

mulation, the slower becomes its forward movement. At all events, it certainly forms a boundary beyond which the individual dunes under no circumstances advance; they can, and do, move onwards until they come to the very top of the accumulation, then however they disappear, and their individuality ceases. Even when this process, as exhibited in the three figures here appended, is continued in both directions as shown in fig. 296, their mutual relations still remain always the same.

Now this could only happen in a country like East Turkestan, where the surface is so level and flat, and so perfectly undiversified — where there are not even minor undulations, and where the prevailing wind is so extraordinarily powerful and so unchecked in its operations. I doubt whether there is anywhere a sandy desert which exhibits such regular and such beautiful sand-formations as the Desert of Tschertschen, for the predisposing conditions which I have mentioned above are nowhere so strikingly developed as there. After crossing this desert, as I have done, and after seeing with my own eyes the extreme regularity of construction which prevails everywhere throughout it, and witnessing how for days together these sharply accentuated concatenations of sand-hills never vary in their features from one end to the other, I do not for one moment hesitate to declare, that each such accumulation or range is built up of innumerable individuals, which, advancing from the east-north-east, climb up, as it were, to the highest summit of the range, and then fling themselves down its steep westward face, and so disappear. Having witnessed this myself, I do not hesitate to say at once, that on level ground and under a steady wind, the individual dunes endeavour to fuse with one another to form a concatenation of sand-hills, or more correctly speaking an unbroken continuous ridge (*ās*). To observe *in situ* what actually takes place in the sand during a spring storm would require not only a long period of observation, but also a great amount of patience. It must suffice to remind the reader, that the reasoning which I have adduced above is in almost exact agreement with the general laws of the formation of waves (kumatology). If you examine a small individual dune whilst a violent wind is blowing, you find that the minute ripples of its surface, the tiny beautifully formed wavelets of sand, travel up the windward side until they reach the top, where they disappear, and that these are constantly followed by others so long as the wind continues to blow. Precisely the same thing takes place with regard both to the individual dunes and the large sand-waves, which represent the highest power of sand-agglutination. And just as the fine ripples travel faster than the dune on which they move, so the individual dunes travel faster than the dune-accumulation to which they temporarily belong. Thus the velocity is proportional to the mass. The same law obtains in the waves of the ocean: amongst them the ripples grow into waves, and the waves into huge foam-crested billows. When a violent wind strikes a perfectly smooth expanse of ocean, it gives rise, within the course of merely a few seconds, to a uniform rippling of its surface; in precisely the same way the wind acts upon every point of the surface of the sand, the continuous wave-movement of the ripples being disregarded. But when the wave-crests are piled up by a long-continued wind, they do not lose their individuality; they absorb all the smaller waves and go on growing unceasingly. If the wind suddenly ceases, the