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978-1-108-07336-3 - The Polar World: A Popular Description of Man and Nature in
the Arctic and Antarctic Regions of the Globe

Georg Hartwig

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PART I.



THE ARCTIC REGIONS.

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Arctic Forest and Aurora.

CHAPTER I.

THE ARCTIC LANDS.

The Barren Grounds or Tundri—Abundance of Animal Life on the Tundri in Summer—Their Silence and Desolation in Winter—Protection afforded to Vegetation by the Snow—Flower-growth in the highest Latitudes—Character of Tundra Vegetation—Southern Boundary-line of the Barren Grounds—Their Extent—The Forest Zone—Arctic Trees—Slowness of their Growth—Monotony of the Northern Forests—Mosquitoes—The various Causes which determine the Severity of an Arctic Climate—Insular and Continental Position—Currents—Winds—Extremes of Cold observed by Sir E. Belcher and Dr. Kane—How is Man able to support the Rigours of an Arctic Winter?—Proofs of a milder Climate having once reigned in the Arctic Regions—Its Cause according to Dr. Oswald Heer—Peculiar Beauties of the Arctic Regions—Sunset—Long Lunar Nights—The Aurora.

A GLANCE at a map of the Arctic regions shows us that many of the rivers belonging to the three continents—Europe, Asia, America—discharge their waters into the Polar Ocean or its tributary bays. The territories drained by these streams, some of which (such as the Mackenzie, the Lena, the Yenisei, and the Obi) rank among the giant rivers of the earth, form, along with the islands within or near the

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Arctic circle, the vast region over which the frost-king reigns supreme.

Man styles himself the lord of the earth, and may with some justice lay claim to the title in more genial lands where, armed with the plough, he compels the soil to yield him a variety of fruits; but in those desolate tracts which are winter-bound during the greater part of the year, he is generally a mere wanderer over its surface—a hunter, a fisherman, or a herdsman—and but few small settlements, separated from each other by immense deserts, give proof of his having made some weak attempts to establish a footing.

It is difficult to determine with precision the limits of the Arctic lands, since many countries situated as low as latitude 60° or even 50°, such as South Greenland, Labrador, Kamtschatka, or the country about Lake Baikal, have in their climate and productions a decidedly Arctic character, while others of a far more northern position, such as the coast of Norway, enjoy even in winter a remarkably mild temperature. But they are naturally divided into two principal and well-marked zones—that of the forests, and that of the treeless wastes.

The latter, comprising the islands within the Arctic circle, form a belt, more or less broad bounded by the continental shores of the North Polar seas, and gradually merging towards the south into the forest-region, which encircles them with a garland of evergreen coniferæ.

This treeless zone bears the name of the ‘barren grounds,’ or the ‘barrens’ in North America, and of ‘tundri’ in Siberia and European Russia. Its want of trees is caused not so much by its high northern latitude as by the cold sea-winds which sweep unchecked over the islands or the flat coast-lands of the Polar Ocean, and for miles and miles compel even the hardiest plant to crouch before the blast and creep along the ground.

Nothing can be more melancholy than the aspect of the boundless morasses or arid wastes of the tundri. Dingy mosses and grey lichens form the chief vegetation, and a few scanty grasses or dwarfish flowers that may have found a refuge in some more sheltered spot are unable to relieve the dull monotony of the scene.

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In winter, when animal life has mostly retreated to the south or sought a refuge in burrows or in caves, an awful silence, interrupted only by the hooting of a snow-owl or the yelping of a fox, reigns over their vast expanse ; but in spring, when the brown earth reappears from under the melted snow and the swamps begin to thaw, enormous flights of wild birds appear upon the scene and enliven it for a few months. An admirable instinct leads their winged legions from distant climes to the Arctic wildernesses, where in the morasses or lakes, on the banks of the rivers, on the flat strands, or along the fish-teeming coasts, they find an abundance of food, and where at the same time they can with greater security build their nests and rear their young. Some remain on the skirts of the forest-region ; others, flying further northwards, lay their eggs upon the naked tundra.

Eagles and hawks follow the traces of the natatorial and strand birds ; troops of ptarmigans roam among the stunted bushes ; and when the sun shines, the finch or the snow-bunting warbles his merry note.

While thus the warmth of summer attracts hosts of migratory birds to the Arctic wildernesses, shoals of salmon and sturgeons enter the rivers in obedience to the instinct that forces them to quit the seas and to swim stream upwards, for the purpose of depositing their spawn in the tranquil sweet waters of the stream or lake. About this time also the reindeer leaves the forests to feed on the herbs and lichens of the tundra, and to seek along the shores fanned by the cooled sea-breeze some protection against the attacks of the stinging flies that rise in myriads from the swamps.

Thus during several months the tundra presents an animated scene, in which man also plays his part. The birds of the air, the fishes of the water, the beasts of the earth, are all obliged to pay their tribute to his various wants, to appease his hunger, to clothe his body, or to gratify his greed of gain.

But as soon as the first frosts of September announce the approach of winter, all animals, with but few exceptions, hasten to leave a region where the sources of life must soon fail. The geese, ducks, and swans return in dense flocks to the south ; the strand-birds seek in some lower latitude a softer soil which allows their sharp beak to seize a burrowing

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prey; the water-fowl forsake the bays and channels that will soon be blocked up with ice; the reindeer once more return to the forest, and in a short time nothing is left that can induce man to prolong his stay in the treeless plain. Soon a thick mantle of snow covers the hardened earth, the frozen lake, the ice-bound river, and conceals them all—seven, eight, nine months long—under its monotonous pall, except where the furious north-east wind sweeps it away and lays bare the naked rock.

This snow, which after it has once fallen persists until the long summer's day has effectually thawed it, protects in an admirable manner the vegetation of the higher latitudes against the cold of the long winter season. For snow is so bad a conductor of heat, that in mid-winter in the high latitude of $78^{\circ} 50'$ (Rensselaer Bay), while the surface temperature was as low as -30° , Kane found at two feet deep a temperature of -8° , at four feet $+2^{\circ}$, and at eight feet $+26^{\circ}$, or no more than six degrees below the freezing-point of water. Thus covered by a warm crystal snow-mantle, the northern plants pass the long winter in a comparatively mild temperature, high enough to maintain their life, while, without, icy blasts—capable of converting mercury into a solid body—howl over the naked wilderness; and as the first snow-falls are more cellular and less condensed than the nearly impalpable powder of winter, Kane justly observes that no "eiderdown in the cradle of an infant is tucked in more kindly than the sleeping-dress of winter about the feeble plant-life of the Arctic zone." Thanks to this protection, and to the influence of a sun which for months circles above the horizon, and in favourable localities calls forth the powers of vegetation in an incredibly short time, even Washington, Grinnell Land, and Spitzbergen are able to boast of flowers. Morton plucked a crucifer at Cape Constitution ($80^{\circ} 45' N. lat.$), and, on the banks of Mary Minturn River ($78^{\circ} 52'$), Kane came across a flower-growth which, though drearily Arctic in its type, was rich in variety and colouring. Amid festuca and other tufted grasses twinkled the purple lychnis and the white star of the chickweed; and, not without its pleasing associations, he recognised a solitary hesperis—the Arctic representative of the wallflowers of home.

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THE BARRENS.

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Next to the lichens and mosses, which form the chief vegetation of the treeless zone, the cruciferæ, the grasses, the saxifragas, the caryophyllæ, and the compositæ are the families of plants most largely represented in the barren grounds or tundri. Though vegetation becomes more and more uniform on advancing to the north, yet the number of individual plants does not decrease. When the soil is moderately dry, the surface is covered by a dense carpet of lichens (*Corniculariæ*), mixed in damper spots with Icelandic moss. In more tenacious soils, other plants flourish, not however to the exclusion of lichens, except in tracts of meadow ground, which occur in sheltered situations, or in the alluvial inundated flats where tall reed grasses or dwarf willows frequently grow as closely as they can stand.

It may easily be supposed that the boundary line which separates the tundri from the forest zone is both indistinct and irregular. In some parts where the cold sea-winds have a wider range, the barren grounds encroach considerably upon the limits of the forests; in others where the configuration of the land prevents their action, the woods advance farther to the north.

Thus the barren grounds attain their most southerly limit in Labrador, where they descend to latitude 57°, and this is sufficiently explained by the position of that bleak peninsula, bounded on three sides by icy seas, and washed by cold currents from the north. On the opposite coasts of Hudson's Bay they begin about 60°, and thence gradually rise towards the mouth of the Mackenzie, where the forests advance as high as 68°, or even still farther to the north along the low banks of that river. From the Mackenzie the barrens again descend until they reach Bering's Sea in 65° N. L. On the opposite or Asiatic shore, in the land of the Tchuktchi, they begin again, more to the south, in 63°, thence continually rise as far as the Lena, where Anjou found trees in 71° N. L., and then fall again towards the Obi, where the forests do not even reach the Arctic circle. From the Obi the tundri retreat further and further to the north, until finally, on the coasts of Norway, in latitude 70°, they terminate with the land itself.

Hence we see that the treeless zone of Europe, Asia, and America occupies a space larger than the whole of Europe.

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Even the African Sahara, or the Pampas of South America, are inferior in extent to the Siberian Tundri. But the possession of a few hundred square miles of fruitful territory on the south-western frontiers of his vast empire would be of greater value to the Czar than that of those boundless wastes, which are tenanted only by a few wretched pastoral tribes, or some equally wretched fishermen.

The Arctic forest-regions are of a still greater extent than the vast treeless plains which they encircle. When we consider that they form an almost continuous belt, stretching through three parts of the world, in a breadth of from 15° to 20°, even the woods of the Amazon, which cover a surface fifteen times greater than that of the United Kingdom, shrink into comparative insignificance. Unlike the tropical forests which are characterised by an immense variety of trees, these northern woods are almost entirely composed of coniferæ, and one single kind of fir or pine often covers an immense extent of ground. The European and Asiatic species differ, however, from those which grow in America.

Thus in the Russian empire and Scandinavia we find the Scotch fir (*Pinus sylvestris*), the Siberian fir and larch (*Abies sibirica*, *Larix sibirica*), the *Picea obovata*, and the *Pinus cembra*; while in the Hudson's Bay territories the woods principally consist of the white and black spruce (*Abies alba et nigra*), the Canadian larch (*Larix canadensis*, and the grey pine (*Pinus banksiana*). In both continents birch trees grow further to the north than the coniferæ, and the dwarf willows form dense thickets on the shores of every river and lake. Various species of the service tree, the ash and the elder are also met with in the Arctic forests; and both under the shelter of the woods and beyond their limits, nature, as if to compensate for the want of fruit trees, produces in favourable localities an abundance of bilberries, bogberries, cranberries, &c. (*Empetrum*, *Vaccinium*), whose fruit is a great boon to man and beast. When congealed by the autumnal frosts, the berries frequently remain hanging on the bushes until the snow melts in the following June, and are then a considerable resource to the flocks of water-fowl migrating to their northern breeding-places, or to the bear awakening from his winter sleep.

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Another distinctive character of the forests of the high latitudes is their apparent youth, so that generally the traveller would hardly suppose them to be more than fifty years, or at most a century old. Their juvenile appearance increases on advancing northwards, until suddenly their decrepid age is revealed by the thick bushes of lichens which clothe or hang down from their shrivelled boughs. Further to the south, large trees are found scattered here and there, but not so numerous as to modify the general appearance of the forest, and even these are mere dwarfs when compared with the gigantic firs of more temperate climates. This phenomenon is sufficiently explained by the shortness of the summer, which, though able to bring forth new shoots, does not last long enough for the formation of wood. Hence the growth of trees becomes slower and slower on advancing to the north; so that on the banks of the Great Bear Lake, for instance, 400 years are necessary for the formation of a trunk not thicker than a man's waist. Towards the confines of the tundra, the woods are reduced to stunted stems, covered with blighted buds that have been unable to develop themselves into branches, and which prove by their numbers how frequently and how vainly they have striven against the wind, until finally the last remnants of arboreal vegetation, vanquished by the blasts of winter, seek refuge under a carpet of lichens and mosses, from which their annual shoots hardly venture to peep forth.

A third peculiarity which distinguishes the forests of the north from those of the tropical world is what may be called their harmless character. There the traveller finds none of those noxious plants whose juices contain a deadly poison, and even thorns and prickles are of rare occurrence. No venomous snake glides through the thicket; no crocodile lurks in the swamp; and the northern beasts of prey—the bear, the lynx, the wolf—are far less dangerous and blood-thirsty than the large felidæ of the torrid zone.

The comparatively small number of animals living in the Arctic forests corresponds with the monotony of their vegetation. Here we should seek in vain for that immense variety of insects, or those troops of gaudy birds which in the Brazilian woods excite the admiration, and not unfrequently

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cause the despair of the wanderer ; here we should in vain expect to hear the clamorous voices that resound in the tropical thickets. No noisy monkeys or quarrelsome parrots settle on the branches of the trees ; no shrill cicadæ or melancholy goat-suckers interrupt the solemn stillness of the night ; the howl of the hungry wolf, or the hoarse screech of some solitary bird of prey, are almost the only sounds that ever disturb the repose of these awful solitudes.

When the tropical hurricane sweeps over the virgin forests, it awakens a thousand voices of alarm ; but the Arctic storm, however furiously it may blow, scarcely calls forth an echo from the dismal shades of the pinewoods of the north.

In one respect only the forests and swamps of the northern regions vie in abundance of animal life with those of the equatorial zone, for the legions of gnats which the short polar summer calls forth from the arctic morasses are a no less intolerable plague than the mosquitoes of the tropical marshes.

Though agriculture encroaches but little upon the Arctic woods, yet the agency of man is gradually working a change in their aspect. Large tracts of forest are continually wasted by extensive fires, kindled accidentally or intentionally, which spread with rapidity over a wide extent of country, and continue to burn until they are extinguished by a heavy rain. Sooner or later a new growth of timber springs up, but the soil being generally enriched and saturated with alkali, now no longer brings forth its aboriginal firs, but gives birth to a thicket of beeches (*Betula alba*) in Asia, or of aspens in America.

The line of perpetual snow may naturally be expected to descend lower and lower on advancing to the pole, and hence many mountainous regions or elevated plateaux, such as the interior of Spitzbergen, of Greenland, of Novaya Zemlya, &c., which in a more temperate clime would be verdant with woods or meadows, are here covered with vast fields of ice, from which frequently glaciers descend down to the verge of the sea. But even in the highest northern latitudes, no land has yet been found covered as far as the water's edge with eternal snow, or where winter has entirely subdued the powers of vegetation. The reindeer of Spitzbergen find near 80°