

The welling up of the water caused by this action may be quite considerable. In the proximity of the entrance of the Alexandra Dock, Hull, the water-level at spring tides is about 19 inches higher than that of the opposite shore, two miles away. The transverse raking effect thus set up in the bed of a stream does not, however, appear to affect materially the flow of the main body of the river.

Owing to the character of its alluvial deposits the Thames, below London, has been moulded into an admirable carrier of world trade by reason both of its natural economy and of the prevision of its authorities of control.

With the growth of the size of merchant ships the problem of the classification of their traffic has become more serious. It is probable that the tendency to cater by means of deep-water quays for vessels of extreme draught at points near the mouth of rivers, where greater depths of water naturally exist, reserving up-river accommodation for ships of less draught, will be accentuated. Trade will inevitably follow geographical conditions.

River Velocities.—Observations have been made by many investigators with the object of defining by formula the laws of stream velocity at varying depths of a channel and also the retardation of velocity due to obstructions in its course. The formulæ thus evolved are to be found in many handbooks. In any serious problem of river regulation exhaustive current observations are essential.

The volume of discharge of a waterway is obtained by multiplying its cross-sectional area by its mean velocity. To ascertain mean velocity observations by current meter or the velocity rod may be taken. Inference from surface velocity is more often resorted to. Owing to the varying rugosity of the bed of a stream, the above expedients furnish, however, an approximation only. It is obvious that the shape of the channel and the obstruction of weeds and other under-water impediments are varying factors which affect the issue. The problem can, nevertheless, be worked out with sufficient closeness for practical purposes by observation and the assistance of the published hydraulic tables.