

transport even the finest sand which occurs along the beaches. They must, however, assist in the distribution of the finest silts and clays over the bottom of the lake.

The currents of streams tributary to the lake only effect the waters a very short distance from their mouths. After discharge, except for the first few yards of their course, the direction that the river water takes in flowing through the lake is determined wholly by the direction in which the lake waters at the point of discharge happen to be flowing at the time. Except in the immediate vicinity of the mouths of the streams in question these currents have no effect in modifying the lake shores.

With regard to the surface currents produced by the prevailing winds, their general direction is the same as that of the wind with which they are associated. A study of the prevailing winds for the lake stations, made by the officials of the United States Weather Bureau, and covering a period of seventeen years, shows that there were on the average 66 per cent. of westerly winds for the whole year. For the months from May to September 56 per cent. were from a westerly direction. For the same period of time a study of the resultant wind directions shows that in 183 out of 204 monthly values and in all the annual values the resultant is westerly.

Out on the open lake the transitory movement of the water before the wind takes the form of a drift, and because of the prevalence of westerly winds this drift is most frequently identified with the easterly flowing body currents of the lake. The drift currents vary their direction with the wind that causes them, usually starting a short interval after the wind has commenced to blow and continuing for some time, often several hours and occasionally several days, after the winds that caused them have ceased. Where this drifting surface water impinges on a shore a longshore current is developed, the direction of the current being dependent on the angle at which the drift impinges on the shore. These currents, which for convenience may be designated wind currents, are seen during wind-storms, and reach their maximum velocity at times of the strongest storms. They are so intimately connected with wave and surf movements that both must be considered together. It is when they act in conjunction that active erosion, transportation, and deposition take place. During a period of heavy storm a longshore current may require a velocity as great as four miles an hour.

The occurrence of undercurrents, moving in a direction contrary to that of the surface current or of the prevailing wind is a common feature. They will be caused wherever in