(3) *Time of Low Water at Springhill.* From Table I it is seen that low water at Springhill occurs on an average eleven hours and nine minutes later than low water at St. John. Hence it takes low water one hour and of rty-nine minutes longer to travel from St. John to Springhill than it does high water. This is shown in another way by the shape of the Springhill curves. It will be noticed that in all cases the curves are steeper on one side of high water than on the other, the tide rises faster than it falls, so that a low water always comes closer to the succeeding high water than to the preceding. In fact, the average time from low water to high water is only five hours and seventeen minutes, while that from high water to the next low water is seven hours and seven minutes. This relative delay of low water is due to one of the differences between wave motion in a shallow river and wave motion on the ocean. In the former the more elevated parts of a wave always travel faster than the less elevated or the depressed parts. In fact, if v be the velocity of any part of a wave whose elevation above the mean level is h, and if H be the depth of the river

$$v = c\left(1 + \frac{3}{2}\frac{h}{H}\right)$$

In this, c is of course the value of v, for parts of the wave for which h is zero ; that is, for parts of the wave midway between crest and trough. In the parts of the wave below mean water level h is negative. Hence v is greater for the crest than for the trough ; that is, greater for high water than for low water. Thus low water keeps lagging farther and farther behind the high water ahead, and approaching the high water behind. This process may go so far that the front of the tide wave becomes nearly vertical and then we have a bore as in the Seine, Petitcodiac and many other rivers.

With this greater steepness of the front of the tide wave another peculiarity is often developed. The rear slope of the wave may first become straight and then actually recurved. This is hardly shown in any marked degree on the St. John River, although the rear slope sometimes approximates to a