tje upper parts of the Zeya flowing on the plateau, while the Ud flows at its base; so that, as shown elsewhere with greater detail,@@1 we must admit the Okhotsk coast-range to be a continuation of the Great Khingan. The Stanovoi range was drawn on old maps to connect the Okhotsk range with the Yablonovoi; but the journeys of the great Siberian expedition have shown that in reality no such range exists,—the upper tributaries of the Gilui (tributary of the Amur) and those of the Konam (basin of the Lena) having their sources in common marshes on the plateau.

A narrow alpine region (40 to 50 miles), consisting of a series of short secondary ridges parallel to the border-ridge, fringes this latter on its eastern slope. Two such plications may be distinguish ed, corresponding on a smaller scale to the belt of alpine tracts fring­ing the plateau on the north-west. The resemblance is further maintained by a broad belt of elevated plains, ranging from 1200 to 1700 feet, which follow the eastern border of the plateau. The eastern Gobi, the occasionally fertile and occasionally sandy plains between the Nonni and the Sungari, and the rich plains of the Bureya and Selimja in the Amur province belong to this belt, 400 miles in breadth, the surface of which is diversified by the low hills of the Ilkhuri-alin, the Khutun, and the Turan. These high plains are bordered on the south-east by a picturesque chain of mountains (the Amur gorge of which has been often described),— the Bureya Mountains (also Little Khingan). It extends, with unaltered character, from Moukden and Ghirin (Kirin) to Ulban Bay in the Sea of Okhotsk (close by the Shantar Islands), its peaks covered from top to bottom with a rich forest vegetation rising to a height of 4500 to 6000 feet. A lowland belt about 200 miles broad runs in the same direction from south-west to north-east along the outer border of the above chain. The lower Amur occupies the northern part of this broad valley. These lowlands, covered with numberless marshes and lakes, seem to have emerged from the sea at a quite recent geological period; the rivers that lazily flow over their surface are still excavating their valleys. They are shut off from the Pacific by an alpine belt as yet but im­perfectly known, in which at least two separate high chains (the Pribrezhnyi and the Tatar) can be distinguished,—their continua­tions probably appearing in Saghalin (*q.v.*), while Kamchatka contains several chains, the orography of which is almost quite unknown.

The geology of Siberia is still but incompletely known ; some detached regions have been explored, while the vast intermediate spaces remain untouched. Viewed broadly,@@2 the great plateau with the alpine tracts fringing it on the north-west and south-east is built up of Palæozoic rocks. On the Vitim and Selenga plateaus immense tracts are composed exclusively of granite, grenatite, and syenite, with subordinate layers of gneisses, which very often are mere modifications, more or less stratified, of the granites and syenites. In some of the ridges that run over the surface of the

plateau we find a variety of metamorphic slates, with subordinate ayers of crystalline limestones. Extensive beds of lava occur in some parts of the plateau, and in the valleys of the rivers layers of Tertiary sands with petrified wood (*Cupressonoxylum aleuticum*)*.* The plateaus of the Vitim and the Selenga are covered with erratic boulders brought from great distances and show unmistakable traces of glaciation ; and immense lakes—small in comparison with their former size—and extensive marshes cover large areas. Besides older metamorphic slates and granites, Silurian and most probably Devonian rocks are widely spread on the lower plateau and in the low chains of mountains which rise above its surface. Silver, lead, gold, and iron are found in these mountains, as also precious stones. Jurassic deposits, yielding many species of fossil insects and plants, occupy several large depressions. They are all of fresh-water origin and were deposited in great lakes. Like the Jurassic beds of China and Turkestan, they contain layers of coal. The alpine tracts in the north-west of the plateau are built up of granites, syenites, gneisses, and chiefly of metamorphic slates, the age of which cannot yet be precisely ascertained (Laurentian, and possibly also Silurian, or even Devonian). Talc schists, and especially clay slates, both intersected with veins of quartz, have also a very great development here. The alluvial and glacial deposits of the valleys contain a rich percentage of gold, derived from the trituration of the clay slates and their quartz veins. Conglomerates, belonging probably to the Tertiary period, fill several valleys. Unmistakable traces of glaciers have been found in West and East Sayan, as also in the Olekma and Vitim regions. In the Altai the mountains are built up of granites, syenites, and diorites covered with metamorphic slates belonging to the Laurentian, Silurian, Devonian, and Car­boniferous periods. The Jurassic strata on the outskirts are all fresh-water deposits and contain coal, as in Eastern Siberia and China. The Ala-tau are of more modern origin, containing ex­tensive Jurassic beds, no longer deposited in depressions, but entering into the structure of the hills. The elevated plains of Western and Eastern Siberia have a more varied structure. On the Lena

and the Yenisei we find Silurian, Devonian, Carboniferous, and Triassic marine deposits, covered here and there with fresh-water Jurassic. Immense tracts on the upper Lena are covered with horizontal sheets of red sandstone, the age of which is not yet determined, but seems to be Devonian ; while in the government of Irkutsk large areas are covered with Jurassic coal-bearing sand­stones. The same structure is found on the outskirts of the Altai, the Carboniferous and older slates having depressions covered with horizontal strata of Jurassic coal-bearing sandstones. The hilly tracts which rise amidst the Eastern Siberian plains on the Angara and Yenisei consist also of granites, syenites, and diorites covered with Palæozoic rocks up to the Carboniferous, while Jurassic strata are found in the Vilui Mountains. The broad lowlands of Western Siberia are covered throughout with Post-Pliocene deposits which conceal the older rocks,—shells from this period having been found as far south as Omsk (55° N. lat.). The lowlands and plains of Eastern Siberia exhibit a greater variety of structure,—Carbon­iferous, Triassic, marine Jurassic, and Chalk deposits being met with both in the deeper ravines and in the few ridges which appear beyond 60° N. lat. Extensive layers of fresh-water Tertiary have been found in depressions of the plateau, in some valleys of the alpine region, and in the plains and lowlands.

There has been much discussion as to the extent of the glaciers in Siberia during the Glacial period,—the want of polished and scratched surfaces like those of Scandinavia having been urged as proof that they cannot have been considerable. It must neverthe­less be held that the high plateau was at one time covered with a vast ice-sheet, and that in the alpine regions of the Altai, Sayan, Olekma, and Aldan glaciers had a much greater extension than at present, descending in the valleys to at least a level of 2000 feet above the sea, and covering the subordinate swellings between the mountain ranges. Thick layers of Post-Glacial deposits, indicating a climate somewhat more genial than the present, and containing numberless remains of extinct mammals, are extensively spread both in valleys throughout the lowlands and on the islands of the Arctic Ocean ; while in the tundras of the north well-preserved carcases of the mammoth and rhinoceros are occasionally found in the frozen soil.

Traces of Palæolithic man have not as yet been met with in Siberia ; but relics of the Neolithic period are exceedingly numerous. One may almost say that they have been found wherever they were looked for, especially on the banks of the numberless lakes with which Siberia was dotted during the Lacustrine period (see below).

Volcanic formations, so far as is known, appear chiefly along the north-western border-ridge of the great plateau. Ejections of basaltic lava have been found on the southern slope of this ridge, extend­ing over wide areas on the plateau itself, on a stretch of more than 600 miles,—namely, in East Sayan about Lake Kossogol and in the valley of Tunka (river Irkut), in the vicinity of Selenghinsk, and widely spread on the Vitim plateau (rivers Vitim and Tsipa). Extensive layers of trap cover more than 1200 miles along the Tunguzka ; they appear also in the Noril Mountains on the Yenisei, whence they extend towards the Arctic Ocean. Basaltic lavas are also reported to have been found in the Aldan region. On the Pacific slope extinct volcanoes (mentioned in Chinese annals) have been found in the Ilkhuri-alin Hills to the east of Mergen.

The mineral wealth of Siberia is considerable. Gold-dust is found in almost all the alpine regions fringing the great plateau, where clay slates, talc slates, and dioritic slates, intersected by quartz veins, make up the bulk of the mountains. The chief gold-mining regions in these tracts are the Altai, the upper (or Nijne-Udinsk) and the lower (or Yeniseisk) *taigas,* and the Olekma region. Gold is found on the high plateau in the basin of the upper Vitim, on the lower plateau in the Nertchinsk district, and on the upper tributaries of the Amur (especially the Oldoi) and the Zeya, in the north-east con­tinuation of the Nertchinsk Mountains. It has been discovered also in the Bureya range, and in its north-east continuation in the Amguñ region. Auriferous sands, but not very rich, have been dis­covered in the feeders of Lake Khangka and the Suifun river, as also on the smaller islands of the Gulf of Peter the Great. Silver and lead ores are found in the Altai and the Nertchinsk Mountains, as well as copper, cinnabar, and tin. Iron-ores are known at several places on the outskirts of the alpine tracts (as about Irkutsk), as well as in the Selenghinsk region and in the Altai. The chief iron­works of the Urals are situated on the Siberian slope (see Ural). Coal occurs in many Jurassic fresh-water basins,—namely, on the outskirts of the Altai, in south Yeniseisk, about Irkutsk, in the Nertchinsk district, at many places in the Maritime Province, and on the island of Saghalin. Beds of excellent graphite have been found in the Kitoi Alps (Mount Alibert) and in the Turukhansk district. Rock-salt occurs in thinner deposits at several places on the Lena and in Transbaikalia, and salt-springs are numerous,— those of Ust-kut on the Lena and of Usolie near Irkutsk being the chief. A large number of lakes, especially in Transbaikalia and in Tomsk, yield salt. Lastly, from the Altai region, as well as from the Nertchinsk Mountains, precious stones, such as jasper, malachite, beryl, dark quartz, and the like, are exported. The Ekaterinburg

@@@1 “Orographical Sketch of East Siberia,” *ut supra.*

@@@2 For further details, see the descriptions of the different provinces of Siberia.