The climate of West Turkestan is exceedingly dry and con­tinental. Although the country is comprised within the lati­tudes of Sicily and Lyons, it has a south Norwegian January and a Persian summer. Temperatures of more than 100o Fahr. in the shade are common, and the heat is rendered still more unbearable by the reflexion from a soil destitute of vegetation. The winter is for the most part so cold that the average temperature of January is below the freezing point, and even reaches 0° Fahr. Snow falls for several months on the lower Syr-Daria, and, were it not blown away by the winds, sledge-communication would be possible. This river is frozen for an average of 123 days every year in its lower parts, and nearly 100 days at Perovsk. At Tashkend there is snow during two months and temperatures of -10° Fahr. have been measured. In 1876, on 24th October, almond-trees, vines, and cotton crops were buried under a heavy snowfall. To the south of Khojend the winter becomes more clement. Absence of rain is the distinctive feature of the climate. Although it rains and snows heavily on the mountains, only 11 inches of rain and snow fall throughout the year at Tashkend, at the base of the highlands ; and the steppes of the lower Amu have less than 3 inches. A few showers are all that fall from the almost invariably cloudless sky above the Transcaspian steppes. The following table will illus­trate the climate of Turkestan :—

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Lati­tude. | Height in feet. | Average temperature. | | | Rain in inches. |
| Year. | January. | July. |
| Akmolinsk | 51° 12' | 1020 | 28°∙8 | 0°∙0 | 69°∙2 | 9∙2 |
| Semipalatinsk | 50o 24' | 590 | 27°∙ 0 | -0°∙7 | 72°∙5 | 7∙7 |
| Irghiz | 48° 37' | 360 | 21o∙8 | 3 ’4 | 76o∙2 | 6∙1 |
| Kazalinsk | 45° 45' | 160 | 45°∙5 | 10°∙6 | 78°∙0 | 7∙9 |
| Alexandrovsk | 44° 33' | -30 | 51°∙2 | 25°∙0 | 78o∙0 |  |
| Kulja | 43° 51' | 2100 | 48° ∙7 | 14o∙4 | 76°∙5 |  |
| Nukus | 42° 27' | 215 | 53°∙0 | 19°∙4 | 79°∙6 | 2∙9 |
| Petro-Alexandrovsk | 41° 28' | 325 | 55°∙0 |  |  | 2 4 |
| Tashkend | 41° 19' | 1480 | 58°∙3 | 29°∙0 | 77 \*5 | 11∙3 |
| Krasnovodsk | 40° 00' | -70 | 59° ∙8 | 36°∙3 | 83°∙2 |  |
| Yarkand (East Tur.).. | 38° 21' | 4120 | 54°∙2 | 21°∙2 | 81°∙7 | .. |

The fauna of Turkestan belongs to the great zoo-geographical domain of northern Asia, and is only differentiated by the presence of species which have disappeared from the peripheric parts of the Old World and now find a refuge in the remotest regions of the uninhabited plateau. From the great Palæoarctic region it is distinguished by the presence of Himalayan species. The distinct­ive animal of the Pamir plateau is the magnificent *Ovis poli* (con­jectured to be the ancestor of our common sheep), mentioned by Marco Polo and rediscovered by Syevertsoff. It breeds by thousands on the Pamir, climbing the highest ridges, which it prefers to the valleys. The region to which it is confined has the shape of an ellipse, with its longer axis running south-west to north-east. The animal is rare on the upper Naryn, and never penetrates to the west of Sel-su. In the alpine tracts of the Tian-Shan, on the borders of the Pamir, their horns and skulls are frequently met with, but there the place of the species is now taken by *Oris karelini* The wild horse, which occurred in Poland a few centuries ago, has been discovered by Prejevalsky in the highlands of Dzungaria and described as *Equus prjevalskii* by Polyakoff. The wild camel in­habits the lonely plateaus south of the Ala-Shan ; but no descrip­tion of it has been published. The other mammals of Turkestan are mostly those which are met with elsewhere in north Asia. The large light-coloured Himalayan bear (*Ursus isabellinus)* has its home on the Pamir, and the smaller, strong, white-clawed *Leucοnyx* up to the highest levels on the Tian-Sham Antelopes, *Lepus lehmanni, Lagomys rutilus,* various species of *Arvicolæ,* and the Himalayan long-tailed marmot (*Arctomys caudatus),* the most char­acteristic inhabitant of the alpine meadows, are the only mammals of the Pamir proper. In the alpine region are found the badger (*Meles taxus),* the ermine (*Fœtorius ermineus)* and six other *Mus- telidæ,* the wild dog (*Canis alpinus),* the common and the black­eared fox (*C. melanotis),* while the corsac fox (*C. corsac)* is met with only on the plains. Two species of lynx, the cheetah (*Felis jubata), Felis manul,* and *Felis irbis,* this last extending westwards as far as the Persian Gulf and eastwards as far as the river Amur, must be added to the above. The tiger is met with only on the lower Amu-Daria, except when it wanders to the alpine region in pursuit of the maral deer (*Cerυus maral).* The jackal is charac­teristic of the steppes ; it banishes the wolves and foxes. Hares are represented by several species, *Lepras lehmanni* being the most characteristic. Both the common and the long-tailed marmot (*A. baibacinus* and *A. caudatus)* are found at the foot of the mountains, as also four species of *Spermophilus,* three of voles, two of the mouse, and three of the hamster. The *Meriones* (four species) and the jerboa (five species) are only met with in the steppe region. Of ruminants, besides the sheep (*O.poli, O. karelini, O. nigrimontana, O. heinsii),* we find one mufflon (*Musimοn vignei),* formerly known only in the Himalayas, the Chinese antelope (*Antilope subgutturosa)* and the saiga antelope in the steppes, the Siberian ibex and another goat, the yak, the zebu or Indian ox, the common ox, the camel, and the dromedary. The wild boar is common in the reed thickets along the rivers and lakes, where it stays during the winter, migrating to the highlands in summer. The hedgehog and porcu­pine are common in the plains.

It would be impossible to describe in a few words the avifauna. No fewer than 385 species are recorded, most of them being middle- European and Mediterranean. A large number were formerly known only in the Himalayas, or in Persia, while others have their origin in east Asia. The commonest are mostly European acquaintances. As for the very rich insect fauna, of which full descriptions are now accessible, it is worthy of note that among the *Lepidoptera* of the Pamir there is an interesting mixture of Tian-Shan with Himalayan species. Μ. Grum-Grzimailo found on the Pamir the *Colias nastes,* a species characteristic of Labrador and Lapland ; like the alpine plants which bear witness to a Glacial period flora in the Himalayas, this butterfly is a survival of the Glacial period fauna of the Pamir.@@1

As a whole the flora of Turkestan belongs to that of Central Asia, which was formerly continued by geo-botanists as far west as the steppes of Russia, but which must now be considered as a separate region subdivided into two,—the Central Asian proper and that of the Gobi. It has its own habitus, notwithstanding the number of species it has in common with Siberia and south-east Russia on the one hand and with the Himalayas on the other, and this habitus is due to the dryness of the climate and the consequent changes undergone by the soil. Towards the end of the Glacial period the Tian-Shan Mountains had a flora very like that of northern Caucasus, combining the characters of the floras of the European Alps and the Altai, while the prairies had a flora very much like that of the south Russian steppes. During the Stone Age the human inhabit­ants lived in forests of maple, white beech, and apple trees. But the gradual desiccation of the country resulted in the immigration from the Central Asian plateau of such species as could adapt them­selves to the dry climate and soil, in the disappearance of European and Altaic species from all drier parts of the region, in the survival of steppe species, and in the adaptation of many of the existing species to the needs of an arid and extreme climate and a saline soil.@@2 At present the flora of Turkestan has a variety of characters, depend­ing on the various physical aspects of the separate regions, the Pamir vegetation and that of the Aral-Caspian steppes constituting two types with numberless intermediate gradations.

There is no arboreal vegetation on the Pamir, except a few willows and tamarisks along the rivers. Mountain and valley alike are covered with soft carpets of grass, various species of *Festuca* predominating almost to the exclusion of all others. In the immediate vicinity of water the *ryang (Carex physoides)* grows, and a few patches are covered with *Allium.* To these may be added a few *Ranunculaceæ,* some *Myosotis,* low *Scabiosæ,* the common *Taraxacum,* one species of *Chamomilla,* and a few *Leguminosæ.* In the north and west the *Stipa* of the Russian steppes supersedes *Festuca* and affords splendid pasture for the herds of the Kara- Kirghiz. In the gorges and on the better-watered slopes of the mountains the herbaceous vegetation becomes decidedly rich. Be­sides the above-named there are many other *Gramineæ,* such as the beautiful *Lasiagrοstis splendens,* and whole seas of *Scabiosæ. Eremurus,* of a variety of colours and 6 to 7 feet in height, forms thickets along with the tall *Scorodosma foetida.* The northern slopes of the Aɫai chain are richer in trees. Up to 12,000 feet full- grown specimens occur of the *artcha (Juniperus pseudo-Sabina),* characteristic of the whole northern slopes of the Turkestan high­lands, the poplar, a very few birches (*B. Sogdiana),* and a rich underwood of shrubs familiar in European gardens, such as *Rhodo­dendron chrysanthum, Sorbus aucuparia (rοwan), Berberis heteropoda* (berberry), *Lonicera Tatarica* (honeysuckle), and *Crataegus* (haw­thorn). Farther east and north comes the Turkestan pine (*Picea Schrenkiana),* while at lower levels there grow numerous willows, black and white poplars, tamarisk, large *Celtis,* as well as shrubs of *Elæagnus* (wild olive), *Hippophae rhamnoides* (sallow thorn), *Rubus* *fructicosus* (blackberry), *Prunus spinosa* (blackthorn), and *P. Ar­meniaca* (apricot). The characteristic poplar, *Populus diversifolia,* which does not seem to have found yet the shape of leaves best suited to the climate, and therefore produces them in most striking variety, and the dwarf *Acer Lobelii—*very different, however, from the European maple—also occur.

The above applies to most of the highlands of the Tian-Shan. The drier southern slopes are quite devoid of arboreal vegetation.

@@@1 For ampler information, see Syevertsoff's “Vertical and Horizontal Distri­bution of Turkestan Animals,” in *Izvestia* of the Moscow Soc. of Amateurs of Nat. Science, 1873 ; Fedtchenko’s “ Travels to Turkestan,” extending over 18 parts of vols. xi., xix., xxi., xxiv., and xxvi. of the same *Izvestia,* and forming a series of monographs by specialists which deal with separate divisions of the animal and vegetable kingdom (the flora by Regel); Oshanin's *Zοο-Geοgraphical Problems in Turkestan,* Tashkend, 1880; Grum-Grzimailo’s “Flora and Fauna of Pamir,” in *Izvestia* of Russ. Geogr. Soc., 1886; *Works of the Aral-Caspian Expedition·,* Butleroff’s “Ornith. of Nukus,” in *Mem. St Petersb. Soc. Eat.,* vol. x., 1879 ; and the journeys of Borschoff, Semenoff, Syevertsoff, Osten-Saeken *(Sertum Tian-Shanicum),* Regel, Prjevalsky, and many others. *Cf.* also for the southern parts of the region *Reports* of the Afghan Boundary Commission.

@@@2 See Μ. Krasnoffs researches in *Izvestia* of Russ. Geogr. Soc., vol. xxiii., 1887.