remains of former lacustrine basins; while at the junction of the Irtish and Ob impassable marshes extend for many thousands of square miles. Several alpine lakes, of which the picturesque Telet- skoye may be specially mentioned, fill up the depressions of the valleys of the Altai. .

The coast-line of Siberia is very extensive both on the Arctic Ocean and on the Pacific. The former ocean is ice-bound for at least ten months out of twelve; and, though navigation along its shores has been proved by Nordenskjöld to be possible, it is ex­ceedingly doubtful whether it can ever become a commercial route of any importance. The coast-line has few indentations, the chief being the double bay of the Ob and the Taz, separated from the Sea of Kara by an elongated peninsula (Samoyede), and from the bay of the Yenisei by another. The immense peninsula of Taimyr —a barren tundra intersected by the wild Byrranga Hills—projects in Cape Tcheluskin as far north as 77° 46' N. lat. The bay of the Yana, east of the delta of the Lena, is a wide indentation sheltered on the north by the islands of New Siberia. The bays of the Kolyma, the Tchaun, and Kolutchin are of little importance. The group of four larger and several smaller islands called New Siberia, situated off the mouth of the Yana, are occasionally visited by a few hunters, as is also the small group of the Bears’ Islands opposite the mouth of the Kolyma. Kellett’s or Wrangel's Land is still quite unknown. The Strait of Behring at the north-east extremity of Siberia and the Sea of Behring between the land of the Tchuktchis and Alaska, with its great Gulf of Anadyr, are often visited by seal-hunters, and the Commander Islands off Kamchatka are valu­able stations for this pursuit. The Sea of Okhotsk, separated from the Pacific by the Kurile Archipelago and from the Sea of Japan by the islands of Saghalin and Yesso, is notorious as one of the worst seas of the world, owing to its dense fogs and its masses of floating ice. The Shantar Islands in the bay of the Ud are worthy of notice only for their geological interest. The double bay of Ghijiga and Penjinsk, as well as that of Taui, would be useful as harbours were they not frozen seven or eight months every year and covered with dense fogs in summer. The northern part of the Sea of Japan, which borders the shores of the Usuri region, has, besides the smaller Bays of Olga and Vladimir, the beautiful Gulf of Peter the Great, on which stands Vladivostok, the chief Russian naval station on the Pacific (see Maritime Province). Okhotsk and Ayan on the Sea of Okhotsk, Petropavlovsk on the east shore of Kamchatka, Nikolaievsk, Konstantinovsk, and Vladivostok on the Sea of Japan, and Dui and Korsakovo on Saghalin (*q.v*.) are the only ports of Siberia.

Although Siberia is nearly all included between 50° and 72° N. lat.,@@1 its climate is extremely severe, even in its southern parts. This severity arises chiefly from the orographical structure: the vast plateau of Central Asia prevents the moderating influence of the sea from being felt. The extensive lowlands which cover more than one-half of its area, as well as the elevated plains, lie exposed to the influence of the Arctic Ocean. The warm south-west winds have to cross the elevated plateau of Persia before reaching the Aral-Caspian depression, and there they deposit nearly all their moisture. And, if a current of warmer air flows from the west over Siberia (several data, such as meteorological observations on Mount Alibert and at the Voznesensk mine in the Olekma region render its existence most probable in Eastern Siberia), it only makes its influence felt in the higher parts of the hilly tracts, by raising the line of perpetual snow in Eastern Siberia to the unusual height of 10,000 feet,@@2 and by elevating by a few degrees the tem­perature of places situated in the alpine regions above the 3000 or 4000 feet level. The air, after being refrigerated on the plateaus during the winter, drifts, owing to its greater density, down upon the lowlands; hence in the region of the lower Lena we find an exceedingly low temperature throughout the winter, and at Ver­khoyansk, in 67° N. lat., the pole of cold of the eastern hemi­sphere.@@3 Nevertheless Siberia enjoys a warm summer; owing to the dryness of the climate, the unclouded sun fully warms the earth during the long summer days in those high latitudes, and gives a short period of warm and even hot days in the immediate neigh­bourhood of the pole of cold. The Siberian winter may be said to last from the end of October until March, and it is exceedingly severe. As early as November mercury freezes in the latitude of Irkutsk (51° to 52° N. lat.), while in December, January, and even February it remains frozen for weeks together in south Siberia. Frosts of -13o to -18° Fahr. are not uncommon at Krasnoyarsk, Irkutsk, and Nertchinsk ; even in the warmer southern regions of

Western Siberia and of the Amur the average winter temperature is respectively 2°∙4 Fahr. and -10o∙2; while at Yakutsk and Verkho­yansk the thermometer occasionally falls as low as -75° and -85° Fahr. Trees, as observed by Middendorff, become frozen to their very heart, and the axe, which becomes as fragile as glass, can hardly make any impression upon them. Rivers are frozen to the bottom, and water flowing over the ice adds new layers. The soil freezes many feet deep over immense areas even in southern Siberia. The atmosphere becomes laden with frozen vapours. Man, however, successfully resists these rigours, provided he adopts the customary costume of Siberia (two dresses of fur, the upper of which has the hair turned outside), and this all the more as the hardest frosts occur only when an absolute stillness of the air prevails. More dreaded than the frosts are the terrible *burans* or snow-storms, which occur in early spring and destroy thousands of horses and cattle that have been grazing in the steppes throughout the winter. Although there are very heavy falls of snow in the alpine tracts—especially about Lake Baikal—on the other side, in the steppe regions of the Altai and Transbaikalia and in the neighbourhood of Krasnoyarsk, the amount of snow is so small that travellers use wheeled vehicles, and cattle can find food in the steppe. Spring sets in with re­markable rapidity and charm at the end of April; but in the second half of May come the “icy saints’ days,” so blighting that it is impossible to cultivate the apple or pear. After this short period of frost and snow summer comes in its full beauty; the days are very hot, and, although they are always followed by cold nights, vegetation advances at an astonishing rate. Corn sown about Yakutsk in the end of May is ripe in the end of August. Still, at many places night frosts set in as early as the second half of July. They become quite common in August and September. Nevertheless September is much warmer than May, and October than April, even in the most continental parts of Siberia. By the end of October the rivers begin to freeze, and in the first days of November they are all frozen; even the Amur becomes a high­way for sledges, while the Baikal is usually frozen before the middle of January. The isotherms are exceedingly interesting. That of 32° Fahr. crosses Western Siberia in its middle parts and Eastern Siberia in its southern parts, running through Bogoslovsk, Tobolsk, a little above Omsk and Tomsk, close by Irkutsk, Tchita, Nertchinsk, Blagovyeschensk, and Konstantinovsk. The isotherms of July run as follows. That of 68° Fahr., which in Europe passes through Cracow and Kaluga, here traverses Omsk, Krasnoyarsk, and Irkutsk, whence it turns north to Yakutsk, and then south again to Vladivostok. Even the mouths of the Ob, Yenisei, Lena, and Kolyma in 70° N. lat. have in July an average temperature of 40° to 50°. Quite contrary is the course of the January isotherms. That of 14° Fahr., which passes in Europe through Uleåborg, only touches the southern part of Western Siberia in the Altai Mountains. That of -4° Fahr., which crosses Nova Zembla in Europe, passes through Tobolsk, Tomsk, Krasnoyarsk, and Irkutsk, and touches 45° N. lat. at Urga, turning north in the Amur region and reaching the Pacific at Nikolaievsk. The isotherm of -22° Fahr., which touches the north point of Nova Zembla, passes in Siberia through Turukhansk and descends as low as 55° N. lat. in Transbaikalia, whence it turns north to the Arctic Ocean. The following figures will give a more complete idea of the climate:—

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | N. Lat. | Height above Sea in Feet. | Average Temperature in Degrees Fahr. | | | Yearly  Rainfall  in  Inches. | Nebu­  losity,  per­  cent. |
| Year. | Jan. | July. |
| Ust Yansk(Yana) | 70° 55' | 30 | 3°∙4 | -42°∙7 | 56°∙0 | .. | .. |
| Verkhoyansk .. | 67° 34' | 160 | 2°0 | -56°∙0 | 59°∙8 | .. | .. |
| Turukhansk .... | 65° 55' | 70 | 20°∙8 | -16°∙1 | 59°∙5 | .. | .. |
| Berezoff (Ob).... | 63° 56' | 100 | 23°∙7 | - 8°∙0 | 62°·0 | .. | .. |
| Yakutsk | 62° 2' | 520 | 12°∙0 | -46°∙7 | 65°∙8 | .. | .. |
| Okhotsk | 59° 21' | 10 | 22°∙8 | -10°∙7 | 55°·2 | .. | .. |
| Narym (Ob) .... | 58° 55' | 200 | 28°∙5 | - 8°∙0 | 67°T | .. | .. |
| Voznesensk mine | 58° 45' | 2800 | 21°∙8 | -12°∙5 | 61°∙9 | .. | .. |
| Yeniseisk | 58° 27' | 260 | 28°∙0 | -12°0 | 66°∙0 | 15∙4 | 55 |
| Tobolsk | 58° 12' | 160 | 31°∙9 | - 2°∙2 | 66°∙7 | 12∙6 | 59 |
| Tomsk | 56° 29' | 230 | 30°∙9 | - 3°∙5 | 66°∙3 |  | 59 |
| Ishim | 56° 6' | 330 | 31°∙9 | - 4°∙1 | 66°∙0 | 12∙6 | 59 |
| Krasnoyarsk.... | 55° 1' | 560 | 33°0 | - 3°∙5 | 67°∙0 | .. | .. |
| Barnaul | 53° 20' | 460 | 32°∙5 | - 2°∙8 | 67°∙5 | 9∙4 | 64 |
| Nikolaievsk .... | 53° 8' | 70 | 27°∙2 | - 9°∙8 | 61°∙8 | 18∙9 | .. |
| Irkutsk | 52° 17' | 1486 | 32°0 | - 4°∙1 | 65°∙6 | 17∙3 | .. |
| Nertchinsk mine | 51° 19' | 2170 | 25°∙3 | -21°∙0 | 65°∙1 | 15∙4 | 34 |
| Semipalatinsk .. | 50° 24' | 590 | 36°∙2 | - 0°∙6 | 72°∙5 | 9∙4 | .. |
| Blagovyeschensk | 50° 16' | 370 | 29°∙8 | -13°∙8 | 69°∙1 | .. | .. |
| Khabarovka .... | 48° 28' | 250 | 32°∙1 | -12°∙8 | 67°∙8 | .. | .. |
| Urga (Mongolia) | 47° 56' | 3770 | 27°∙2 | -12°∙7 | 62°∙6 | 10∙2 | 30 |
| Vladivostok .... | 43° 7' | 100 | 40°∙1 | 4°∙5 | 67°∙3 | 12∙6 | 42 |

The flora of Siberia presents very great local varieties, not only on account of the diversity of physical characteristics through this wide territory, but also in consequence of the intrusion of new species in various proportions from the neighbouring tracts, as widely different as the arctic littoral, the dry steppes of Central Asia, and the wet monsoon regions of the Pacific littoral. A com­plete description of the flora of Siberia would have to treat of (1)

@@@1 Only the narrow fringe of the tundras extends beyond 70° N. lat.

@@@2 Although rising to heights ranging from 6000 to 10,000 feet, the mountain peaks of Eastern Siberia do not reach the snow-line, which is found only on the Munku-Sardyk in East Sayan, above 10,000 feet. Patches of perpetual snow occur in Eastern Siberia only on the mountains of the far north. On the Altai Mountains the snow-line is about 7000 feet.

@@@3 The average temperature of winter (December to February) at Yakutsk is -40°∙2 Fahr., at Verkhoyansk -53°∙l. At the polar meteorological station of Sagastyr, in the delta of the Lena (73° 23' N. lat.), the following average temperatures were observed in 1882 and 1883—January - 34°∙3 Fahr. (February - 43°∙6), July 40°∙8, year 2°∙l. The lowest average temperature of a day is - 61°∙6 Fahr.