

the bottom some time before the deeper water off shore has had its momentum destroyed and its direction of flow changed.

Transportation During Storms by Wave-Generated Longshore Currents.

In the shifting of materials along the shores the only effective agents of transportation are the wave-generated longshore currents and the waves associated with them. Transportation of all but the finest materials ceases as soon as the swells disappear, and is at its maximum at the time the waves are largest. The longshore currents of themselves are usually not strong enough to hold even fine sands in suspension for any length of time—as may readily be ascertained by experiment, or as is shown by the rapidity with which the water in the shore zone clears as soon as the waves cease. Clay in suspension is carried for some time by longshore currents, and also by the currents of the general circulation; sands and all coarser materials along the shores cease to move as soon as the agitation caused by the swells stops, they are transported both by waves and currents. The very coarse materials—cobble and boulders—are shifted almost wholly by the waves.

The Supply of Waste:—Bedrock exposures on the shore of the lake are few in number. For the most part the materials found on the shores and adjacent to them are fine clays and silts, sand and gravels, cobbles and boulders. The clays and silts in large part are derived from similar materials in situ and are brought to the shores by various processes, in small part they are produced at the shore by the grinding of the coarser materials upon one another, and upon bedrock. The sands are derived almost wholly from sands of glacial origin. The gravels and cobbles come from beds of till in large part; along those portions of the shore where there are exposures of bedrock almost all of them are derived from the rock in situ, a small amount of glacial material being mixed with the rest. The boulders and large blocks are usually of glacial origin, though here and there one may note blocks of the adjacent bedrock shifted only a short distance from its source.

Distribution of the Waste on the Shores:—The waste supplied to the shores from the different sources is spread out in a nearly even sheet parallel to the shoreline; much of the finer material is carried out rapidly to the deeper waters and there deposited, while the sands and coarser debris are shifted along the shore within the limits of the wave swept zone.