

ENCYCLOPÆDIA BRITANNICA.

SIB—SIB

SIBBALD, SIR ROBERT (1641-1712), may be considered as the most eminent representative of science and medicine in Scotland towards the close of the 17th century. He was born near Leslie in Fifeshire in 1641. Educated at Edinburgh, Leyden, and Paris, he settled as a physician in Edinburgh and soon rose to eminence. His career is one of marked initiative: he was the first professor of medicine in the university of Edinburgh, and the first president of the college of physicians, and, along with Sir Andrew Balfour, founded the botanic garden. He was also geographer-royal, and his numerous and miscellaneous writings deal effectively with historical and antiquarian as well as botanical and medical subjects. He died in 1712.

Amongst Sibbald's historical and antiquarian works may be mentioned *A History of Fife and Kinross* (Edinburgh, 1710, and Cupar, 1803), which is still indispensable to the student of local history and antiquities; *An Account of the Scottish Atlas* (folio, Edinburgh, 1683); *Vindiciæ Scotiæ Illustratæ* (folio, Edinburgh, 1710); and *Description of the Isles of Orkney and Shetland* (folio, Edinburgh, 1711 and 1845). See also his *Autobiography* (Edinburgh, 1833), to which is prefixed an account of his MSS.

Plate I.

Name and extension.

SIBERIA (Russ. *Sibir*, a word of unknown origin, probably Permian) in the 16th century indicated the chief settlement of the Tatar khan Kutchum,—Isker on the Irtysh. Subsequently the name was extended so as to include the whole of the gradually increasing Russian dominions in Asia, and in the first half of the 19th century it was applied to the immense region stretching from the Ural Mountains to the Pacific, and from the Arctic Ocean to the Chinese frontier and the Kirghiz steppes. This region, however varied in its separate parts, constituted a geographical whole having its own characteristic physical features. The division into Western and Eastern Siberia which naturally came into general use had also a geographical meaning. In 1856, after the annexation of the Amur and Usuri regions, Eastern Siberia was extended so as to include the Russian dominions on the Pacific, although these latter in reality belong climatically and physically to a quite separate region,—that of the North Pacific littoral; and, as the Russian dominions extended into the Kirghiz steppes, these last were also reckoned to Siberia, although mostly belonging in their physical features to another geographical domain,—the Aral-Caspian depression. Later on these steppes were transferred

to the "Orenburg region," or to the "steppe region"; but, on the other hand, some districts which really belong to Western Siberia were included under this new denomination. What is now called "Siberia" has thus lost its geographical unity. There still remains, however, for the geographer a vast tract of northern Asia which might be included under this general name, as representing some special features characteristic of the region. It would be limited by the Ural Mountains on the west, by the Arctic and North Pacific Oceans on the north and east respectively, and on the south by a line broadly corresponding to the 50th degree of latitude, running from the sources of the river Ural to the Tarbagatai range (thus separating the steppes of the Irtysh basin from those of the Aral and Balkash basins), thence along the Chinese frontier as far as the south-east corner of Transbaikalia, whence it might be drawn to the Great Khingan, and along it to the upper Zeya (tributary of the Amur) and Udskoi Ostrog on the Sea of Okhotsk. This wide area would be naturally subdivided into Western Siberia (basins of the Ob and Irtysh) and Eastern Siberia (the remainder of the region). Western Siberia would include the governments of Tobolsk and Tomsk, as well as the parts of Perm situated to the east of the Ural Mountains, and those northern parts of Semipalatinsk which belong to the basins of the Irtysh and the Tobol¹; while Eastern Siberia would include the governments of Yeniseisk and Irkutsk, the provinces of Yakutsk and Transbaikalia, together with the north-western part of the province of Amur and the northern parts of the Maritime Province. In fact, the north-western parts of Manchuria situated between the Argun and the Great Khingan, as well as the upper parts of the Selenga and the Yenisei (Shishkit) belonging to Mongolia, are so intimately connected with Eastern Siberia as regards their physical features that it is difficult for the geographer to separate them.

Since the inclusion of Uralsk, Turgai, Akmolinsk, and Semipalatinsk within the governor-generalship of the steppes, the present administrative subdivisions stand as follows:—

¹ This natural subdivision has been adopted by P. Semenov in his valuable sketch of Western Siberia in *Picturesque Russia* (*Jivopisnaya Rossiya*), vol. xi.

	Area Square Miles.	Population.	Pop. per Square Mile.
Tobolsk	531,982	1,283,168	2.4
Tomsk	329,039	1,134,748	3.4
Western Siberia ¹	861,021	2,417,916	2.8
Yeniseisk	992,870	421,010	.42
Irkutsk	309,190	398,873	1.2
Yakutsk	1,517,127	243,443	.16
Transbaikalia	240,781	497,760	2.1
Eastern Siberia ¹	3,059,968	1,561,086	.51
Amur	173,559	40,533	.23
Maritime Province	730,022	74,000	.10
Amur ¹	903,581	114,533	.12
Total	4,824,570	4,093,535	.85

It is evident that a territory so immense—covering more than 25 degrees of latitude and 120 degrees of longitude—must include a great variety of orographical and climatological characters, and that the popular conception which persists in representing Siberia as a snow-clad desert is erroneous. In fact—no one can speak of the rich prairies of the middle Amur and the Usuri region, where the wild vine grows freely—we find in Siberia proper the very fertile black earth prairie steppes, or rather pampas, of the Tobol and Ishim,—not mere patches of fertile land, but plains covering some 25,000,000 acres and ready to receive millions of inhabitants; the highlands of the Altai, with their rich valleys, alpine lakes, glaciers, and snow-clad peaks,—a country three times as large as Switzerland and presenting almost the same variety of aspects; the high plains of Eastern Siberia, where water-melons are grown in the fields during the short but hot summer; the rich steppes of Minusinsk, profusely adorned with flowers; the lower plateaus of Transbaikalia, embellished with the beautiful Daurian flora and supplying food to hundreds of thousands of cattle; the high inhospitable marshy plateaus of the Selenga and Vitim; vast hilly tracts densely covered with forests, and visited only by hunters and gold-diggers; and beyond these the frozen tundras of the north,—all these constitute an immense world, with the most striking contrasts of scenery and vegetation, of manners and customs. In one direction only is the popular conception true: throughout its extension Siberia is the coldest country of the world in consequence of its protracted and exceedingly severe winter. This variety of characters will be best understood from the following brief sketch of the orography.

Oro-
graphy.

The leading features of the orography of Siberia are so much at variance in our best maps that a few words are necessary to explain the views taken in what follows. The inhabited districts are well laid down; but the immense areas between and beyond these have only been visited by geographers and are mapped only along a few routes hundreds of miles apart. The intermediate spaces are filled according to information derived from native hunters. With regard to a great many rivers we know only the position of their mouths and their approximate lengths estimated by natives in terms of a day's march. Even the hydrographical network is very imperfectly known, especially in the uninhabited hilly tracts.² The orographical representation of Siberia is nothing more than a combination of a few surveys and journeys, in which conscious or unconscious hypothesis is resorted to in order to connect the isolated facts. As soon as the river systems of Siberia began to be approximately known, chains of mountains were drawn in all hilly tracts,—higher ones on the chief watersheds and lower ones along the secondary ones. This representation conveyed quite a false idea as to the surface configuration of Siberia. The immense plateaus which play so predominant a part in the

¹ Governor-generalships.

² The wide area between the middle Lena and the Amur, as well as the hilly tracts west of Lake Baikal, the Yeniseisk mining region, and many others, are in this condition. An instance of a map distinguishing between surveys and information derived from natives is given on a cartoon of map 4 of *Mem. Russ. Geogr. Soc., General Geography*, vol. iii

structure of Asia (as they also do in the western parts of North America) were quite overlooked. Chains of mountains were drawn as if they rose in the midst of plains, where in reality we have either the slopes of one side of the plateaus or border-chains. Lofty mountains appeared where none exist, as, for instance, in those parts of Yakutsk where tributaries of the Lena and the Amur start from common marshes; and some of the highest chains were represented as minor upheavals because they are pierced by rivers descending from the high plateaus to the lowlands. It was only by making use of rich unpublished collections of barometrical observations for the calculation of hundreds of heights that many sections of Siberia could be drawn,³ and by going into a minute study of topographical materials scattered through the bulky literature of Siberia and certain MS. field-books—the whole controlled by personal journeys—that it became possible to arrive at the following general conclusions as to the structure of the country, which may be of service until more complete surveys shall have given more reliable data.⁴ This study has shown how predominant has been the part played in the formation of Siberia by huge swellings of the earth's crust (plateaus), and how subordinate that played by isolated chains of mountains, which latter are regulated in their direction in north-eastern Asia by the border ridges of the plateaus; and it has enabled us to make out a close connexion between the structure of Central Asia and Tibet and that of north-eastern Asia, and to establish a link between the two.

A vast plateau, beginning in the south at the foot of the gigantic Great semicircular border range of the Himalayas, and having the lofty plateau of Pamir in the west and the little-known high tracts of the upper Hoang-ho and Yang-tse-kiang in the east, extends towards the north-eastern extremity of Asia. Broadly speaking, it has the shape of a South America pointed towards Behring Strait. It attains a width of no less than 1800 miles and an altitude of from 11,000 to 14,000 feet in the south; but both width and altitude diminish towards the north-east. In north-west Mongolia the average height is but 4000 to 5000 feet, and this diminishes to 3500 feet in the Vitim plateau; while its width is not more than 700 miles in the latitude of Lake Baikal. On the 50th parallel of latitude there occurs in the plateau a broad lateral indentation, occupied by Lake Baikal and the plains of Kansk, and this renders the resemblance of the plateau to South America still more striking. This immense plateau is the remainder of a vast and very old continent, which, so far as we know, has not been submerged since at least the Devonian period.⁵ It extends from the Himalayas to the land of the Tchuktchis, but does not of course present a plane surface of the same altitude in all its parts. It is diversified in the following ways. (1) Like other plateaus, it has on its surface a number of gentle eminences (*angehäuete Gebirge* of Ritter), which, although reaching great absolute heights, are relatively low. These chains for the most part follow a north-easterly direction in Siberia; but in the southern parts of the plateau, as we approach the Himalayas, they seem to assume a direction at right angles (towards the north-west). (2) On the outskirts of the plateau there are several excavations which can best be likened to gigantic trenches, like railway cuttings when with an insensible gradient a higher level has to be reached. These trenches for successive geological periods have been the drainage valleys of immense lakes (probably also of glaciers) which formerly spread over the plateau, or fords of the seas which surrounded it. Now the chief commercial routes have been made to follow these trenches to reach the higher level of the plateau. Their steep excavated sides, which have the appearance of chains of mountains to the traveller who follows the bottom of the trench, have often been described as such; in reality they are merely unilateral slopes, which may best be compared with the steep slope of the Jura turned towards the Lake of Geneva. We have examples of such trenches in the valley of the Uda to the east of Lake Baikal (route to the Amur); in the valley of the Orkhon, leading to Urga and Mongolia (route to Peking), with a branch up the Djida; in the broad depression of the Ulungur leading from Lake Zaisan to Barkul; and in a few others which have been utilized as

³ A catalogue of heights in East Siberia is given in the appendix to the present writer's "Report on the Olekma and Vitim Expedition" (*Mem. Russ. Geogr. Soc., General Geography*, vol. iii, 1873); also in *Petermann's Mitth.*, 1872. The height of Irkutsk, taken as a basis for the catalogue, has been determined since that date by a levelling through Siberia at 1486 feet.

⁴ "General Sketch of the Orography of Siberia," with map and sections, and "Sketch of the Orography of Minusinsk, &c.," by the same writer (same series, vol. v., 1875). The views taken in these writings have been embodied by A. Petermann in his map of Asia, sheet 58 of Stieler's *Hand-Atlas*.

⁵ The great plateau of North America, also turning its narrower point towards Behring Strait, naturally suggests the idea that there was a period in the history of our planet when the continents turned their narrow extremities towards the northern pole, as now they turn them towards the southern.



routes from the Lena to the Sea of Okhotsk. (3) There are, moreover, two terraces in the plateau,—a higher and a lower, which are very well pronounced in TRANSBAIKALIA (*q.v.*) and in Mongolia. The Yablonovoi range and its south-western continuation the Kentei are border-ridges of the upper terrace. Both rise very gently above it, but have steep slopes towards the lower terrace, which is occupied by the Nertchinsk steppes in Transbaikalia and by the Gobi in Mongolia (2000 to 2500 feet above the sea). They rise to from 5000 to 7000 feet above the sea; the peak of Sokhondo in Transbaikalia reaches nearly 8500 feet. Several low chains of mountains have their base on the lower terrace and run from south-west to north-east; they are known as the Nertchinsk Mountains in Transbaikalia, and their continuations reach the northern parts of the Gobi.¹

The great plateau is fringed on the north-west by a series of high border-ridges, which have their southern base on the plateau and their northern at a much lower level. They may be traced from the Thian-Shan to the arctic circle, and have an east-north-easterly direction in lower latitudes and a north-easterly direction farther north. Both the Alai ridge of the Pamir, continued by the Kokshaltau range and the Khan-Tengri group of the Thian-Shan, and the Saïlughem range of the Altai (see TOMSK), which is continued, in the opinion of the present writer, in the yet unnamed border-ridge of West Sayan (between the Bei-khem and the Us),² belong to this category. There are, however, in these border-ridges several breaches of continuity,—broad depressions or trenches leading from Lake Balkash and Lake Zaisan to the upper parts of the plateau. On the other hand, there are on the western outskirts of the plateau a few mountain chains which take a direction at right angles to the above (that is, from the north-west to the south-east), and parallel to the great line of upheavals in south-west Asia. The Tarbagatai Mountains, on the borders of Siberia, as well as several chains in Turkestan, are instances of these upheavals. But, notwithstanding these complications, it remains certain that the Alai Mountains, the Khan-Tengri group, the Saïlughem range, and the West Sayan are border-ridges of the high plateau fringing it from 70° to 100° E. long. These border-ridges contain the highest peaks of their respective regions; they are immense walls which render access to the high plateau extremely difficult, unless the traveller follows the above-mentioned trenches. Beyond 100° E. long. the above structure is complicated by the great lateral indentation of Lake Baikal. But around and beyond this lake we again find the same huge border-ridge fringing the plateau and turning its steep north-western slope towards the valleys of the Irkut, the Barguzin, the Muya, and the Tehara, while its southern base lies on the plateaus of the Selenga (nearly 4000 feet high) and the Vitim (see TRANSBAIKALIA). The peaks of the Saïlughem range reach from 9000 to 11,000 feet above the sea, those of West Sayan about 10,000. In East Sayan is Munku-Sardyk, a peak 10,000 feet high, together with many others from 8000 to 9000 feet. Farther east, on the southern shore of Lake Baikal, Khamar-daban rises to 6900 feet, and the huge dome-shaped, bald summits of the Barguzin and Southern Muya Mountains attain an elevation of 6000 to 7000 feet above the sea-level. The orography of the Aldan region is but little known; but travellers who journey from the Aldan (tributary of the Lena) to the Amur or to the Sea of Okhotsk have to cross the same plateau and its border-ridge, the former becoming narrower and barely attaining an average altitude of 3200 feet. Whether it projects farther into the land of the Tchuktchis remains unsettled, although the probability is that it does.

A typical feature of the north-eastern border of the high plateau is a succession of broad longitudinal³ valleys along its outer base, shut in on the outer side by walls of wild mountains having a very steep slope towards them. Formerly filled with alpine lakes, these valleys have now a flat alluvial soil occupied by human settlements, and are watered by rivers which flow along them before they make their way to the north through narrow gorges pierced in the mountain-wall just mentioned. This structure is seen in the valley of the Us in West Sayan, in that of the upper Oka and Irkut in East Sayan, in the valley of the Barguzin, the upper Tsipa, the Muya, and the Tehara, at the foot of the Vitim plateau, as also, probably, in the Aldan.⁴ The chains of mountains which fringe these valleys on the north-west belong to the wildest parts of Siberia. They are named the Usinsk Mountains in West Sayan and the Tunka Alps in East Sayan; the latter, pierced by the Angara at Irkutsk, in all probability are continued north-eastwards

¹ The lower terrace is obviously continued in the Tarim basin of East Turkestan; but in the present state of our knowledge we cannot determine whether the further continuations of the border-ridge of the higher terrace (Yablonovoi, Kentei) must be looked for in the Great Altai or in some other range situated farther to the south. There may be also a breach of continuity in some depression towards Barkul.

² See "Oreographical Sketch of Miusinsk, &c.," *ut supra*.

³ The word "longitudinal" is here used in an orographical not a geological sense. Meglitzki in 1896 and recently M. Chersky have shown that these valleys are not synclinal foldings of rocks; they seem to be erosion-valleys.

⁴ We do not know at present whether the same structure is exhibited in the Altai at the foot of the Saïlughem range. The upper Bukhtarma valley seems, however, to belong to the same type.

in the Baikal Mountains, which run from Irkutsk to Olkhon Island and the Svyatoi Nos peninsula of Lake Baikal, thus dividing the lake into two parts, the great and the little.⁵ The Barguzin Mountains (on the right bank of the Barguzin river) and the Northern Muya range continue them farther to the north-east, and most probably they are prolonged still farther on the left bank of the Aldan.

A strip of alpine region, 100 to 150 miles in breadth, fringes the north-western border of the plateau beyond the ridges just mentioned. This constitutes what is called in Eastern Siberia the *taiga*: it consists of separate chains of mountains whose peaks rise from 4800 to 6500 feet above the sea, beyond the upper limits of forest vegetation (the *goltsy*); while the narrow valleys afford difficult means of communication, their floors being thickly covered with boulders, or else swampy; the whole is clothed with thick impenetrable forests. The orography of this alpine region is very imperfectly known; but the chains have a predominant direction from south-west to north-east. They are described under different names in Siberia:—the Altai Mountains (see TOMSK) in Western Siberia, which also belong to this category, the Kuznetskiy *tau* and the Us and Oya Mountains in West Sayan (see YENISEISK), the Nijne-Udinsk *taiga* or gold-mine district, several chains pierced by the Oka river, the Kitoi Alps in East Sayan, the mountains of the upper Lena and Kirenga, the Olekminsk gold-mine district, and the yet unnamed mountains which protrude north-east between the Lena and the Aldan.

A broad belt of elevated plains, ranging between 1200 and 1700 feet above the sea, extends beyond these alpine regions. These plains, which are entered by the great Siberian highway about Tomsk⁶ and extend farther in a south-westerly direction, fringing the Altai Mountains, are the true abodes of Russian colonizers; they are fertile for the most part, although sometimes dry, and are rapidly being covered with Russian villages. About Kansk in Eastern Siberia they penetrate in the form of a broad gulf south-eastwards as far as Irkutsk. Those on the upper Lena, having a somewhat greater altitude and being situated in higher latitudes, are almost wholly unfitted for agriculture. The north-western border of these elevated plains cannot yet be determined with exactitude. In the region between Viluisik (on the Vilui) and Yeniseisk a broad belt of alpine tracts, reaching their greatest elevation in the northern Yeniseisk *taiga* (between the Upper and the Podkamennaya Tunguzka) and continued to the south-west in lower upheavals, separates the elevated plains from the lowlands which extend towards the Arctic Ocean. In Western Siberia these high plains seem to occupy a narrower area towards Barnaut and Semipalatinsk, and it is difficult to say whether they are separated by an abrupt slope from the Aral-Caspian depression.

Farther to the north-west, beyond these high plains, we find a broad belt of lowlands extending as far as the Ural Mountains and the Arctic Ocean. This vast tract, which is now only a few dozen feet above the sea, and most probably was covered by the sea during the Post-Pliocene period, stretches from the Aral-Caspian depression to the lowlands of the Tobol, Irtysh, and Ob, and thence towards the lower parts of the Yenisei and the Lena. Only a few separate mountain ranges, like the Byrranga on the Taimyr peninsula, the Syverma Mountains, the Verkhoyansk and the Khara-utakh ranges, diversify the monotonous surface of these lowlands, which are covered with a thick sheet of black earth in the south and assume the character of barren tundras in the north (see TOBOLSK and YENISEISK).

The south-eastern slope of the great plateau of Asia cannot properly be reckoned to Siberia, although parts of the province of eastern Amur and the Maritime Province are situated on it; they have slope of quite a different character, climate, and vegetation, and ought properly to be reckoned to the Manchurian region. As already said, we have to the east of the Yablonovoi border-ridge the lower terrace of the high plateau, reaching about 2000 to 2500 feet in Transbaikalia and extending farther to the south-west through the Gobi to East Turkestan. The south-eastern edge of this lower terrace is fringed by a massive border-ridge—the Khingan—which runs in a north-easterly direction from the Great Wall of China to the sources of the Nonni-ula. The traveller crossing it from the west is hardly aware of its existence; but it has a very steep slope towards the east, and forms a most important boundary for the Manchurian flora, which does not extend over the plateau. The northern parts of the Khingan are quite unexplored; the most northerly point that has been visited is the sources of the Gau, where the present writer crossed it on his way to Mergen; and we have no direct data for determining where it is crossed by the Amur. But, considering the structure of the country on the left bank of the Amur, it appears probable that this river crosses it below Albazin (between Totbuzina and Kuznetsova, where it makes great windings), and the Zeya where it is joined by the Gilui,—

⁵ The deep crevice filled up by Lake Baikal would thus appear to be made up of two longitudinal valleys connected together by the passage between Olkhon and Svyatoi Nos.

⁶ "Levelling of Siberia," in *Izvestia of the Russian Geogr. Soc.*, vol. xxi.

Longi-
tudinal
valleys.