

composed of the crystalline massive rocks, on either side a succession of uptilted and upheaved strata covered in their turn by younger, slightly tilted, or horizontal deposits composing the neighbouring plains. Michell, however, did not draw any general conclusions. Pallas was enabled from his wide experience to fill in the details of Michell's skeleton plan of a mountain-system.

According to Pallas, granite forms the core of all great mountain-systems. It is covered by unfossiliferous schistose rocks of various kinds, serpentine, porphyry, etc. These rest against the granite in highly-tilted or vertical positions, and are themselves succeeded by argillaceous schists and shales, and by thick masses of limestone containing marine fossils. The shales and limestones have highly-tilted positions where they occur in the inner parts of a mountain-system, but become less tilted and horizontal in the outer portions, the number and variety of the fossils at the same time increasing. The low hills and plains are composed either of sandstone, marls, and red clay with stems of trees and twigs of land plants, or of loose material, with the bones of large land mammals. Pallas examined the mammalian remains with great care. He proved the astonishing frequency in the occurrence of mammoth, rhinoceros, and bison in the Siberian plains, and described a rhinoceros corpse with hide and hair complete, imbedded in the sand and pebbles on the bank of the Willui river. He also stated that great accumulations of sand and sulphur occur in the schistose zone of rocks, and that the decomposition of those materials gives origin to volcanic disturbances, which however affect only the rocks above the schistose zone and the granite.

The primeval ocean of the globe, in his opinion, never stood more than 100 fathoms above the present sea-level, so that the granite core of the mountain-chains could not have been covered by it. All mountain-ranges composed of schists, limestone, and younger formations, or, as Pallas called them, the mountains of the second and third order, owed their upheaval to volcanic force. The schist mountains had originated before the creation of living creatures; then the limestone ranges rose above the primeval ocean, and some of these, such as the Alps, in relatively recent periods. The mountains of the third order were due to the last volcanic eruptions. The upheaval of mountain-chains was always accompanied by violent ground-