

littoral drift is due to tidal action, the other that it is caused by wave action. The march of the circulating medium of defence is, in fact, represented by the sum of all the forces operating on a coast-line. Wind-waves are the prime cause. The tidal impulse plays its part. Wind creates great sand-storms, producing vast deposits above high-water line, and the recoil from a cliff or sea-wall of heavy swell scours and drags down shingle, bringing it within reach of the oblique stroke of running seas. That the tidal force is not the sole or principal operative action in the travel of drift is evidenced by the fact that on coast-lines where tidal lift is negligible the same familiar phenomena are to be met with.

The column of drift oscillates coastwise, and on the recession of the tide is left alternately heaped into terraces and dragged down into slopes. The prevailing wind in Northern Europe is west-south-west. Taking an exposed coast-line, such as that fronting the English Channel, running roughly east and west, the effect of wind-waves varies greatly. An off-shore wind causes the beach material to heap up, a due on-shore wind sweeps it down. Between these two extremes the variations of angle of stroke cause all the familiar gradations of phenomena. Where the trend of a coast affords protection from sea exposure and the worst conditions of wind, the severity of the problem of erosion is lessened. Thus under the lee of an outstanding headland, such as the Start, the shore can be maintained with comparatively little difficulty. It is beyond the zone of such protection that the full rigour of erosion results. For instance, between the Start and Sidmouth the inroads of the sea are less acute than is the case on the frontage to the east, by reason of the fact that the former strip of foreshore is partially sheltered.

Oceanic waves advance in columns from the open sea. As they approach the shore their diagram of forces changes. From waves of oscillation they become waves of translation. A wave of oscillation is a mere carrier of momentum. The impetus it has acquired sets up a vertical spinning action. Its motion is the resultant of the horizontal force of the wind and the vertical force of gravitation. The contour of a deep-sea wave