

des Aralsees beschrieben, und an den Ufern des Caspi spielen sie eine grosse Rolle.»* In 1893 I travelled, at the north-east corner of the Sea of Aral, through a zone of shore dunes of very respectable dimensions.**

It is precisely because the deserts we are discussing extend regionally over such wide areas, and because certain parts of them, as for instance on Mangischlak, are so far distant from all rivers, that they appear to be more intimately connected with the shrinking of the Aralo-Caspian Sea than with the great rivers. I have however no intention of denying to the rivers the dune-forming power that really does belong to them. Beside the middle Dnjepr the fluvial dunes reach the height of 12 m., and beside the Don they vary from a few decimeters up to 10 m. and more. This belt of dunes, between Ust-Medveditskaja and Novo-Grigorievskaja average 12 to 13 km. in breadth. Sokolow says with regard to this belt of sand-dunes: »Die Entstehung der dem Don am nächsten gelegenen Dünen aus dem vom Don abgelagerten Sande ist wohl kaum zu bestreiten; nicht so leicht ist aber der Ursprung der zweiten an beiden Seiten des Atscharabaches sich ausbreitenden Flugsandzone zu erklären. Ihn dem Bache selbst zuzuschreiben, wäre wenig begründet, wegen der in keinem Verhältnis zu einem unbedeutenden Bache stehenden mächtigen Sandabsätze.»*** And he goes on to prove that the belt of sand in question is a survival from an old bed of the Don. Sokolow also clearly assumes, that the dunes beside the Bay of Narva and on the southern side of the Gulf of Riga are formed exclusively out of the sand which the rivers Narva and Düna (Dwina) have brought down to the sea, and which the sea has subsequently flung back upon the coast. In a word, the dune-forming power of rivers is proved to exist beyond all doubt. All I desire to say is, that to this power there exists a limit. If the belts of fluvial dunes to which I have here briefly alluded, or those which have been formed in the deltaic regions of many other much greater rivers, be compared with continental dunes of the type which occurs, for instance, in the Tarim basin, it is abundantly evident that the latter could not be formed in the same way. In the case of the former we *know* that the several rivers in question are the causes of their origination; but in the case of the latter it is impossible to prove that the adjacent river, *i. e.* the Tarim, is the source and origin of the dunes which abut upon it. There exists no plausible reason for agreeing with Bogdanovitsch, when he says, that these last are formed out of former fluvial and lacustrine deposits, and that the gigantic dune-accumulations between Karaul and Kara-koschun consist of products derived from the disintegration of the Jarkent clays. If the origination of this desert cannot be accounted for except in dependence upon the vicinity of the river, how are we to explain the formation of the adjacent deserts, where there does not exist the smallest river, and scarce any trace even of older river-beds? The Kumtagh of Pitschan cannot be regarded as having been originated by the extremely insignificant stream which exists there any more than the southern Kumtagh can be traced to the effects of the small ephemeral streams that issue from the Astin-tagh, and which, at the period of high-water alone, advance only a few kilometers

* *Gesetz der Wüstenbildung*, p. 119.

** *Through Asia*, I. p. 48.

*** *Die Dünen*, p. 250.