single barkhans, then lines and chains of coalescing dunes, which again grow and increase in the process of time.

Sokolow, after comparing together the ripplings of lacustrine and marine waves and the ripple-marks of the dunes, and pointing out their dissimilarities, goes on to say, speaking of the last-named: »Sie wachsen ununterbrochen in die Höhe, indem sie die auf der Oberfläche bewegten Körner aufhalten, und wandern zugleich, weil der Sand von der Luvseite beständig auf die Leeseite hinübergeweht wird.» Sokolow does thus appear to contemplate the existence of forms intermediate between ripple-marks and individual dunes.

Cholnoky emphasises with good reason the difference between water-waves and sand-waves, and indeed it would be futile to expect anything else in two media that present such diverse properties of aggregation as these do. Owing to the cohesion of the aqueous molecules shocks and impulses in the mass of water are propagated in waves; and if the force is not maintained, after a while the wave-movements die away. Particles of sand on the other hand are free, isolated bodies, separated from one another by layers of air, and a thrust or other external application of force takes effect only at the point at which it is applied, without being transmitted sideways. A sea which has been agitated by a persistent storm becomes as smooth as a mirror some time after the storm has subsided. Sand-waves on the contrary which have been piled up by the wind retain their positions even after the wind has fallen. The only laws they are subject to are those of gravity, and in consequence of their aggregational properties, they are unable to alter their positions, as water does, until some fresh external force is applied to them. Their form and shape are determined by the wind, and to this must be added, further, the property which the sand possesses of disposing itself on the leeward side at the steepest angle actually possible to it, an angle which I found in several instances to be equal to 32° to 33°. (Sokolow gives 29°—32° as the limit-value in the case of the dunes beside the Gulf of Finland and the Gulf of Riga.)

And yet, notwithstanding these great and perfectly natural differences, the formation of dunes and the formation of waves are identically the same phenomena. Drift-sand is, like water, a medium that readily responds to the influence of the wind, and obeys all its caprices. But in the case of the particles of sand the great amount of friction set up between them has the inevitable result of making all their movements incomparably slower, and that altogether apart from their inability to propagate movement once the wind has ceased. Unlike though these two media are to one another, yet, when acted upon by identically the same force, namely wind, they present phenomena of motion which resemble one another, at all events in certain respects. Several of the points of difference between waves and dunes, upon which Cholnoky dwells, nevertheless present, according to my conception, certain features of resemblance, and where these features of resemblance are wanting the cause is to be sought in the aggregational properties, and consequently the absence is due to a quite natural cause. For instance, Cholnoky calls attention to the fact that, whereas in wave-movement every point of the medium is in motion, in dune-movement those points only are in motion that are affected by the wind. If the movement of an aqueous wave makes itself perceptible to a depth equal to