

Currents:—In 1892 and 1893 the United States Weather Bureau carried out a series of investigations on the distribution of the surface currents of the Great Lakes—bottle floats being employed. In his report on the results of the investigations M. H. Harrington groups the currents of the Great Lakes under four heads:—The body current, a surface current due to the prevailing winds, the return currents and surf motion.*

The body currents and the return currents may be regarded as constant. With these may also be associated the locally constant currents found at points of inflow and outflow of the main streams of the lake—the Niagara and St. Lawrence Rivers. At these points there is a small but constant current, really a portion of the body current of the main lake. Usually these local currents are too weak to be active transporting agents except in the immediate vicinity of the outlets or inlets. At the mouth of the Niagara River the discoloration of the lake water shows that a small amount of fine waste is carried out into Lake Ontario. Two miles off the mouth of the river the coloration has disappeared and the current has been merged with the general drift of the surface waters of the lake. The outer portion of the Niagara River current in Lake Ontario has been found to shift its position with the winds. The waters of the St. Lawrence where it leaves the lake are clear and practically free from sediment.

In Lake Ontario there is a slow general set of the mass of the water towards the outlet, while there is a pronounced vortical movement of the mass of water at the west end of the lake forming a backset eddy. Where, by the action of the wind, surface currents have driven more water to the eastward of the lake than can well pass through the discharge there must be more or less of a return current. In this lake no return current, so well marked as in the other great lakes of the system, has been found. The probability seems to be that in part it breaks up into smaller whirls along the great pockets of the coast on either side of the general current and that a considerable body of water is returned as an under-current.

The rate of the general east flowing drift is very slight, probably never exceeding twelve miles per day, more frequently being much less than this. The currents of the general circulation and the return currents are too feeble to

*Currents of the Great Lakes, Bulletin B., United States Weather Bureau, 1894.