ridge, running W.S.W. to E.N.E. on the edge of the great plateau of eastern Asia. This plateau is fringed on its outer side by a complex of shorter ranges, which mostly run parallel to the border-ridges and send off a series of isolated chains, due to a later system of upheaval, through the plains and steppes in a north-western direction. Down to the middle of the 19th century these highlands were almost absolutely unknown, and the orography of Central Asia as shown on our maps was quite hypothetical. Numer­ous surveys by Russian and British explorers have, how- ever, recently disclosed the real structure of those regions ; and it has now become possible to discriminate the leading features of the orographical conformation of the country. The Hindu-Kush, with its snow-clad summits of 18,000 and 20,000 feet, limits the highlands of Turkestan to the south-east. It appears now to be settled that this ridge runs from north-east to south-west, as far at least as the latitude of Cabul, and possibly still farther south ; and the last Russian surveys of the Pamir show that it extends north-east as far as Tash-Kurgan (37° 45' N. lat., 75o E. long.). At the foot of its north-western slope it has the plateau of Pamir—the “Roof of the World,”—with an area of about 37,000 square miles. A series of chains, gently sloping and dome-shaped, rising 4000 or 5000 feet above the level of the plateau, traverse it from south-west to north-east, with a remarkable parallelism, dividing it into a series of broad parallel flat-bottomed grooves or valleys, which do not sink below 10,000, and sometimes 14,000, feet above sea-level. Thus the features of the lower plateaus of north-eastern Asia reappear here on a greater scale, hav­ing the same characters and the same direction in the plaitings of the earth’s crust.

Nearly 150 miles to the north-west of the Hindu-Kush lies the north-western border of the Pamir, fringed by the lofty Trans-Aɫai Mountains. Their crest, covered with snow, rises nearly 4 miles above the sea (Kaufmann Peak 23,000 feet) ; but the traveller approaching them from the south would hardly guess their height, because their southern slope towards the wildernesses of the plateau, themselves 13,000 feet high, is very gentle. The great elevation of the border-chain is only realized when it is seen from the Alai valley on the north, where its steep and deeply furrowed sides tower up like a dark wall, from 11,000 to 14,000 feet high, above the high and broad valley of the Kizil-su. The geological structure of the Aɫai valley must not be inferred from its orographical features, otherwise we should describe it as longitudinal. It is watered by the Kizil-su, which flows towards the west- south-west and joins the Amu-Daria under the name of Vaksh (or Wakhsh). On the north it has the lofty Aɫai- Tagh range, also partially snow-clad. On our best maps the Trans-Aɫai Mountains are figured as an isolated range, some 120 miles in length ; and it cannot yet be affirmed with certainty which chains of the Tian-Shan, possessing the same border-ridge characters, ought to be considered as its continuations. Further research is needed to determine whether it is continued south-west by the Darvaz, or Lahor, Mountains, where the group of lofty Sel-tau peaks feed the extensive Fedtchenko glacier, or by the Hoja-Mahomet chain on the left bank of the Amu-Daria.@@1 Thus the real north-western limits of the Pamir are still unsettled. As for the north-eastern continuations of the Trans-Aɫai, the present writer is inclined to trace them, not in the Kokshaɫ-tau, but in the Terskei Ala-tau and the high mountains of Sary-yassy, where the Khan-Tengri lifts its snow-clad granitic cap 24,000 feet above the sea, and is surrounded by numerous vast glaciers (Semenoff's and Mushketoff's Muz-art). It would thus separate, broadly speaking, the drainage area of the Tarim from those of

Lake Balkash and the Sea of Aral. Thus the border-ridge of the Central Asian plateau would have a length of more than 1000 miles from the Amu to Kulja, and the valleys of the upper Naryn and Tekkes would therefore be homologous with that of the Aɫai.

A girdle of alpine tracts, from 150 to 180 miles in width, which fringes the outer edge of the Pamir plateau, consists of shorter chains running parallel to the border ridge and ranging from 11,000 to 17,000 and 20,000 feet in altitude. They are separated by deep valleys, mostly with three separate foldings of Azoic rocks. Some of these ranges are covered with perennial snow and feed great glaciers, among which Schurovsky and Fedtchenko glaciers around the lofty Kok-su group are especially worthy of mention. These subsidiary chains all belong to the oldest system of upheavals, which have had a north-east direction, and which at four different places are modified by more modern ones having a north-western direction. In lat. 47° N. the orographical structure becomes more complicated, the alpine region being pierced by the broad Dzungarian trench, which leads from the lowlands of the Irtish to the heights of the Central Asian plateau. A high ridge—the Tarbagatai—continued in the Tchinghiz (Jinghiz) and Karkaralinsk Mountains, branches off north-westwards, separating Turkestan from Siberia. Further east the Tian- Shan is continued on our maps in an eastern direction ; but our knowledge of it still remains very imperfect.@@2

A series of deep depressions,—Balkh, Ferghana, Issyk- kul, and Kulja, —sinking to low levels amidst the Tian-Shan highlands follow one another in a north-east direction. That of Issyk-kul is occupied by the lake of the same name (5000 feet above the sea), while the second and fourth, now desiccated, are lacustrine basins. A great number of smaller lacustrine basins, mostly filled with Tertiary con­glomerates, occur higher up in the mountains. For the orographer and the geologist they are homologous with those of the Altai and east Siberia (Bukhtarma, Us, Irkut, Bar­guzin, and others). The rivers that issued from the high alps had to pierce many parallel ridges in order to reach the plains, and they frequently expanded into wide lakes before cleaving through the chains of mountains the narrow and deep transverse gorges by which they descended to the lower terraces.

Like the highlands of Siberia, those of Turkestan are fringed by a girdle of plains, having an altitude of from 1000 to 1500 feet, and these again are skirted by an im­mense lowland area reaching only 400, 300, and 150 feet, or even sinking below the level of the ocean. These plains and lowlands cover nearly 650,000 square miles. Some geographers divide them into two portions,—the higher plains of the Balkash (the Ala-kul and Balkash drainage areas) and the Aral-Caspian depression, which occupies nearly two-thirds of the whole and has been ably described by M. Mushketoff under the appropriate name of Turanian basin,—the Kara-tau Mountains being considered as the dividing line between the two. The Balkash plains, more than 1000 feet above the sea, and covered with clay, with a girdle of loess at their foot, are well watered by the Ili and other feeders of Lake Balkash (see Semiryetchensk) and on their rich prairies are the homes of numerous Kirghiz. In the south-west the clayey soil becomes saline. There is the Famine steppe (Bek-pak-daɫa), while in the Ak-kum steppe, which surrounds Lake Kara-kul, large areas are covered with sands, partly shifting. A gulf of clayey plains penetrates up the Ili into the in-

@@@1 See G. Grum-Grzimailo, in *Izvestia* of Russ. Geog. Soc., vol. xxii., 1886.

@@@2 The present writer is inclined to consider the “ Eastern Tian-Shan of our maps, which runs east-south-east to Bagratch-kul, as a separate chain belonging to the more modern system of north-western upheavals, meeting at its eastern extremity a chain which trends towards the north-east.