. Harbours which receive fresh-water streams, or submarine springs of fresh-water, are more apt to be clear from sunken patches; and the same causes keep open shallow passages to the shores, where there are shore reefs.

It should be remembered, that while the effects from fresh-water streams are so trifling around islands, they may be of very wide influence on the shores of the continents where the streams are large and deep, and transport much detritus. This point is illustrated further on.

## II. ATOLL REEFS.

The remarks in the preceding pages respecting reefs around other lands apply equally to atoll reefs. There are usually currents flowing to leeward through the lagoon, and out, over, or through the leeward reef, the waves with the rising tide dashing over the windward side, and keeping up a large supply, which is greatly increased in times of storms; and this action tends to keep open a leeward channel for the passage of the water. This is the common explanation of the origin of the channels opening into lagoons. These currents are strongest when a large part of the windward reef is low, so as to permit the waves to break over it; and the coral débris they bear along will then be greatest. When a large part of the leeward reef is under water, or barely at the water's edge, the waters may escape over the whole, and on this account large reefs sometimes have no proper channels. When the land to windward becomes raised throughout above the sea, so as to form a continuous barrier which the waves cannot pass, the current is less perfectly sustained, since it is then dependent entirely upon the influx and efflux of the tides; and the leeward channels, in such a case, may gradually become closed.

The action of currents on atolls is, therefore, in every way identical with what has been explained. The absence of