wendige Vorbedingung der Dünenbildung, wie man früher angenommen hat, aber jedenfalls befördern sie dieselbe. Und es gibt deren überall: Muschelhaufen, Baumstümpfe, Sträucher u. s. w., und kein Hindernis is zu klein, denn der gestaute Sand macht es selbst von Tag zu Tag grösser.»*

If, disregarding formulæ and theories, we go to nature herself, the impression conveyed is that the conception last quoted is the only right one. For instance, in the Desert of Tschertschen and the west of the Desert of Lop the surface is inconceivably level, and there exist no irregularities or obstacles to cause the sand to accumulate, and yet we find there dunes of unparalleled amplitude and regularity of formation. There then they do not owe their origin to any peculiar properties of the surface. If Neumayr's view were correct, we should expect to find in the Desert of Tschertschen a flat, evenly disposed sand-field without dunes. For my own part, I believe that, if the masses of sand now in the Desert of Tschertschen were to be spread out perfectly evenly over the entire desert in a layer some 30 m. thick, the sand would after a certain lapse of time be rearranged by the wind in dune-accumulations precisely similar to those that now exist. If such an absurd eventuality could be at all contemplated, as that the wind should for the space of one, or even two centuries blow constantly from the north, the relief of the sand would change conformably; but if it were then to be changed back to its usual east-north-east direction, the desert would again resume its old relief — assuming of course that no disturbing element were introduced through the agency of secondary factors, such as the checking of the supply of sand by a new position taken up by the Tarim. I mean, that the relief and orientation of the masses of sand in the Desert of Tschertschen are prescribed by absolute and incorruptible laws of the wind, and that, so long as the wind relations remain what they are, those masses of sand could not arrange themselves in any other way. And I believe, further, that this intimate connection between the wind and the relief of the sand is every bit as subject to law as are Chladni's »sonorous figures», which are exemplified by means of a thin layer of sand on an elastic plate, the sand returning with the same minute fidelity to a certain part of the plate every time the layer is shaken.

The formation of dunes is of course likewise occasioned by obstacles, for example vegetation; but nobody, I suppose, will maintain, that the regular dune-accumulations of the Desert of Tschertschen have grown up out of dunes which have originated in that way, or that, did such obstacles not exist farther east in the desert, the sand-masses of the Desert of Tschertschen would have arranged themselves in any other way than that they now exhibit. Sokolow says truly: »Wenn sich hinter dem Strande eine ebene Fläche befindet, welche frei ist von windhemmenden oder schwächenden Gegenständen, so lagert sich der vom Winde getriebene Sand als gleichmässige Schicht ab und bildet ein Sandfeld, dessen einzigen

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während er an den Linien stärkeren Druckes, die den Wellenthälern entsprechen, fortgeblasen wird .... Dass die Dünen keine zufälligen Sandanhäufungen, sondern wirkliche Wellen sind, ist von manchen Beobachtern gleichsam instinktiv geahnt worden» .... (*Die Entstehung wellenähnlicher Oberflächenformen, ein Beitrag zur Kymatologie* by Otto Baschin, in *Zeitschrift der Gesellschaft für Erdkunde zu Berlin*, vol. XXXIV. p. 419.

* *Grundzüge der physischen Erdkunde*, p. 505.