

basins is as follows : Lake Superior, 29 inches ; Lake Huron, 30 inches ; Lake Michigan, 32 inches ; Lakes Erie and Ontario, 34 inches. This is about equal to 31 inches on the entire lake basin. The following represents the average discharges at the outlets of the lakes : —

Lake Superior, at St. Mary's River.....	86,000 cubic ft per sec.		
Lakes Michigan and Huron at St. Clair			
River.....	225,000	"	"
Lake Erie, at Niagara .....	265,000	"	"
Lake Ontario, at St. Lawrence River.....	300,000	"	"

If the average discharge of the lakes passed through a river one mile wide with a mean velocity of one mile per hour, such river would have a depth of 40 feet from shore to shore.

The volume of water in the lakes is about 6 000 cubic miles, of which Lake Superior contains a little less than one-half. Perhaps a better idea of this volume may be obtained when it is said that it would sustain Niagara Falls in its present condition for about 100 years.

The principal changes in the elevation of the lake surface are those due to the wind and to rainfall.

During protracted autumn gales, waves have been observed which, through reliable means, measured from 15 to 18 feet above the normal surface. The second class of variation are those due to rainfall, as before stated. The last ten years show a tendency to irregularities which may be due to changes in rainfall and watershed, produced by the rapid destruction of the forests which, ten years ago, covered the basin of the upper lakes. Observations made by the U.S. Survey have established the existence of small tides which, at Chicago, had an amplitude of  $1\frac{1}{2}$  inches for the neap tide and about 3 inches for the spring tide. There is still another class of oscillations called *seiches*, which have been already observed in the Swiss lakes, and for which a solution, in all respects satisfactory, has not been offered. Whenever the lakes are sufficiently free from the disturbing action of wind to permit observation, a quite regular series of small waves, or pulsations, can be detected, which have an interval of about ten minutes from impulse to impulse. These pulsations seem to occur almost without cessation on Lake Superior. Besides having tides in common with