difficult to discriminate the real directions of its chains. Nevertheless, another lofty chain, containing the snow-clad Alps of the Katuñ (Katunskiye Byełki) and those of the Tchuya, and running also from south-west to north-east, parallel to the Sailughem border-ridge, can be distin­guished in the labyrinth of confusedly scattered mountains seen on our present maps. It is one of the most pictur­esque chains of the region, and contains the Byelukha peak, estimated at 11,000 feet, and the Alas-tu, of nearly the same height. It is pierced, however, by so many rivers, which rise on the north-west edge of the plateau, and find their way to the lowlands by a series of gorges, that its continuity could be easily overlooked. Farther to the north-east it joins, in the opinion of the present writer, the high chain on the left bank of the Kemtchik, which is continued by the picturesque Alps on the northern bank of the Us. A third system of mountain chains, also parallel to the above, can be distinguished in the succes­sion of the Terektinsk Mountains, those which are pierced by the Tchulyshman and those which follow the right bank of the Abakan ; while traces of a fourth plication of the rocks may be discovered in the Tigeritsk Mountains, those pierced by the Biya below Lake Teletskoye, and the Kuznetskiy Ałatau, on the left bank of the Abakan. A number of smaller, much lower, and shorter chains faintly appear as outer walls of this extensive alpine region. As for the Great Altai, or Altain-Nauru, our knowledge of which has been greatly increased by the recent explora­tions of M. Potanin,@@1 it may be regarded as a south-western border-ridge of the Khobdo plateau, with its steep slope facing towards the wide Dzungarian depression, or rather to the broad trench of the Ulungur. Its direction is nearly at right angles to the above, running from north­west to south-east, like the Tarbagatai Mountains (see Turkestan), and it is continued farther to the south-east by the Irdyn-ula and Artsa-bogdo Mountains, which separ­ate the eastern Gobi from the Tarim depression. It is most probable that upheavals, having the same north­western direction (which, according to M. Mushketoff, are in Central Asia more recent than the north-eastern ones), have to a certain extent modified the old north-eastern chains of the Altai, and complicated the chains of its alpine region. If so, the structure of the Altai would be very similar to that of the Turkestan mountains. A chain having a north-western direction—the Salair Mountains— shoots off from the main ranges of the Altai, between the Tom and the Tchumysh ; it is about 170 miles in length, with a width of nearly 60 miles, and contains the best silver-mines of the region, as also several gold-washings. Its upheaval belongs to a more recent epoch than that of the Sailughem ridge, and (like the mountains of Turkestan, having a north-west direction) it is due to dioritic rocks. In the Kuznetsk depression it is covered with deposits of the Lower and Upper Carboniferous, containing beds of coal. The Kuznetskiy Ałatau, in which Humboldt saw one of his meridional upheavals, consists of a series of ridges running south-west to north-east, with further con­tinuations within South Yeniseisk.@@2

The alpine region of the Altai is most picturesque ; most of its chains, rising over 8000 and 9000 feet, are snowclad, and a great glacier descends from the hollows under the Byelukha peak ; several other less known glaciers occur in the different “ byełkis” (snowclad chains). A thick forest vegetation clothes the mountain slopes, while beautiful valleys, often of great length, such as that of the Bukhtarma (180 miles) or that of the Uimon and Koksu, offer on their fertile and well-sheltered floors most favourable conditions for agriculture. Several lakes are met with, some, like the Juvlu-kul and Kendykty-kul on the small alpine plateaus, at heights where only the dwarf birch grows and the polar marmot takes up its abode.

while two others, Lakes Kołyvanskoye and Teletskoye, respectively 1170 and 1600 feet above the sea, from their position amidst steep and picturesque mountains, recall those of Geneva and Lucerne.

The Altai flora is very rich. Although the European flora (in­cluding the beech) which clothed the Altai at a recent period has disappeared, and the Siberian flora invades its hillfoots from the north-west, while the steppe flora is advancing from the south, still in a zone ranging from 1000 to 6000 feet above the sea the botanist has to admire a flora rich in bright flowers, tall grasses, and shrubs, several of which are now common ornamental plants in European gardens ; and the zoologist discovers in the Altai the meeting-place of the northern fauna (including the reindeer) with that of the high Central-Asian plateau (including the tiger and the two-humped camel of Bactriana).

A strip of elevated plains or grassy steppes, also about 200 miles in breadth, girdles the alpine region upon the north-west. Its outer border can be roughly indicated by a line running north-east from Lake Gorkoye to Tomsk. They have an average altitude of from 700 to 1000 feet above the sea, and are covered with a luxuriant grass vegetation; the conditions for agriculture are excel­lent, and Russian villages are rapidly springing up. The south-west portion is known as the Kumandinsk steppe. An innumerable succession of small lakes—rivers in the process of formation—cover this steppe, where we have a system of parallel undulations, resulting in tributaries of the Ob, all flowing north-eastward with remarkable regularity.

Beyond the high plains, that is, all over north-western Tomsk, are the lowlands, which may be subdivided into two portions,—the Baraba steppe in the south-west (see Tobolsk), and the marshy region of the Ob (the Vasyugan and Narym regions). The latter is one boundless marsh, a few settlements of native hunters occurring only along the rivers. The interior is for the most part inaccessible alike to boats and to human feet. Low hills, or rather swellings, intersect it, but even the highest points, barely 200 or 300 feet above the sea, are covered with marshy forests. The forests themselves grow on marshy ground ; but where the trees disappear one sees for hundreds of miles nothing but green flowery carpets, which, when trodden on, treacherously yield under the unwary traveller. Similar in character must have been the marshes in which the Siberian mammoths and rhinoceroses of the Quater­nary epoch found their graves. Only the light and broad- hoofed reindeer, but not the elk, can cross them. This inhospitable region is inhabited only by Ostiaks, who have been driven into it by stress of circumstances, and support themselves partly by fishing and partly by hunting.

The Sailughem ridge, and the high Khobdo plateau as well, con­sist of granites, syenites, porphyries covered only with the oldest metamorphic slates belonging to the Archaic formation (Huronian and Laurentian). The structure of the outer chains of the Altai is more complicated. Their backbone is also composed of granites, porphyries, and porphyrites covered with metamorphic slates which are intersected by layers of crystalline limestones, breccias, and veins of jade.@@3 Diorites, diabases, augitic porphyries, and hyper- sthenites also appear, but they are of a more recent origin. Silurian clay-slates are widely spread in the southern Altai. Devonian slates and limestones are also developed in the southern Altai, and the metalliferous deposits of Zmeinogorsk, Petrovsk, Riddersk, &c., belong to that age. Carboniferous dolomitic limestones and slates are widely spread both in the southern and northern Altai. After the Carboniferous epoch the southern Altai was not again sub­merged, while the northern Altai was covered by the Jurassic sea, and has thick Jurassic deposits containing a copious fossil flora and rich beds of coal. Basaltic eruptions, dating from the Jurassic period, have been found in the Salair Mountains. Thick diluvial deposits cover the whole area, and in many valleys are traces of immense former glaciers ; in fact, the whole of the Sailughem ridge must at one time have been clothed with an ice-cap.@@4

The southern Altai is rich in silver, copper, lead, and zinc ; while in the Ałatau are concealed its chief auriferous alluvial (or diluvial) deposits, iron-ores, and coal-seams. The mineral wealth of the Altai is really immense, but only a very few of the mines already known are worked. In 1881 4030 lb of gold, 14,820 lb of silver, 13,100

@@@1 Sketches of N. W. Mongolia, St Petersburg, 1883 (Russian).

@@@2 Kropotkine, “ Orographical Sketch of the Districts of Minusinsk and Krasnoyarsk,” in Mem. Russ. Geogr. Soc., vol. v., 1875.

@@@3 Prof. Mushketoff in Picturesque Russia, vol. xi.

@@4 See Potanin, Sketches of N. W. Mongolia, vol. iii. pp. 6, 9 sq.