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WAVE ACTION.

WAVE and wave action form an interesting study. We see the billows curling toward the shore, then break, the sand and pebbles washing backward with them; who has not noted the rapid changes of the ocean beach? This storm tearing it away, and that one broadening it out; the gradual wearing away of islands along their seaward face, while at the same time making to leeward. What is the mean effect of wave action on the continents is a subject which, for the most part, has been treated by hydrographers like Admiral Davis, Lieutenant Maury, and Beautemps-Beaupre. Now comes a geologist, Prof. Shaler, who, in a recent paper discusses the subject from the standpoint of one familiar with continent formation, that is to say, from effect to cause as well as from cause to effect. All the rocks, he says, bear undeniable evidence that the sea has swung over them in the oscillations of the continent in its alternate uprisings and downsinkings. All waves, save those coming from submarine upheavings, are caused by the wind. Wind comes from variations of temperature, the great trade winds being an effect of the disparity between the heat of the tropics and the poles; difference in temperature between sea and land causing local winds. You can study wave action on an ordinary pond. So says the author. If the shore be a shelving one, the waves will topple over, as do the ocean's surges, and strike their blows. After an artificial pond has existed for a short period, it is easy to see where these repeated blows have cut the earth upon its shelving sides, so as to form what is called a wave scarf, and how the process of erosion goes on. On ordinary soil, even upon rocks of moderate hardness, this wave action combined with the freezing which takes place in winter breaks up the earthy material and bears it outward.

The tops of the waves move more rapidly than the bottoms, thus all wave-swept shores have an undercurrent movement of their waters, which sets off from the coast line toward the deeper waters. Where ever a wave rolls up on a shore, it grinds up a certain amount of material. With the reflux of the surge this material is carried off to the edge of the deeper water, the margin of the surf belt, where the undertow comes in to drag the debris still further from the coast. Undertow has no influence near the surface, which sets shoreward while it is pressing seaward. Many lives are lost at the bathing beaches, he thinks, because the exhausted swimmer essays to struggle ashore afoot instead of throwing himself out flat in the surface waters.

Waves while scarfing a beach against the shore build out a shelf composed of all the material they had dragged from the land, save that gone into complete solution from grinding. By this he means the outside bar, with which every bather is familiar, the same being composed of the detritus. Hundreds, indeed thousands, of miles inland are found sandstones and clay deposits, which, in nearly all cases, indicate the former presence of the sea, under which they were formed precisely as like formations exist to-day in the outer bars.

SAYS a Washington dispatch: General Nelson A. Miles, of the division of the Pacific, is in Washington to appear before the congressional committee on coast defenses in support of his report recommending that additional protection to the Pacific coast be made. The report of General Miles has created a great deal of interest among congressmen here, who were not aware that there was so much need of coast defenses in Oregon and Washinvton. The average congressman is not easily convinced that the greatest harbor in the world is on the Pacific coast, and it is hard to teach them that the principal coast line of the Pacific is above the California line. General Miles believes that with the showing he will make the appropriation asked for in the bill now pending, $125,000,000 for the Atlantic and $28,000,000 for the Pacific coast, will be favorably reported. The Oregon and Washington delegations are very much interested in the bill and will use all the influence they possess to get through the appropriation.

FROM the manner in which rail communication has been blockaded during the last few weeks, says an exchange, a casual observer will almost come to the conclusion that steamboating is almost as reliable as the iron rail. Man made the railroad and God the river. Remove the obstructions at The Dalles and the Cascades, and allow the water to flow unvexed to the sea, and the inland empire will pour its wealth of production down the bosom of the placid stream to tide water by wholesale.