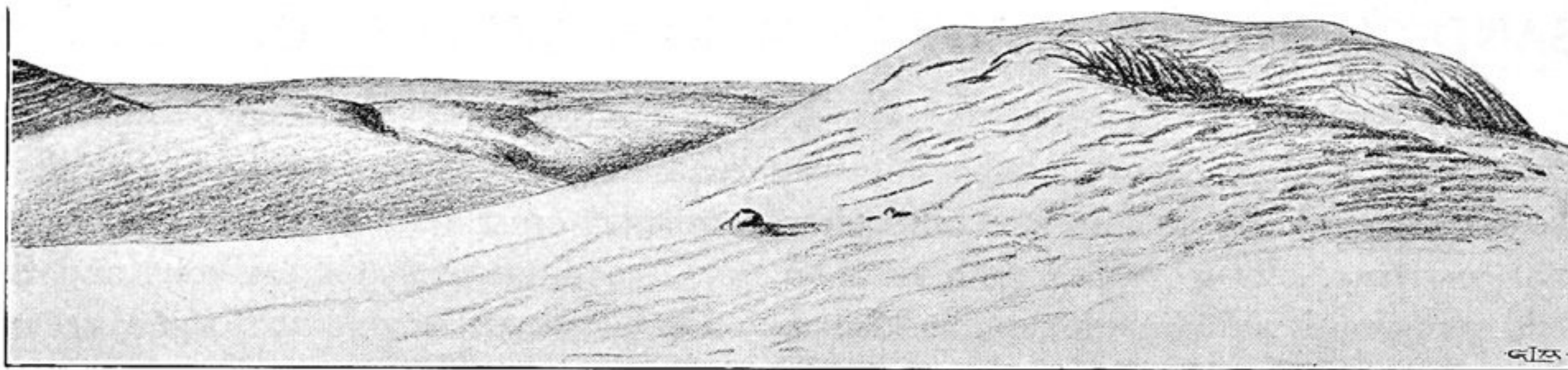


Speaking of the origin of the ocean currents, Hann says, that the movements which are now taking place in the oceans of the earth are a summation of the effects produced by the winds during thousands upon thousands of years. In this case too the wind has been labouring to carry away, as it were, the water, though equilibrium tends just as constantly to counteract its labours by bringing in equivalent quantities of water from the windward. If, owing to certain external conditions, this re-supply cannot be effected, the result is that an accumulation of shallow water may be blown by a fierce wind completely out of its containing basin, as I once saw between the Kara-buran and Tscharklik. In a word, water is subject to the same mass-transportation as sand; as we see, when we compare analogous phenomena in the case of both elements.



A SAND-DUNE NEAR ANAU IN TRANSCASPIA.

That I may still further emphasise and define the difference between wave-movement and mass-transportation, I will quote Supan, who shows how the former originates, when, for example, an object is flung against a water-surface, and how the motion is propagated until friction overcomes the force of inertia. »Der Wind dagegen ist eine kontinuierlich und horizontal wirkende Kraft und sollte die Wasserteilchen vor sich herschieben. Und dies ist in der Tat auch der Fall, der Wind erzeugt ebenso Strömungen wie Wellen, und die Frage ist nur die, wann erzeugt er die eine, wann die andere Bewegungsart, und wie gehen beide ineinander über? . . . Wenn der Wind lang genug aus einer und derselben Richtung weht, wird die Tendenz immer grösser, die Wasserteilchen in dieser Richtung auch wirklich weiterzubewegen, so dass die Orbitalbahnen nicht mehr geschlossene Kurven bilden, und jedes Wasserteilchen am Ende einer Schwingung von seiner früheren Lage etwas abgerückt ist. Daraus entstehen die Triftströmungen . . .»\*

It is only with this phenomenon that movements in sand admit of being directly compared, for sand possesses a great amount of friction, but is destitute of the moment of inertia, and consequently lacks the power of progressive wave-movement.

\* *Handbuch*, p. 267.