

similar to that of winnowing. As an examination of sand ripples demonstrates, their windward slope is always flat, their leeward slope acute. Wherever a wide stretch of sandy foreshore is exposed and some slight obstruction to the travel of blown sand exists, the familiar phenomenon of the sand dune is reproduced.

It will be obvious that whenever an elevation or depression of a sandy coast-line takes place such condition is ripe for the formation of sand dunes. Holland is a case in point, and the sub-Glacial strata of that country bears witness to the fact.<sup>1</sup> The Pliocene strata of Holland rest in a shallow basin rising towards Norfolk, Germany, and Belgium. The depression of the Dutch area was contemporaneous with a rise of 500 to 600 feet in the Pliocene sea bed along the coasts of southern England and north-western France. The prevailing winds being then, as now, westerly, these movements probably furnished the origin of the sand barriers along the coast-line from the Seine to the north of Holland.

Along the English coast sand dunes pass under a variety of names, such as the Denes at Lowestoft, and the Meals or Meols of Lancashire and Cheshire; in Cornwall they are termed Towans, and in Devonshire, Burrows. In addition to the above, other dune systems are to be found in Norfolk, Somerset, Cumberland, and the east coast of Scotland. Both in area and in height the British dunes are inferior to those of the N.W. coast-line of Europe, where they prevail from Spain to Riga. Of these, the most extensive system is that of Gascony (150 miles long, 2 to 5 miles wide), on the Atlantic seaboard of France; whilst others occur S.W. of Boulogne at Le Touquet, along the coasts of Belgium, Holland, and Denmark, and the Baltic littoral of Prussia. Here, on the Kurische Nehrung they exceed 180 feet in height (at Pillkoppen), whilst the dunes of Gascony have approximately the same height, except at Biscarosse, where they reach 250 feet or more. Scolt Head in Norfolk, about 60 feet high, is typical of the British dunes (Plate IV, 1). Greater heights are attributed to the dunes of

<sup>1</sup> "The Pliocene Deposits of Holland and their Relation to the English and Belgian Crags" (F. W. Harmer), *Quarterly Journal of the Geological Society*, Vol. LV, p. 748.