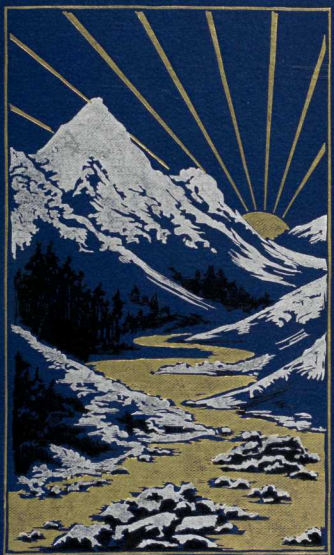
THE YUKON TERRITORY



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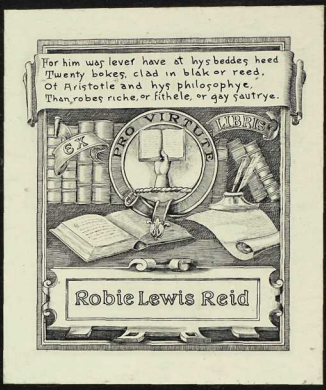

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DOG-DRIVING NEAR THE VESOLIA SOPKA.

THE

YUKON TERRITORY

THE NARRATIVE OF W. H. DALL, LEADER OF THE EXPEDITION TO ALASKA IN 1866—1868

THE NARRATIVE OF AN EXPLORATION MADE IN 1887 IN THE YUKON DISTRICT BY GEORGE M. DAWSON, D.S., F.G.S.

EXTRACTS FROM THE REPORT OF AN EXPLORATION MADE IN 1896—1897 BY WM. OGILVIE, D.L.S., F.R.G.S.

INTRODUCTION BY

F. MORTIMER TRIMMER, F.R.G.S.

WITH MAP OF THE TERRITORY

FIFTY WOODCUTS AND TWENTY-TWO FULL-PAGE ILLUSTRATIONS

DOWNEY & CO. LIMITED
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INTRODUCTION.

GREAT public interest during the past six months has been directed to that remote territory in the North-West corner of the continent of North America which may be geographically described under the comprehensive term of the Yukon Territory. And in the succeeding pages will be found all the information of economic and scientific value that so far has been gathered on the spot, and prepared for publication by trained and responsible observers acting in an official capacity.

In San Francisco last spring the present writer had the advantage of meeting a number of times with practical men—miners and prospectors—from the Yukon, who had come South for the winter season and were then returning northwards. Some of them were men known previously to the writer in Colorado and in other Western mining districts, but who since then had drifted off towards the arctic circle, in the roving manner characteristic of Western miners.

Comparing the accounts of the Yukon country given to me by these with what is set out in the chapters following here, I find there is little that can profitably be added.

The gold discoveries that have attracted so much attention have been made on some of the smaller tributaries of the main Yukon River. Dawson City settlement is the centre of the trading and supply point of this district. This place, as the

map shows, is in Canadian territory, and not very far from the point where the Yukon River is crossed by the international boundary line.

The range from which the gold-bearing side-streams come down to join the Yukon may be described as the arctic prolongation of the fundamental range of the continent of America; a range dotted at intervals, greater or less, with gold and silver camps from Klondyke to Cape Horn. The source of the Yukon gold is a significant point, as the permanent character of the mineral-bearing lodes of the Rocky Mountains (as the range is known north of Mexico) has been so long and thoroughly established wherever they have been uncovered—though as far as information goes, the fountain head, the mother lode of the Klondyke placers, remains to be discovered yet.

This mother lode, unless all precedents fail, will be found somewhere up the mountain sides towards the sources of these same streams the placers have been formed on, or on the summits of the range.

The placers in the valleys have been formed by the gathering through long ages of fragments detached from exposed portions of permanent reefs; by weathering or water action—the gold finding its way slowly to the lowest level.

In this connection it is worth perhaps recalling—as some persons have seen in these rich Klondyke discoveries a possible solution of the present deadlock in the commercial ratio between gold and silver—that the uncovering of placer gold has sometimes in the Rocky Mountains led to the uncovering of silver-bearing ores, instead of gold, by prospectors seeking for the mother lode. A notable instance of this is the great silver camp at Leadville, originally a gold placer camp; and other cases might be cited.

A question asked sometimes, but not often answered, is, How does gold come in these veins? how are they formed?

An answer to this interesting question comes from China, where philosophers long ago have solved the problem to their satisfaction by a theory which if it has no other merit has that at least of novelty. My authority here is a Chinaman, a trader, and a man of education whom I used to know in Idaho.

Our planet's centre (so Chinese professors hold) is full of molten gold, and whenever any orographic catastrophe in the past has occurred of magnitude sufficient to fracture the earth's crust right down to the seething molten mass below, some of the gold is squeezed out to the surface through the cracks.

This theory though crude is plausible, and simple.

Since the Klondyke "rush" set in a great deal has been written descriptive of the difficulties and the hardships to be encountered, and probably these have not been exaggerated. But the story of all big "gold rushes," and of many small ones, too, has been of hardships to be faced in the preliminary struggle. Only in days gone by there was less known to the outside civilized world of what was happening. In these latter days it is different, and now an increase of knowledge is apt to be confounded with an increase of facts.

Still, there does remain the severity of the Arctic winters, which must always be a drawback, though in the end this drawback will mean nothing more serious perhaps than a slower development. The climate of the Yukon Basin proper, in its upper half, that is in the share of it which falls within the Canadian Dominion, is in marked contrast to the climate of the seaboard.

This interior country has a comparatively dry and clear atmosphere, with a limited precipitation, though here the cold is intense. Along the sea front of the Coast Range, on the other hand, the conditions are reversed completely as to moisture, and the degree of cold is by comparison quite moderate.

In the lower or Western half of the Yukon Basin a gradual

increase of precipitation marches with the fall of the land westward towards the river's mouth.

Communication with that section which has made so much stir, is kept up at present under difficulties.

At its mouth, the Yukon River is navigable for a very short period—from the beginning of July to the end of September; but on its upper part it is navigable from May until the middle of October. Travellers seeking the easiest route go by steamer during the open season from one or other of the ports on the Pacific Coast to St. Michael's on Behring Sea, near the Yukon mouth, transferring there to river steamers which make the trip to Dawson City, distant some sixteen hundred miles. The duration of the river trip depends somewhat on the risks and chances of the river navigation.

The route of which most has been heard since the rush first started is one by trails across the Coast Range at the Chilcat and neighbouring passes, starting from tide-water at the head of the Lynn Canal, as an arm there of the sea is known.

The advantage of this route is its shortness, and once the Coast Range difficulties have been passed, the head-waters of streams navigable for boats flowing to the Yukon are quickly reached. Down these the trip is continued, going with the stream all the way to Dawson City, and without serious obstacles other than portages at several points necessitated by dangerous rapids. The distance, as measured in miles, from tide-water on the Lynn Canal across these passes to the head of navigation, is small, but the difficulties to be overcome at the crossing of the passes make the trip a serious undertaking, until some very necessary engineering outlay has been made upon the trails.

But the route said to be the coming main route to the interior, and one growing already in favour in spite of the primitive conditions of the trail, is that entering by the

Stikine River; a very full description of the features along the course of which river is given in Dr. Dawson's itinerary, starting from Fort Wrangel at the river's mouth.

Arrangements are reported to have been completed for opening up this route by the building of a railway from the head of navigation on the Stikine to the head of steam navigation on the Lewes, this being one of the main Yukon branches,—the length of the gap to be filled being about two hundred miles.

The Stikine Valley climate contrasts phenomenally with that of the interior. The mean annual temperature in the Dawson City region being as low as 16° Fahrenheit, while at Wrangel, near the Stikine mouth, 47° Fahrenheit is given as the corresponding figure.

So favoured indeed is the Stikine Valley, that, on his trip through there, Dr. Dawson met with the humming-bird.

F. MORTIMER TRIMMER.

February, 1898.

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PART I.

TRAVELS ON THE YUKON AND IN THE YUKON TERRITORY.

CHAPTER I.

Arrival in Norton Sound. — Circumstances of previous visit. — News of the death of Robert Kennicott. — Change of plans. — Receive my appointment as Director of the Scientific Corps, and determine to remain in the country. — Landing, organization, and departure of the vessels. — Departure of the Wilder for Unalaklik. — Russian peechka. — St. Michael's Redoubt and Island. — Russian traders. — Stepanoff. — Natives and their houses. — Skin boats. — Departure from the Redoubt. — Journey to Unalaklik. — Detention at Kegiktowruk. — Seal-hunting. — Innuit graves. — Bath as enjoyed by the Innuit. — Character of the coast. — Departure from Kegiktowruk. — Topanika. — Arrival off the mouth of the river. — Ice-cakes. — Arrival at Unalaklik. — Cockroaches. — Native clothing. — Description of the post and village. — Deficiency of medical supplies. — Departure for Nulato via Ulukuk. — Iktigalik and its inhabitants. — Telegraph stew. — Escape of dogs and return to Unalaklik. — Russian baths. — Disagreeable trip to Iktigalik. — All gone on my arrival. — Second return to Unalaklik. — Impromptu theatricals. — Departure for Ulukuk. — Deserted village. — Arrival at Ulukuk. — Springs. — Transportation of goods. — Arrival of Mike with the brigade from Nulato. — Departure for Nulato. — Parhelia. — Mysterious caterpillar. — First view of the Yukon. — Arrival at Nulato.

ON the 24th of September, 1866, the clipper ship Nightingale came to anchor half a mile southeast of Egg Island, Norton Sound.

A driving storm from the north and northeast obscured the atmosphere, and covered the deck with an inch or two of half-melted snow and hail. The waves were yellow with sediment, churned up by their own violence, and the very white-caps had a sullied look which spoke of shallow water. We were drawing nineteen feet, with a rise and fall of the waves of at least twelve feet more, and the breeze was freshening. This did not leave a very large margin under the keel, and the well-known rapidity with which a north wind will diminish the depth of water in the Sound, sometimes making a difference of a fathom in the course of a few hours, added to the anxiety of our ship's officers. Our indefatigable commander, Captain Scammon, was seriously ill. Altogether, the circumstances attending our arrival in the vicinity of Redoubt St. Michael's were not propitious.

A little more than a year before, we had visited this point in the bark Golden Gate. We left a party to make the preliminary explorations, previous to deciding on the line on which it was proposed to build the international telegraph. This party was under the command of the Director of the Scientific Corps, Robert Kennicott, whose previous experience in the Hudson Bay Territory to the westward had fitted him above all others to fill the arduous post of commander of the explorations in Russian America. Several members of the Scientific Corps were of his party, and to their combined labors we looked hopefully for a solution of the problem of the identity of the Yukon River with the so-called Kwikhpák of the Russians. This identity was stoutly upheld by Mr. Kennicott, though persistently denied by many, who looked upon the so-called Colvile River, flowing into the Arctic Ocean, as the true mouth of the Yukon, while they considered the Kwikhpák as a distinct river. The question was regarded as uncertain by all. Information received from the Russians, however, soon put the matter beyond a doubt, and we looked to Mr. Kennicott and his party as the favored few who were to pass the *terra incognita* between the limit of Russian explorations and the Hudson Bay Territory, and thus complete the exploration of the Lower Yukon.

Though their equipment was not such as we could have wished, and though grave doubts prevailed as to the value of a miniature steamer, of which much had been expected, still we left all of them in the highest spirits, and with the heartiest wishes for their success, as we sailed slowly away from Stuart Island, September 17, 1865.

During the year which had passed many changes had taken place in the organization of the Expedition. No word had been received from the party even through the Russian mail, which is carried overland from St. Michael's every winter to Nushergák and thence by sea to Sitka.

Various detentions kept the vessels of the fleet lying in San Francisco Bay long after they should have reached the shores of Bering Sea, and it was only in the month of July that the Expedition finally set sail. We had been lying in Plover Bay several weeks, during which time a rumor had reached us that an exploring party had been at Grantley Harbor during the winter, and that

one member of the party had been badly frost-bitten. All were supposed to be alive and well.

Now that we had again come within reach of our friends and companions, our anxiety may be imagined. The state of the weather and our distance from St. Michael's, almost twelve miles, prevented our landing in a body. A boat with two officers was despatched late in the afternoon, but the distance and the still increasing storm forbade us to expect their return that night.

My own impatience was so great that I soon abandoned the attempt to sleep, and accompanied the officer of the deck in his inclement night-watch, pacing up and down in the rain and sleet; and I almost fancied that there was something derisive in the whistle of the wind through the rigging and insulting in the masses of slush which the swaying cordage occasionally threw in our faces.

The next morning the storm continued with little abatement. About noon we saw the steamer George S. Wright, which we knew had arrived with the commander of the expedition a day or two before, getting up steam behind the point of Stuart Island. About four o'clock in the afternoon she came out and anchored under the lee of Egg Island near us, and we soon saw a boat put off from her. Every glass was pointed at her, and every eye was strained for a glimpse of some familiar face; but the long hair and beards, the unfamiliar deer-skin dresses and hoods defied recognition.

Pressing forward to the gangway, as the first man came over the side, my first question was, "Where is Kennicott?" and the answer, "Dead, poor fellow, last May," stunned me with its sudden anguish. I stayed to hear no more, but went to my cabin as one walks in a dream.

So he was gone, that noble, impetuous, but tender-hearted man, who had been to me and many others as more than a brother! During the past two years many had had bitter controversies with him, but all felt and expressed their grief at his untimely death. He was one who made enemies as well as friends, but even enemies could not but respect the purity of motive, the open-handed generosity, the consideration, almost too great, for his subordinates, and the untiring energy and lively spirits which were the prominent characteristics of the man.

The details of his explorations and death will be found elsewhere. His body had been tenderly cared for, brought down the Yukon from the point where he died, placed in a vault at the Redoubt, and was to be taken home in charge of Mr. Charles Pease, who had been his friend from boyhood, and Mr. H. M. Bannister, both members of the Scientific Corps. This would leave the Corps without a single representative in the whole of Russian America north of Sitka.

My own plan had been, to explain the operations of the Corps during the past year to Mr. Kennicott, and if approved by him to cross to the Siberian side and obtain such information and collections as opportunity might offer, and especially to determine by the barometer the height of the different volcanoes for which Kamchatka is renowned.

Under the circumstances, however, and considering the information in regard to North American natural history and geology more important than that relating to the other continent, I resolved to remain at St. Michael's or in the valley of the Yukon during the ensuing season. I determined to use my best energies to complete the scientific exploration of the northwest extremity of the continent, as it had been planned by Mr. Kennicott, and which comprised the exploration of, —

First, the region between Fort Yukon, at the junction of the Yukon and the Porcupine, and Nuláto, the most eastern Russian post on the former river;

Second, the region between Nuláto and the sea, westward across the portage, and south by way of the Yukon to the sea; and, —

Lastly, the whole region bordering on Norton Sound and the sea to the north and south of it.

Toward this considerable collections and many observations had been made at St. Michael's, but little had been done in other parts of the country.

Captain Charles S. Bulkley, U. S. A., Engineer-in-chief of the Expedition, having signified his desire that I should succeed Mr. Kennicott as Director of the Scientific Corps, and learning that I desired to remain in the country, ordered me to act as Surgeon in general charge of the district between Bering Strait and the Yukon. I submitted my plans for the scientific operations of the coming year to him, and they met with his entire approval.

Great expedition was necessary in making my preparations.

The continued north wind began to tell on the depth of water in the Sound, and on Saturday we grounded with every swell. Luckily the bottom here is an impalpable soft mud, without any stones, otherwise the old Nightingale would have left her bones there ; and as it was, every few moments she came thumping down, with a severity that shook everything, from truck to kelson.

The following morning it cleared off, and those who were to remain took their seats in a large scow loaded with coal, which was to be towed ashore by the steamer Wilder. The Wilder was one of two small stern-wheel steamers, built in San Francisco, and brought up on the deck of the Nightingale, designed for river navigation. They were shaped much like an old-fashioned flat-iron, and were just about as valuable for the purposes required ; being unable to tow anything, or to carry any freight, while in a breeze of any strength it was no easy matter to steer them.

Sitting pensively on the larger lumps of coal, we had ample opportunity of studying the defects of our tug, and it became an interesting matter as to what we should do if she should break down before reaching shore, as seemed likely. A cold and extremely penetrating rain gave us a foretaste of the concomitants of exploration, and rendered our departure anything but romantic. Indeed, I could not help thinking that we bore much more resemblance to a party of slaves *en route* for the galleys, as Victor Hugo describes them, than to a party of young and ardent explorers, defying the powers of winter, and only anxious for an opportunity to exhibit our prowess.

We finally arrived in safety at the landing, near the Russian trading-post of St. Michael. Having pocketed some biscuit, I was provisioned, and, picking out a soft plank in a back room, I rolled myself in a blanket, and after some difficulty got to sleep. The rain continued ; the Russians were holding an orgie, with liquor obtained from the vessels ; the dogs howled nearly all night ; the roof leaked, not water, but fine volcanic gravel, with which it was covered. If this is a sample of the country, I thought, it is not prepossessing !

On rising in the morning I found, as might be expected, that

I was likely to feel for some time the effect of my new style of bed in a way that was anything but agreeable.

On Monday, the 1st of October, 1866, the Nightingale sailed for Plover Bay. All was activity on shore, preparing the Wilder and all available boats for a trip to Unalaklík, the seaboard terminus of the portage to the Yukon, at the mouth of the Unalaklík River. My friend, Mr. Whymper, the genial and excellent artist of the expedition, proposed to leave for Unalaklík on the steamer.

The work of construction and exploration had been divided. The larger number of men, and the work to be done in the region west of the Yukon, had been placed in charge of Mr. W. H. Ennis and several assistants. Here the work of exploration had been mainly finished, and construction, exclusive of putting up the wires, was to be immediately commenced.

The work of exploration and future construction, to the north and east of Nuláto on the Yukon, was intrusted to Mr. F. E. Ketchum, to whom, with Mr. Michael Lebarge, the honor of exploring the region between Nuláto and Fort Yukon had fallen after Kennicott's death.

Mr. Ketchum, who bore the title of Captain in the service of the Expedition, was thoroughly qualified for the execution of the trust committed to him. He had been eminently faithful to Mr. Kennicott during his arduous explorations, and had successfully carried out his plans after his death.

I proposed to accompany him to Nuláto, the place best suited for the prosecution of the scientific work, and as he had decided to remain for a while at St. Michael's, after consultation with him, we secured a room in the Russian quarters together.

On Tuesday the steamer, in charge of Captain E. E. Smith, with a Russian pilot, started for Unalaklík. As we were waving our congratulations, to our dismay we saw her come to a stand-still, plump on a rock at the entrance of the cove. It seemed as if her career were about to come to an ignominious conclusion, but after a good deal of labor she worked off without damage, and proceeded on her way.

We returned to our quarters, where we built a fire in the Russian stove. These stoves are a "peculiar institution," in use throughout the territory, and worthy of description. Here they

are built of fragments of basalt, the prevalent rock, and smeared inside and out with a mortar made of clay. A damper in the chimney is so arranged as to shut off all draught, and is taken out when the fire is made. After the whole has been thoroughly heated by a wood fire the coals are removed. The damper is put in, thus preventing the escape of hot air by the chimney, and without further fire this stove will warm the room for twenty-four hours. It is admirably suited to the climate and country, and its only objectionable point is the amount of room it occupies. A good deal of cooking, baking, &c., can be accomplished in a large one, and the remainder is done in a building erected for the purpose, and called the *povárnia*. The Russian name for this stove is *peéchka*, but an iron stove, such as is used in the United States, is called a *kanecla*. The foundation of the peéchka is of wood, filled in with volcanic gravel, and covered with brick or slabs of lava. In Russia they are generally built of brick entirely, and are often tiled over on the outside with painted tiles, such as are yet to be found in some of the older houses in New England.

Our beds, as in all the houses in this part of the territory, were made on a platform raised a few feet from the floor, and about seven feet wide. Mine consisted of a reindeer skin with the hair on, and with one end sewn up, so as to make a sort of bag to put the feet in ; a pillow of wild-goose and other feathers is essential to comfort ; this, with a pair of good blankets, is all that one needs in most instances. Sheets are unknown in this part of the world, and counterpanes are almost so.

Our time was well occupied in getting everything in readiness for transportation, if the steamer should return as we hoped. If, as was probable, she found ice in the Unalaklík River, she would have to go into winter quarters at once.

Meanwhile I took a careful survey of the old trading-post, or Michaélovski Redoubt, as the Russians call it.

By order of Baron Wrangell, Michael Tébenkoff, an officer of the Russian American Company, established this post in 1833. It is stated by different writers to be in latitude 63° 33′ or 63° 28′ north, and longitude 161° 55′ or 161° 44′ west of Greenwich. Few points were established by the Russians with the accuracy deemed indispensable in modern English or American surveys. It is stated by Tikhménief that, in 1836, the Unalígmuts of the

vicinity attacked the Redoubt, which was successfully defended by Kurupánoff, the commander.

It is built of spruce logs, brought by the sea from the mouths of the Yukon and Kuskoquím, which annually discharge immense quantities of driftwood. This is stacked up by the Russians in the fall, for miles along the coast north and west of the Redoubt, and is carried in winter to the fort over the ice by means of dogs and sleds. No other fuel exists on the island and adjoining shores. These are entirely destitute of wood, if we except low, scrubby willows and alders, which are found in the vicinity of water. St. Michael's is situated on a small point of the island of the same name, which puts out into the sound and forms a small cove, abounding in rocks and very shallow. Here a temporary landing-place is built out into water deep enough for loaded boats drawing five feet to come up at high tide. This is removed when winter approaches, as otherwise it would be destroyed by the ice. The shore is sandy, and affords a moderately sloping beach, on which boats may be drawn up. A few feet only from high-water mark are perpendicular banks from six to ten feet high, composed of decayed pumice and ashes, covered with a layer, about four feet thick, of clay and vegetable matter resembling peat. This forms a nearly even meadow, with numerous pools of water, which gradually ascends for a mile or more to a low hill of volcanic origin, known as the Shamán Mountain.

The fort is composed of log buildings with plank roofs, placed in the form of a square, and with the intervals filled by a palisade about ten feet high, surmounted by a *chevaux-de-frise* of pointed stakes. This is also continued round the eaves of the buildings. There are two outlying bastions, pierced for cannon and musketry, and containing a number of pieces of artillery of very small calibre and mostly very old-fashioned and rusty, except two fine brass howitzers of more modern manufacture. The principal buildings are the commander's house, — consisting of two private rooms, an armory and a counting-room, or *contórum*, — a couple of buildings used as storehouses, a bath-house, and separate houses for the married and unmarried workmen. There is a flag-staff leaning apologetically as if consciously out of place, and a gallery for the watchman, who is on duty day and night, with reliefs, and who tolls a bell on the hour stroke to notify the inmates that he is not asleep. One of

ST. MICHAEL'S REDOUBT.

the bastions is without cannon, and is used as a guard-house for refractory subjects.

Outside of the stockade are several other buildings, — a small storehouse used for furs, a large shed where boats are drawn up in winter, a blacksmith's shop, and a church. The latter is octagonal in shape, with a small dome, surmounted by a cross, and a beam bearing a bell at the side of a small porch which covers the doorway. Other small buildings are scattered about ; a sun-dial is to be found not far from the church, and a noticeable feature in the fall is the stacks of bleached driftwood, which, from a distance, look not unlike tents or bastions.

Between the point on which St. Michael's is built and the mainland, a small arm of the sea makes in, in which three fathoms may be carried until the flagstaff of the fort bears west by north. This is the best-protected anchorage, and has as much water and as good bottom as can be found much farther out.

At the southwest extremity of this arm, known as Tébenkoff Cove, we enter a narrow and tortuous channel, often not more than fifty feet wide, which separates the island of St. Michael from the mainland. This has been aptly named the Canal by the Russians, and it divides midway into two branches which are, it seems to me, equally tortuous, though they are styled the Straight and the Crooked respectively.

The mainland near St. Michael's gradually rises from the Canal and the adjacent shores into low basaltic hills, with a rugged and rocky, though not elevated coast.

The inmates of the fort — with the exception of Sérgei Stepánoff Rúsanoff, an old soldier, who commands not only this, but all the trading-posts in the District of St. Michael, under the title of Uprovalísha — may be divided into three classes: convicts, creoles, and natives.

The workmen of the Russian American Company were, almost without exception, convicts, mostly from Siberia, where the Company was originally organized. They were men convicted of such crimes as theft, incorrigible drunkenness, burglary, and even manslaughter. These men, after a continued residence in the country, naturally took to themselves wives, after the fashion of the country, since Russian subjects in the Company's employ were prohibited from legal marriage with native women.

These connections are looked upon with a different feeling from that which prevails in most communities, and these native women mix freely with the few Russian and half-breed women in the territory who have been legally married. Their children are termed creoles, and formerly were taken from their parents and educated in Sitka by the Company, in whose service they were obliged to pass a certain number of years, when they became what is called "free creoles," and were at liberty to continue in the service or not, as they liked. Many of the most distinguished officers of the Company were creoles, among them Étolin, Kushevároff, and Málakoff.

There are a few Yakúts in the service of the Company, and these, with some native workmen, who are generally of the tribe which inhabits the immediate vicinity of the post, compose the garrison.

The regular workman gets about fifty pounds of flour, a pound of tea, and three pounds of sugar, a month; his pay is about twenty cents a day. Some of the older men get thirty cents and a corresponding addition to the ration of flour. They work with little energy and spirit as a general thing, but can accomplish a great deal if roused by necessity. Small offences are punished by confinement in the guard-house, or *boofka*, and greater ones by a thrashing administered by the commander in person; those who commit considerable crimes are forced to run the gauntlet, receive one or two hundred blows with a stick, or in extreme cases are sent for trial to Sitka, or, in case of murder, to St. Petersburg.

The present Uprovalísha, Stepánoff, has been in office about four years. He is a middle-aged man of great energy and iron will, with the Russian fondness for strong liquor and with ungovernable passions in certain directions. He has a soldier's contempt for making money by small ways, a certain code of honor of his own, is generous in his own way, and seldom does a mean thing when he is sober, but nevertheless is a good deal of a brute. He will gamble and drink in the most democratic way with his workmen, and bears no malice for a black eye when received in a drunken brawl; but woe to the unfortunate who infringes discipline while he is sober, for he shall certainly receive his reward; and Stepánoff often says of his men, when speaking to an American, "You can expect nothing good of this rabble: they left Russia because they were not wanted there."

The commanders, or *bidárshiks*, of the smaller posts in the District of St. Michael are appointed by Stepánoff, who has absolute authority over them, and does not fail to let them understand it, making them row his boat, when the annual supply-ship is in port, as Alexander might have called his captive kings to do him menial service. But Stepánoff trembles before the captain of the ship or an old officer of the Company, much in the same way that his workmen cringe before him. This sort of subserviency, the fruit of a despotic government, is characteristic of the lower classes of Russians ; and to such an extent is it ingrained in their characters that it seems impossible for them to comprehend any motives of honor or truthfulness as being superior to self-interest.

The native inhabitants of this part of the coast belong to the great family of *Innuit*. The name of the tribe is *Únalcet*, and their name for the village, half a mile west of the Redoubt on the island of St. Michael, is *T'satsúmi*. The few families living there bear the local designation of *Tutsógemut*, much as we should say Bostonian or New-Yorker. The village comprises half a dozen houses and a dance-house, built in the native fashion ; that is to say, half underground, with the entrance more or less so, and the roof furnished with a square opening in the centre, for the escape of smoke and admission of light.

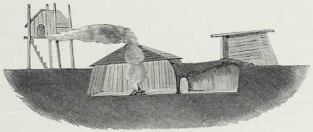


Diagram of Innuit Tópek.

They are built of spruce logs, without nails or pins, and are usually about twelve or fifteen feet square. The entrance is a small hole through which one must enter on hands and knees, and is usually furnished with a bear or deer skin or a piece of matting to exclude the air. Outside of this entrance is a passage-way, hardly larger, which opens under a small shed, at the surface of the ground, to protect it from the weather.

They are about eight feet high in the middle, but the eaves are rarely more than three or four feet above the ground. The floor is divided by two logs into three areas of nearly equal size, the entrance being at the end of the middle one. This portion of the floor is always the native earth, usually hardened by constant passing over it. In the middle, under the aperture in the roof, the fire is built, and here are sometimes placed a few stones. On either side the portion separated by the logs before mentioned is occupied as a place to sit and work in during the day, and as a sleeping-place during the night. The earth is usually covered with straw, or spruce branches when obtainable, and over this is laid a mat woven out of grass. Sometimes the space is raised, or a platform is built of boards, or logs hewn flat on one side. This is a work of such labor, however, that it is seldom resorted to. The beds, which generally consist of a blanket of dressed deerskin, or rabbit-skins sewed together, are rolled up and put out of the way during the day. Almost all sorts of work are done in the houses after the cold weather sets in. At this time, however, there did not appear to be any people in the village, and Captain Ketchum told me that they would not return for a week or two, being absent at Pastólik, where they were killing the beluga or white whale. A solitary old woman, perhaps of exceptional ugliness, spent her time picking berries, which were abundant near the village.

Sunday, October 7th. — A party of natives of the Máhlemut tribe arrived, in a skin boat, bringing letters from Unalaklík, saying that the boats had arrived safely at that point. The turrets or bastions of the Russian post were being fitted up for the accommodation of the officers, and winter quarters for the men were being arranged and made comfortable. The ground was well covered with snow, and we were advised to use all practicable expedition in reaching Unalaklík by water, before the formation of ice should interfere with navigation. The thermometer averaged 9° Fahrenheit during the day, and no time was to be lost.

We therefore made arrangements for starting the next day, — Captain Ketchum and myself in one boat, Mr. Westdahl our astronomer, and a party of natives, with two others.

The skin boats, in which most of the travelling by water is done,

are of three kinds. One is a large open boat, flat-bottomed and consisting of a wooden frame tied with sealskin thongs, or *rémni*, and

Bidarrá.

with the skins of the seal properly prepared, oiled, and sewed together, stretched over this frame and held in place by walrus-skin line, or *máhout*. This kind of boat is known among all the Innuit by the name *oómiak*, and is called a *bidarrá* by the Russians.

Bidárka.

Another, a smaller boat, for one man, is made essentially in the same way, but covered completely over, except a hole in which the occupant sits, and around the projecting rim of which, when at sea, he ties the edge of a waterproof shirt, called a *kamlâyka* by the Russians. This is securely tied around the wrists and face also; the head being covered by a hood, so that no water can by any means penetrate to the interior of the boat. This boat is called by the natives a *kýak*, and by the Russians a *bidárka*.

The other kind is used only by the Russians, and was copied from those of the Aleutians, differing from the last only by being longer and having two or three holes; it is adapted to carry two or three people. These boats are admirably light and strong, and extremely valuable for making short journeys. It is, with persons skilled in their use, all but impossible to swamp them, and the Russians have introduced them into every part of the territory as an invaluable adjunct to exploration. They call them simply two or three holed bidárkas. They are propelled by single or double ended paddles, and attain an extraordinary speed.

Monday, 8th. — The weather being clear and fine, the wind nearly fair, we determined to put off for Unalaklík. We left St. Michael's about noon, Westdahl leading, but the wind hauling ahead we ran closer in, and left him making a long tack, which Ketchum was rather apprehensive would be unsuccessful, as it is

impossible, or almost so, to beat against the wind with one of these flat-bottomed skin boats.

About eight o'clock P. M. we put into a small rocky cove about twenty-two miles from the Redoubt. This, from two small rocky islets which protect it, is known to the Unaleets as *Kegiktówruk*, a word derived from *kikhtuk*, meaning an island. There is quite a village on the high bank back of the cove, and the inhabitants came down and helped us to haul our boat up on a sort of ways, built of round logs, held in place by large masses of rock. These are necessary, as the cove is very shallow and so full of rocks that the skin boats are very liable to be cut on them at low tide. There were no signs of the other boats.

The village is notable on account of the number of graves scattered over the plain about it, and also for the large size of the dance-house, or *casine* as the Russians term it. This building is to be found in almost every village, and serves for a general work-room, a sort of town-hall, a steam bath-house, a caravanserai for travellers, and a meeting-house for celebrating their annual dances and festivals.

It is usually the largest and cleanest house in the village, and generally empty at night, so that travellers prefer it to one of the smaller and more dirty and crowded houses. In the present case we were quartered in it very comfortably.

We immediately sent out our teakettle, in this country always made of copper, and universally known as the *chynik*, — tea being *chy* in the Russian, a derivative from the original Chinese *chah*.

Chy being ready, we imbibed deeply, and filling up the chynik with water we dispensed the diluted fluid to our native friends, in the bountiful tin cups provided by the Company. A small handful of broken biscuit added to the acceptability of the treat and disguised the weakness of the chy. This is the invariable and expected tribute to the hospitality of the natives from all travellers who avail themselves of the casine and other accommodations of the village ; for which the Innuit have not yet learned to charge by the night's lodging.

Appreciating the banquet, and warmed to enthusiasm by the hot water, an old blear-eyed individual seized an article something between a drum and a tambourine, and began to beat upon it with

a long elastic rod. He was joined by all the old men in the vicinity, in a dismal chorus of

Ung hi yáh, ah ha yáh, yah yah yáh, &c.,

keeping time upon his drum with an energy which showed that the vigor of his youth had not departed from him.

Four or five of the young men began to dance, posturing in different attitudes, moving their arms and legs, stamping on the floor, all in perfect accord with one another, and keeping accurate time with the drum. We were too tired, however, to appreciate this exhibition, and signified as much to the company, who finally left us to enjoy a good night's rest.

Tuesday, 9th.—We were awakened by an officious native, who put his head in, bawling at the top of his lungs that the weather was bad, very bad indeed, and that we could not get away to-day; after which pleasing piece of information he left us to our own reflections.

On getting up and going out I found that the sky was cloudy and the wind adverse, and ordering one of our Máhlemuts to put on the chynik, I went down and reported the situation, which involved our remaining a day or two where we were. Breakfast, consisting of chy, with sugar, — but of course no milk, — biscuit, and a savory piece of bacon, was duly discussed; and after a comforting pipe, we were quite ready to bear our detention with the true voyageur's philosophy.

I went out, and soon made the acquaintance, by signs and the very few native words which I had picked up, of a fine-looking young Máhlemut, who was also on his way to Unalaklík with his family. The interview commenced by his begging for a little tobacco, upon receiving which he was so delighted as to take me to his tent, a poor little affair, made of unbleached sheeting procured from the Russians. Here he introduced me by signs to his wife and child, the latter about two years old. The former was not particularly ugly or pretty, but was engaged in manufacturing tinder, which rather detracted from the neatness of her person. This tinder is made out of the fur of the rabbit, the down from the seed-vessels of the river poplar, or cotton lint obtained from the Russians; either of which is rubbed up with charcoal and water, with a very little gunpowder, and then dried. The rubbing pro-

cess was just going on, and I was thankful that etiquette did not require hand-shaking, among the Innuit of Norton Sound. The husband was a fine-looking, athletic fellow, standing about five feet five inches, with a clear brunette complexion, fine color, dark eyes, and finely arched eyebrows. The flat nose, common to all the Eskimo tribes, was not very strongly marked in him, and a pleasant smile displaying two rows of very white teeth conquered any objection I might have felt to his large mouth. The baby looked like any other baby, and was notable only from never showing any disposition to disturb the peace.

Returning after a while to the casine, I observed that the aperture in the roof was closed by a covering composed of the intestines of seals, cut down on one side, cleaned, oiled, and sewed together into a sheet, which is sufficiently translucent to admit the light while it retains the warm air.

The universal salutation of the Innuit is *Chamni ! Chamni !* and as likely as not, some greasy old fellow will hug you like a brother upon a first meeting. As they are given to raising a certain kind of live-stock, this method of proceeding is not likely to suit the fastidious.

A note arrived from Westdahl by a native, one of his crew, saying that on account of rough weather he had been obliged to put into a small cove, some miles south of us, had cut his bidarrá on the rocks and wet almost everything.

Ketchum immediately despatched four men with a needle, some twisted thread made of deer sinew, called *gíla*, and a piece of sealskin prepared for use, technically known as *luvták*. These, with some grease to rub on the seam, are all that is needed to repair any injury done to the skin of a bidarrá or bidárka.

Wednesday, 10*th*. — The water of the little cove in front of the village was white with foam when we rose in the morning : evidently we were not to get away yet. We walked over to a small bay on the other side of the point on which Kegiktówruk is situated. Here we found a cache, that is to say, a kind of small log enclosure about six feet square, covered with logs held down by heavy stones. In it were the bodies of four small hair seal, called *nérpa* by the Russians and *níksuk* by the Máhlemuts. They are covered with short, stiff hair of a greenish silvery tinge, with darker spots surrounded by dark rings, especially on the back. The young are

very beautiful, covered with long, silky, silvery hair, softer than in the adult and without the dark spots. They are about eighteen inches long, and the adults not more than four feet. The flippers have five long nails and are covered with hair like that on the body. The eye of the seal is black, very large and liquid, almost human in its expression, and the whiskers are placed like those on a cat; the bristles are perfectly transparent, three-sided and twisted, looking like glass threads, about four inches long. The blood of these seal is very black, and so is the flesh, both having a slightly disagreeable odor when fresh. They are caught in rawhide nets. There is a much larger seal (like *Phoca jubata*) which is called *maklók* by the natives; the name has been frequently applied to both species, but erroneously. The fat or blubber is about an inch and a half thick, very white and firm. The natives eat it, as well as the meat, and trade it with the Indians of the interior. The oil is used for burning, and the casine is lighted by means of four saucer-shaped dishes full of dry moss or sphagnum soaked in this oil, which give out quite as much smoke as light.

Returning, our attention was attracted by the numerous graves. These are well worth the careful attention of the ethnologist; many of them are very old. The usual fashion is to place the body, doubled up, on its side, in a box of plank hewed out of spruce logs and about four feet long; this is elevated several feet above the ground on four posts, which project above the coffin or box. The sides are often painted with red chalk, in figures of fur animals, birds, and fishes. According to the wealth of the dead man, a number of articles which belonged to him are attached to the coffin or strewed around it. Some of them have kyaks, bows and arrows, hunting implements, snowshoes or even kettles, around the grave or fastened to it; and almost invariably the wooden dish, or *kantág*, from which the deceased was accustomed to eat is hung on one of the posts.

There are many more graves than present inhabitants of the village, and the story is that the whole coast was once much more densely populated.

On arriving at the casine we met some men carrying long sticks of light-wood, and were requested to remove our bedding and other traps from the building, as the inhabitants were about to take a

bath. This we did, much to our disgust, and adjourned to one of the houses till it should be over, as a cold wind was blowing.

These baths are made by building a very hot fire in the casine, the middle part of the floor being removable, so that the earth may be exposed. Here the fire is built, and when it has subsided into coals the gut cover before mentioned is put over the smoke-hole, and the inmates proceed to bathe themselves in an unmentionable liquid, which is carefully saved for this and other purposes. Strange as it may appear, this habit was not contracted without reason, for the alkaline properties of this fluid combine with the oil with which they are smeared, and form a soapy lather, which cleanses as thoroughly as soap, which they cannot obtain, and removes the dirt, which water alone would not do. After this they wash off with water and retire to certain shelves, which are placed near the roof of the building, and repose, wrapped in a deerskin, until the lassitude produced by the bath passes away.

We waited as long as possible before entering the casine, but as evening came on we were obliged to return to it. As might be supposed, the ammoniacal odor was nearly stifling, and only the raw, blustering weather prevented us from sleeping outside.

Thursday, 11th. — To our great delight the sea had gone down a good deal and the wind was fair. We bundled our things into the boat, and although short-handed — two of our men having remained with Westdahl — we put out about eight o'clock, and just as we rounded the point saw the other boats, which had repaired damages, following. The character of the shore is abrupt and rocky from the Redoubt to Kegiktówruk, thence to Golsóva River, known by the two small islets or rather rocks in the vicinity, and finally around Tolstoi Point to a place called Topánika. There are very few points at which a boat, especially a skin boat, can land even in perfectly smooth weather, and in rough weather only two between Tolstoi Point and the Redoubt. The first of these is the Major's Cove, so named because it was the first point at which Major Kennicott landed, after leaving St. Michael's with his party. The other is Kegiktówruk. We passed Tolstoi Point and reached Topánika in safety. Here there is, except at high tide, a narrow, shelving beach, backed by perpendicular walls of sandstone in

bluffs from twenty to one hundred feet high. This beach continues all the way to the mouth of the Unalaklík River, the bluff growing gradually lower, until near the mouth of the river there is only a marshy plain behind the beach. As the wind was light we sent two of our men ashore with a long máhout line to "track" the boats along the beach. We were now about ten English miles from Unalaklík. The wind blowing fair and freshening, we took our men on board and made a straight course for the mouth of the river. Meanwhile it was growing dark. I had been snoozing under a deerskin for an hour or two, as the air was very cold, but finally took up the paddle to warm myself, when Ketchum's experienced ear caught the crunch of ice, and in a minute we were into it. Large cakes about four inches thick covered the surface of the water, and we all had our hands full in staving them off, as they would have sunk the boat had they nipped us. We were not far from shore; the lights at the trading-post at the mouth of the river were plainly visible. We fired several shots, but apparently without rousing any one, and were obliged to go nearly a mile north of the post to find a bit of beach sufficiently clear of ice to land upon. Having succeeded in hauling the boat above high-water mark, we stumbled amongst the driftwood with which the beach was strewn, up to the fort or trading-post, which was closed, every one being asleep. We soon roused them, however, and after a regale of tea and bread I appropriated the bed of a Russian, and sank to slumber, surrounded and overrun by not less than thirty thousand adult cockroaches and their families.

Friday, 12th. — Rose with the determination of going somewhere where there were no *terrakánoff*, as the Russians call the insects with which their apartment was infested. I obtained a tent, pitched it, and moved most of my traps out into it. Planted a flag-pole and threw the ensign of the Scientific Corps to the breeze, with the resolution to carry the blue cross and scallop, before the year was out, where no other flag had yet floated, if that were possible.

I began to provide myself with suitable clothing, such as the natives wear. First, an *artégi*, or *párka*, as the Russians call it. This is a shirt of dressed deerskin, with the hair on, coming down to the knees, and to be confined by a belt around the waist. There is no opening in the breast or back, but a hood large

enough to cover the head, which may be pushed back when not needed. This garment is trimmed around the skirt, wrists, and hood with strips of white deerskin and wolverine or wolfskin, both of which are highly prized for the purpose. Around the hood the wolfskin is broad and taken from the back of the animal, where the longest hairs are barred with white and black, which, when the hood is drawn up, makes a kind of halo about the face which is not unbecoming. When travelling, these long hairs shield the face from a side wind to a surprising extent. The parka is exceedingly warm, and the wind does not penetrate it; while in exceedingly cold weather a light one, made of fawn-skin, or *wiperotky*, as the Russians term it, may be worn with the hair turned in, inside of the usual garment, which is made of various skins, according to the fancy. The fall skin of the young deer, known as *needress*, is the most common and perhaps the best. The skins of Parry's marmot (*Spermophilus Parryi*) and the musk-rat (*Fiber zibethicus*) are praised for their durability, and wiperotky parkies are neat and light, but do not last long. On the whole the needress is as strong, durable, and warm as any, and almost as handsome when well trimmed.

The next most important articles are the *torbassá* or Eskimo boots. These are made of the skin of the reindeer's legs, where the hair is short, smooth, and stiff. These are sewed together to make the tops of the boots, which come up nearly to the knee, where they are tied. The sole is made of sealskin, or luvták prepared in the same way as for making boats. This sole is turned over at heel and toe, and gathered like the skirt of a dress, so as to protect those parts, and brought up on each side. It is of course nearly waterproof and rather durable, but can be easily replaced in half an hour by a new one if necessary. It is wetted before being sewed, which makes the sealskin flexible, and the proper formation of the toe is aided by the teeth of the seamstress. In wearing these boots, which are made much larger than the foot, a pad of dry grass, folded to the shape of the sole, is worn under the foot. This absorbs any moisture, serves as a non-conductor, and protects the foot from the inequalities of ice or the soil. The whole furnishes a warm and comfortable covering, indispensable to winter travel. There are a pair of strings, one on each side, which are tied about the ankle, supporting it and preventing the foot from slipping about in the boot.

Deerskin breeches are worn by the natives, but are rarely needed by white men when provided with clothing of ordinary warmth and thickness.

The value of a good parka is at present about six dollars. Boots and other articles are usually obtained by barter. Ten musket-balls and a few caps are the regular price for a pair of torbassá, a pair of deerskin mittens being worth from four to six balls; ornamental gloves and other articles are more or less costly, according to the amount of work and the scarcity of the article at the time. So far, the natives have not yet learned to make a well-shaped thumb to gloves and mittens, a triangular shapeless protuberance serving their needs, but they may be easily taught a better mode of manufacture.

A deer or bear skin in the raw, dry state is used as a bed, and a blanket of dressed deer or rabbit skins, in addition to a pair of woollen ones, completes the list of articles needed for winter travel, though a small pillow is a great addition to one's comfort. A deerskin is worth, at the regular price, about sixty cents.

For a number of days nothing occurred of special interest. Captain Ketchum delayed starting across the portage to the Yukon for Nuláto, as it was still doubtful whether all the small rivers were securely frozen over. I found my nights in the tent not uncomfortable, though the thermometer ranged from twenty-eight to zero of Fahrenheit. Waking one morning, I found myself so deeply snowed up that I had a good deal of difficulty in getting out of the tent. It proved to be only a drift, however. A tin dipper of water frozen the first night showed no signs of melting.

The Russian trading-post at this point is much smaller than the Redoubt. It is in rather a decayed condition, and has only two glass windows, the remainder being made of gut, as used by the natives. Glass is a rare article here.

The stockade is built after the same plan as that at St. Michael's, and encloses one barrack building, with a room for the commander, a store, cook-house, bath-house, and a shed for storing oil, &c.; it is defended by two square bastions pierced for cannon. The guns had lately been removed, and the turrets fitted up for the accommodation of our officers. They

were of the most antiquated description, and likely to do as much damage by the breech as by the muzzle.

The fort is situated on the right bank of the Unalaklík River, where it empties into Norton Sound. It is said to have been built in 1840 and 1841.

To the north are two assemblages of houses occupied by Innuit of the Káviak, Máhlemut, and Únaleet tribes during part of the year, the latter being the only permanent residents. The village was formerly situated on the left bank of the river, but, an epidemic occurring, they removed and built new houses on the north side. The remains of the old houses and the graves may be distinctly traced.

The steamer Wilder, with the assistance of several hundred natives and our own party, under the direction of Captain Smith, had been hauled up on the beach beyond the reach of the ice, and might be considered as in winter quarters.

The Captain, who was an enthusiastic and successful sportsman, gave me the first specimens I had seen of the beautiful snow-white arctic grouse (*Lagopus albus*), which may be started in coveys on all the plains around the mouth of the river.

The beach at Unalaklík is shelving and sandy, and is bounded by a ridge, on which the houses are built. Back of this ridge the land is low, and overflowed for some distance when the freshets occur in the spring; beyond this low strip, which is parallel with the beach, it rises slowly and evenly, culminating in the ridges of the Shaktólik hills, which trend in a northeast and southwesterly direction, and attain a height of about a thousand feet above the sea. Several miles north of the river they come down to the shore in high bluffs of gray sandstone. The country to the south, already mentioned, is much the same, though the hills are farther inland and attain a higher elevation. From the beach near the fort, Besborough Island may be seen standing sharply and precipitously out of the sea, about thirty miles north-northwest. Egg Island and Stuart's Island, to the southwest, are so low that it is only on a very clear day, with a faint mirage to elevate them, that they can be distinguished. Covered with snow and without trees, the easy slopes and gracefully rounded hills have an aspect of serene beauty; the effect on a calm moonlight evening is delightful.

Thursday, October 25th.— Captain Ketchum having made up his mind to an early start across the portage, we entered on the necessary preparations for our journey. Appointing Lieutenant F. M. Smith Acting Surgeon for the Unalaklík party, I divided our exceedingly insufficient supply of medicines with him. The liberal scale on which everything was purchased allowed of no excuse for the inefficiency and red tape which left fifty men for a year, in a country where nothing of the kind was obtainable, with a supply of medicines which could be packed into a Manila cigar-box.

The proposed party for Nuláto was composed of Captain Ketchum in charge of that division, Mr. Frederick Whymper the artist of the Expedition, Mr. Francis the engineer of the Wilder, Lieutenant Michael Lebarge, a constructor who may be called Scratchett, and myself. Mr. Dyer the quartermaster proposed to join us later in the season. It will doubtless be noticed that this comprised some six officers to one man, but it must be recollected that the work laid out for the coming year in our division comprehended only exploration, and that we relied on the Indians in the vicinity of Nuláto for such manual labor as we should need. The following season we expected to receive a large number of constructors, who should proceed to build the line as soon as the route was determined.

We intended to travel with dogs and sleds, the universal and only practicable mode of winter transportation in this country. The sleds, harness, and so forth, I shall take another opportunity of describing minutely, and will only state at present that the dogs are about the size of those of Newfoundland, with shorter legs, and of all colors, from white, gray, and piebald to black. They are harnessed to the sled on each side of a line, to which the traces are attached, — two and two, with a leader in front; and the usual number is either five or seven, according to the load. They will draw when in good condition about one hundred pounds apiece with the help of the driver, who seldom rides, unless over a smooth bit of ice or with an empty sled. The sleds of the Eskimo are heavy, and shod with bone sawed from the upper edge of the jaw of the bowhead whale. These bones are obtained in the vicinity of Bering Strait, and good ones are quite valuable. The remainder of the sled is made of spruce wood. They will carry from six to eight hundred pounds. The sleds

used in the interior are much lighter and differently constructed. The Eskimo sleds are suitable only for travelling over ice and the hard snow of the coast.

Saturday, 27th. — Having loaded four sleds and finding the number of dogs insufficient, we sent down to the village and procured an additional supply, seizing any stray dog whose owners were not forthcoming, and pressing him into the service. About eleven o'clock, just as we were ready to start, an old woman, howling dismally, cut the harness of one of these conscripts and let him go. He was, however, immediately secured, the old woman pacified with a small present of tobacco ; and with a salute of one gun from the fort and a volley of revolver shots from our friends we started up the Unalaklík River on the ice. We got along very well, with the usual number of small casualties, such as the loss of one or two of the vicious dogs, who gnawed their harness in two, and the breaking of the bones with which some of the sleds were shod. We proceeded until darkness and an open spot in the river arrested our progress, and we camped on the bank for the night. The atmosphere being about ten below zero, we all relished our tea, biscuit, and bacon, and the ever-grateful pipe which followed it, before retiring. No tents are used in the winter, as they become coated with ice from the breath of the sleepers and are also liable to take fire ; so, pulling our blankets over our heads, we slept very comfortably, with nothing above us except the branches of the spruce-trees and the canopy of the sky. The trees commence as soon as we get sufficiently far up the river to be out of the way of the coast winds and salt air, and are principally willows, birch, poplar, and spruce.

Sunday, 28th. — Woke to the disagreeable discovery that four of our dogs had taken advantage of the darkness to gnaw their sealskin harnesses and decamp to Unalaklík. Pushing on, literally, with only three dogs, and five hundred pounds on the sled, I found rather hard work for a beginner. At last, about noon, we arrived at the first Indian village, called Iktígalik, where we unloaded our sleds, fed our dogs, and went into an Indian house built after the Eskimo fashion and very clean and comfortable.

Iktígalik is a fishing village with a larger population in summer than in winter. On the left bank of the river, which is about six hundred feet wide, are eight or ten summer houses, built on the

bank, of split spruce logs driven into the ground, and roofed with birch bark. The door is at the end facing the river, and is an oval opening some three feet high. The houses are about twelve feet square and entirely above ground, as in summer the underground houses are full of water. Behind these houses are the caches, called *kradowói* by the Russians. They are simply small houses, about six feet square and high, elevated from six to ten feet above the ground on four upright posts. They are well roofed and are used only as storehouses for provisions, dry fish, and furs, and are thus elevated in order that dampness or field-mice may not gain access to them; much like an old-fashioned corn-crib. Frames are also erected where the sleds, boats, and snow-shoes may be put out of the way of the dogs, who are always on the alert for any animal substance, and will eat sealskin and even tanned leather with avidity, even when moderately well fed.

On the other side of the river are two winter houses and several caches. One of these houses was the property of an old and rather wealthy Indian, as Indians go, who had been christened Amílka by the Russians. Amílka was anxious to obtain the title of *Tyone*, or chief, which is here merely a title and conveys no authority except what age and wealth may bring with it. He had been invested with the title by the explorers during the previous season, and, though an exceedingly mean old fellow, had been of some assistance to them. In the house with him were his wife, a very fine-looking Indian woman of considerable intelligence; and a young fellow called Ingechuk by the Russians, who had a wife about four feet high, of whom he was exceedingly fond and jealous. The other occupants were an intelligent fellow known as Andrea, and his wife, an old, very ugly, but dignified and hospitable woman. On our entering, she ordered some one to clear a place, and spreading out a clean grass mat motioned to us to be seated. Without relaxing her diligent oversight of the children around her, of her work, or of a kettle that was boiling by the fire, she sent out to the cache and obtained some dried backfat of the reindeer, the greatest delicacy in this part of the world; cutting it into pieces of uniform size, she placed it on a clean wooden dish and handed it to us, with an air of quiet dignity quite unaffected, and as elegant as that displayed by many a

civilized dame when doing the honors of a palace. No return was asked or expected, but a present of a few leaves of tobacco was received with thanks. The backfat, when toasted over the fire, has a rich nutty flavor and is extremely good.

The other house was occupied by a dirty old rascal called Matfáy, and another, equally dirty and more stupid, called Méeshka. Matfáy bore his greedy and deceitful disposition plainly impressed on his countenance, and evidently felt aggrieved that we had not honored his house with our presence, instead of sending our Máhlemuts there, who would make him no presents.

Ketchum had actually gone into his place at first, thinking, as the house was new, that it would be the cleaner of the two ; but after a glance at it had beaten a hasty retreat.

These Indians belong to a branch of the family of Tínneh, or Chippewayans, similar to those of Mackenzie River ; their tribal name is Ingalik, or, in their own language, *Kaíyuh-khatâna*, or people of the lowlands. The tribe extends from the edge of the wooded district near the sea to and across the Yukon below Nuláto, on the Yukon and its affluents to the head of the delta, and across the portage to the Kuskoquím River and its branches. Many of the adults have been christened, but not Christianized, by the missionaries of the Greek Church, and are usually known by their Russian names. They retain and use among themselves, however, their original Indian names.

Monday, 29th. — After a long night's rest, woke a good deal refreshed, though rather stiff, and enjoyed our breakfast thoroughly. Francis and myself took a walk some distance up the river, finding many open places in the ice. After our return I made a few sketches of the houses and Indians, and obtained a beginning of a vocabulary of Ingalik words. These Indians all understand a little Russian, and by this means are enabled to communicate with the whites. No one in the territory understands any English. The Innuit, especially the Máhlemut dialect, is so easy to acquire that the fur-traders learn it in preference to attempting the difficult task of teaching them Russian. Very few of the Innuit understand any Russian, while almost all the Russians understand some Eskimo. On the other hand, the Indian dialect is so much harder to learn than the Russian, that the Indians pick up Russian with facility, while none of the

Russians, except an old interpreter named Teléezhik, know more than a few words of the Indian dialects.

In the afternoon Ingechuk brought us some white grouse and some fresh reindeer meat. Of the latter a delicious dish was concocted, which I will describe for the benefit of future explorers. It was invented by the members of Kennicott's party during the first year's explorations. The frozen reindeer meat was cut into small cubes about half an inch in diameter. An equal amount of backfat was treated in the same way. Hardly covered with water, this was simmered in a stewpan for nearly an hour; water, pepper, and salt being added as needed. When nearly done, a little more water was added, and the finely broken biscuit from the bottom of the bread-bag slowly stirred in, until the whole of the gravy was absorbed. This done, we sat down to enjoy a dish which would have awakened enthusiasm at the table of Lucullus. It was known among the initiated as "telegraph stew," and the mere mention of its name would no doubt touch, in the breast of any one of them, a chord of electric sympathy.

The Russian name for the reindeer is *alénė*, perhaps derived from the French. These deer are migratory, feeding on the twigs of the willow and the fine white moss, or rather lichen, which is to be found on every hillside. They frequent the hills during the summer, and are driven thence only by the mosquitoes to seek refuge in the water. In the fall and winter they prefer the more sheltered valleys, and appear on the plains in immense herds in the spring.

Tuesday, 30th. — Walked down the river, and, looking into some deserted Indian huts, obtained some exquisite green mosses and lichens which were flourishing there notwithstanding the cold weather.

A number of sleds arrived from Unalaklík, bringing a large amount of goods and provisions for transmission to Nuláto.

On the rolling plain between the summer houses and the bases of the Ulúkuk Hills I found the larch (*Larix microcarpa?*) growing sparingly to the height of twelve feet, and abundance of alders. The snow-covered sides of these symmetrical hills stood out with striking beauty against the dark clouds which formed the background of a rich crimson and purple sunset.

Wednesday, 31st. — Ketchum decided to send back all the heavy

Máhlemut sleds, and kept nine dogs to assist us in taking the goods up to Nuláto on the light Ingalik sleds. The weather, being above the freezing point, was so warm as to render the prospect of our being able to cross the Ulúkuk River on the ice rather dubious; it would have been useless to start until we could cross it, as it is only a few miles from Iktígalik. After the sleds had started for Unalaklík, we let out the dogs from an empty summer lodge where they had been confined to prevent their following their comrades down the river.

At this period of our explorations arose the famous controversy between two of our party, in regard to the relative merits of beans and rice as articles of food. However insignificant the subject, such was the earnestness and even eloquence developed on both sides, such was the array of facts brought forward to sustain the several arguments, that the interest of every one was awakened in the discussion. This lasted late into the night, and was renewed immediately the following morning. I am sorry to be obliged to record, however, that, as in many other discussions, both literary and scientific, no definite result was arrived at, although each was convinced against his will of the valuable properties of the esculent defended by his opponent.

Thursday, November 1st.—The weather was still warm and snow falling fast. We made the discovery that nine or ten of our dogs had apparently decided to hold a town meeting in Unalaklík, and had accordingly left for that place. This was exceedingly provoking, as it would render our starting impossible in the event of a sudden cold snap. I therefore proposed to Ketchum to go back to Unalaklík and get the dogs, and Francis offered to do the same thing. The decision was postponed till the next day. Ketchum, finding dry fish likely to be scarce, called on the Indians to bring out what they had to spare, and purchased it. This fish is principally salmon and some small white fish, and is dried in the sun without smoke or salt. It is the principal staple of food, under the name of *úkali*, for all travellers, both men and dogs; being very light and portable, yet full of oil; of not the most agreeable flavor, it is at least strong if not strengthening. Occasionally one does get hold of a clean, well-dried ukali, that tastes very well when broiled over the fire; though in my own case the use of it invariably produced heartburn. The ration for a dog is

one salmon weighing from a pound and a half to two pounds, or as many smaller fish as will amount to the same. They will travel on less, but the best policy is to feed your dogs well, and you may then, with proper attention, be sure that they will work well and rarely run away.

At this time Ketchum made an arrangement with Lófka, a newly arrived Indian, and Andrea, to accompany him in a proposed winter trip up the Yukon, and paid them partly in advance.

Friday, 2d. — Francis and I started at nine o'clock for Unalaklík to bring back the missing dogs. Found the walking good but wet, and we occasionally had to take to the bank. The distance is twenty-two English miles in a direct line, but at least thirty by the river, which is exceedingly tortuous. We arrived at the post at two o'clock, just in time for a glorious Russian bath and a hot cup of tea. These baths are an institution to be proud of. Every Russian trading-post in the territory is furnished with a bath-house, and once a week all the inmates avail themselves of it. As they reckon time according to Old Style in the Russian colonies, their Sunday falls on our Saturday, and as a consequence bath-day comes on Friday. The apparatus is very simple. A rude arch of loose stones, of the hardest obtainable kind, is built, and more stones piled over it, so that a fire made beneath the arch can penetrate between them. There is no chimney, but a trap-door in the roof. A large cask full of water heated for the purpose, and another of cold water, generally with ice floating in it, and a succession of benches one above the other, complete the equipment. When the stones are thoroughly heated and the smoke has all passed out, all coals are removed and the trap-door is shut; any smoke or coals remaining will make the eyes smart and the bath very uncomfortable. Each one leaves his clothing in an outer room, and on entering wets his head and throws hot water on the heated stones until as much steam is produced as he can bear. He then mounts as high on the benches as he finds comfortable, and the perspiration issues from every pore. He then takes a sort of broom or bunch of dried mint or birch twigs, with the leaves still on them, which is prepared at the proper season and called *méenik*. With this he thrashes himself until all impurities are thoroughly loosened from the skin, and finishes with a wash off in hot water and soap. Then taking a kantág, or

wooden dish, full of ice-cold water, he dashes it over himself and rushes out into the dressing-room. This last process is disagreeable to the uninitiated, but is absolutely necessary to prevent taking cold. I have known cases of acute rheumatism brought on by omitting it. The dressing-room is spread with straw and always communicates with the outer air. The temperature is often many degrees below zero ; but such is the activity of the circulation, that one dresses in perfect comfort notwithstanding. A warm dressing-room would be insupportable.

These baths cannot be recommended for those with a tendency to heart disease or apoplexy, but to persons in a healthy condition the effect is delightful ; rheumatic patients are frequently cured by their means, with proper precautions. One of these baths will remove all traces of extreme exertion or fatigue as if by magic, and they may be advantageously followed by a few cups of hot tea and an hour's repose.

After our bath we found to our disgust that the dogs had been sent back, thanks to the energy of Mr. Dyer, and must have passed us on the way, while making a short portage. The weather becoming disagreeable, we were soon reconciled to our disappointment, and were snugly ensconced in one of the bastions, which had been hung with reindeer skins for comfort and warmth during the severe winter, relating our experiences over the ever-grateful cup of tea, while the sleet was driving and the storm howled outside.

Saturday, 3*d.* — The weather continued warm and disagreeable. The ice was very wet and bad, and we concluded not to return to Iktígalik to-day. The village beyond Iktígalik is called Ulúkuk, and many of the Russians call the former village New Ulúkuk, as it was built since the latter, by Ulúkuk Indians, the point being a good one for the fisheries.

The mouth of the Unalaklík River is obstructed by a bar, over which at low tide there is only a few feet of water, except in a narrow and tortuous channel, which is continually changing as the river deposits fresh detritus. Inside of this bar we get two or three fathoms of water for a few miles, but the river has only a few feet in the channel, most of the summer, from the mouth to Ulúkuk. The tide-water comes up a mile or two, and from this cause it is difficult at times to procure fresh water for drinking

purposes, as the well water is disagreeably brackish. The same trouble is found at St. Michael's, where the only good water is obtained from springs on the mainland, near the shore opposite the island. There are many of these springs near the shore along the coast, and they are unfrozen all winter, the water having a temperature of 28° to 30° Fahrenheit, even when the air is several degrees below zero. Whether this is due to any latent volcanic heat cannot yet be decided, but the islands of Stuart and St. Michael, as well as the coast as far north as Tolstoi Point, are composed of basaltic lava, full of amygdaloidal cavities and crystals of olivine, and, in many places, roughly columnar in five-sided pillars.

Sunday, 4th. — In the morning a strong northeast wind was blowing, with the thermometer about 16°, and a great deal of loose snow driving about. I determined, in spite of the remonstrances of the others, to delay no longer, and, putting some biscuit and ukali in my pocket, I started alone, about eleven o'clock, for Iktígalik. The wind sweeping over the broad plains near the mouth of the river was so violent, and the sleet was so blinding, that I was unable to face it, and was obliged to go from side to side of the river diagonally. In doing this I was misled by a branch of the river, and proceeded several miles before I found out my mistake. Retracing my steps, I took the right direction, and reached the wooded part of the river, where the trees made a shelter from the force of the wind and driving snow, late in the afternoon. I found the ice rather soft and covered in many places with drifted snow, so that the travelling was very laborious. To add to my annoyances, it soon became very dark, and I had to grope my way over ice-hummocks and through snow-drifts until nearly worn out by the exertion. Passing round a bend in the river, the ice gave way under me, and I had only time to throw myself on one side, where it proved more solid, and I got off with a wetting up to my knees. Taking off my boots and socks, I wrung out the water and put them on again, when they froze immediately. Nothing but the want of an axe prevented my camping then and there; but a howling, which came evidently from no great distance, reminded me that it might not prove healthy to sleep without a fire. I trudged along, and, to my great delight, about eight o'clock, the moon rose, and I soon saw the

high caches of the village standing out against the sky. I heard no dogs, however, and on reaching the entrance of the house on the bank I found it closed with a block of wood. Climbing on to the roof and looking through the gut cover, I thought I saw a glimmer as of live coals where the fire had been. My shouts finally aroused Ingechuk, who was the only occupant. Ketchum had evidently gone, and I had my labor for my pains! Between the small stock of Russian which I had picked up, and the little Ingechuk knew, I finally managed to make out that they had left that day and gone to Ulúkuk. I made him boil the chynik, and changed my wet clothes, which were frozen so hard as to be difficult to get off; and then, after taking my tea, retired with a feeling that I had earned a good night's sleep.

Monday, 5th. — Not wishing to take another useless tramp, I prevailed on Ingechuk to take a note to Ketchum, if he was at Ulúkuk and if he wished me to join him; and feeling rather stiff, I remained in the house, writing and resting most of the day. About the middle of the afternoon, Francis arrived. He had met an Indian with a note from Ketchum, on the river, and knew that he was gone, but had kept on to Iktígalik. Soon after, Ingechuk returned with a note from Ketchum, who was on the point of starting for Nuláto, and advised us to return to Unalaklík and come up with the next brigade of sleds.

Tuesday, 6th. — Breakfasted on some fine salmon trout (*kokolimýa* of the Indians, and *kolshéh* of the Russians) which Ketchum had sent down to us. These fish, when broiled in their skins on a stick over the fire, are exceedingly fine eating, but if fried or cleaned before cooking lose much of their flavor.

Leaving some of our things with Ingechuk, to follow us the next day, we started for Unalaklík about eleven, and reached it about five o'clock in the afternoon; our return created some amusement. The ice being very glairy made the travelling very disagreeable, and we were well satisfied when we came to our journey's end.

Adams, one of the original party, now justly known as the pioneers, had left for the Redoubt in a bidarrá, but had not returned; some fears were excited that he might not be able to do so until the sea ice had fully formed. Temperature varied from 15° to 20°.

For several days we remained *in statu quo*. Our time was taken up in increasing our knowledge of Russian and the Máhlemut dialect, in preparations for another attempt to cross the portage, and in reading a variety of matter provided by the kindness of some of the officers who did not remain in the country. Several evenings were pleasantly diversified by an amateur theatrical performance, aided by several violins. Many capital personal hits were made, which, being taken in good part by the victims, were productive of a great deal of merriment.

Monday, 12th. — Started for Iktígalik about ten o'clock, with two Máhlemuts, Shurúgeluk and Ichíluk by name, commonly known as Shuggy and New-Years, the latter having been hired the previous year by Mr. Kennicott on New-Year's day. We had two heavily loaded sleds of Máhlemut make, drawn by five and four dogs respectively, dogs being scarce. The party consisted, besides the two Eskimo above referred to, of Messrs. Dyer and Francis, and myself, — Mr. Francis and I, not wishing to be idle, having volunteered to assist in transporting the Nuláto goods to Ulúkuk. By making several short portages, the distance was materially reduced, and we arrived in good condition at Iktígalik about two o'clock in the afternoon.

Tuesday, 13th. — After breakfast, loaded up one Máhlemut and one light Ingalik sled and started at half past ten for Ulúkuk, which is about eleven miles from Iktígalik by several portages and the river. About half-way on a bend of the river were two roofless deserted houses, once a summer fishing village, called by the Indians *N'tsoh*. Unromantic as it may appear, the sight of these poor ruins, indicating probably a death in the midst of the primeval woods, could hardly fail to produce a touch of emotion in any mind less occupied than that of the hardy and careless voyageur. They formed a rude, half-effaced, but effective monument of human sorrow, in a country where humanity seems hardly to have taken root, existing as it does, only by a constant struggle for the necessities of life.

Pursuing our way up steep banks and down sharp declivities requiring the greatest care in the management of dogs and sleds, over the ice-bound river and the rolling plains, dotted with clumps of larch and willow, we finally struck the river at a sharp bend, just below the point where the village of Ulúkuk is situated.

Here a large number of springs exist, some of them below the bed of the river, whose waters are never frozen, an open patch being found here during the most severe winters. The water in these springs, measured by a standard thermometer of Greene's make, was not very warm, but retained a temperature of thirty-two to thirty-four degrees Fahrenheit during extremely cold weather. I counted seven springs in the gravel beach near the village, all without any ice about them; most of them continue open during the entire year, but are covered by the river during the spring freshets.

The village contains five winter houses, a small casine, and a row of high caches. It is situated on the right bank of the river, which is here about two hundred feet wide; about four miles to the eastward the Ulúkuk Hills rise to a height of about two thousand feet. At this time they were snow covered of course, but they are free from snow during the summer.

The open water in the river makes it somewhat difficult to approach the village with sleds from below, the banks, though low, being steep and covered with small trees. Snow or ice, placed upon the smooth pebbles from beneath which the springs were flowing, soon melted, though the weather was at zero. With the atmosphere at eight below zero, the temperature of one spring, which gave out beautifully clear water with a slight saline taste like bicarbonate of soda, was thirty-two degrees; another, quite tasteless, was thirty-four degrees Fahrenheit.

The water in the river, at the edge of the ice, which was about eighteen inches thick, had a temperature of thirty-one degrees. A remarkable abundance of fish frequents the vicinity of this patch of open water, especially the delicious salmon trout for which Ulúkuk is noted, and a small cyprinoid fish not elsewhere observed.

Amílka has a house in this village also, and into it we took our baggage and rested; an old Indian called Sammák roasted some trout for our evening meal, while with some fresh alêné meat and backfat Dyer concocted one of those appetizing telegraph stews previously mentioned.

Wednesday, 14th. — Francis and our two Eskimo started off with three sleds to bring loads from Iktígalik. Several sick Indians came to me for treatment, their own medical knowledge being confined to steam-baths and to counter-irritants in the form of

bleeding by means of a large number of small cuts and the actual cautery. They have no knowledge of the uses of the indigenous herbs of the country or of any medicines.

I purchased a fine pair of snow-shoes about five feet long for a sheath-knife, and Dyer obtained a large number of the river trout from the Indians. I cannot understand why Kane and other Arctic travellers could not preserve fresh provisions in a frozen state, for winter use. In this country immense quantities of meat and fish are so preserved without taint all the year round. Excavations are made in the earth to the depth of two or three feet, where it is usually frozen, and the contents are thus protected from the rays of the sun.

Towards evening Francis and the sleds returned with heavy loads of goods from the other village.

Thursday, 15th. — It being my turn to take charge of the brigade, I started with the dogs and men about half past ten, with empty sleds. Reached Iktígalik about two o'clock, and by means of a little diplomacy induced Ingechuk and Amílka to lend me their dogs, and also got hold of another sled.

Friday, 16th. — Rose early, and after chy peet, as the Russians call a meal of bread and tea, harnessed up the dogs, and, taking all the remaining goods, except some dog feed, started about half past eight and arrived at Ulúkuk about noon. Cached the goods and repaired sleds and harness.

News arrived from Ketchum in the afternoon, by an Indian who brought a sled and a worn-out dog from a point called Vesólia Sópka, or Cheerful Mountain. He said that Ketchum had passed that point with three sleds *en route* for Nuláto, but that the roads were very bad, the snow being deep and soft. One of our party had been trading with Lófka, who, having an ear for music, bought an accordeon, giving in exchange two dogs, one of which was supposed to be running wild in the woods. Lófka knew nothing of the use of the instrument, and it was a moot question which had the best of the bargain. The instrument having been used to play "Tramp, tramp, the boys are marching" for some four months, about twenty-four times a day, was, to say the least, not in a condition to be much injured by Indian fingering.

After waiting a day for the return of the Nuláto brigade which was due, Dyer returned to Unalaklík, leaving Francis and myself

with nothing to do but eat, drink, and sleep, which was extremely tedious, as the days were very short. We finally determined, if the brigade did not arrive the next day, we would get a few dogs together and carry a load to Vesólia Sópka. If it were a small one it would be of assistance, and anything would be better than continued idleness. A large number of Indians arrived from different quarters, and I improved the opportunity to enlarge my Ingalik vocabularies. One of them went out, and returned with three brace of beautiful ruffed grouse (*Bonasa umbellus.*) I also purchased some small fish, which were devoted to the interests of science.

Wednesday, 21st. — Heard a howling early in the morning and an outcry among the Indians, and jumped into my clothes just in time to catch a sight of Mike's pleasant face coming up the bank, with two Russians, six sleds, and nearly forty dogs behind him. A rapid interchange of news ensued, while unharnessing the dogs and putting the sleds up on the stages provided for the purpose. Mike was delighted to find that the work of carrying the goods from Unalaklík to Ulúkuk had been taken off his hands. The Russians were to go on to Unalaklík, and we should immediately proceed to Nuláto. Ketchum sent word to me to come up immediately, as my services were likely to be needed; but unfortunately he was obliged to ask Francis to wait for the next brigade, as the supply of provisions at Nuláto was exceedingly small. Nuláto, as the natives say, is emphatically a "hungry" place. We all regretted the provoking necessity which deprived us for a time of the society of our lively and energetic companion. He therefore made arrangements for returning a third time to Unalaklík with the Russians.

Thursday, 22d. — Rising early, the sleds were soon in readiness, and, buying a lot of fresh trout, for our own use and to send by the Russians to Unalaklík, we started about noon for Vesólia Sópka; our party consisting of six Indians, one man to each sled, besides Mike and myself. The road was excellent, and we did not require snow-shoes; the dogs were in good condition, and we progressed very well.

After leaving Ulúkuk, crossing the river and a belt of spruce timber of small size and about a mile in breadth, we came to open rolling land, between the river and the base of the hills.

This country is almost level, with hillocks here and there, and occasional clumps of low willows. This prairie-like plain is called a *túndra* by the Russians.

From Ulúkuk to the river at the Vesólia Sópka is about fourteen miles,* the greater part of which is over the tundra, which is occasionally intersected by small streams falling into the Ulúkuk branch of the Unalaklík River, and forming deep gullies, which, until filled with snow, are difficult to pass with loaded sleds. The dogs have sometimes to be unhitched and the sled carefully eased over the ravine and lifted up the opposite bank, — a work frequently of no small labor.

The Vesólia Sópka forms the termination of the range of the Ulúkuk Hills, but is somewhat lower and detached from the rest. It attains a height of about eight hundred feet above the surrounding plain, and has an even and beautifully rounded summit. At its base, hidden by large and very tall spruce and poplar, runs the Ulúkuk River. We crossed the stream, which is about two hundred feet wide, and soon reached a spot where the Russians are accustomed to camp, on the opposite bank, from which the Sópka (Russian for cone or peak, particularly a volcanic one) probably derived its name of Vesólia (cheerful). Near this point a small stream, known to the inhabitants as Poplar Creek, enters the river. This is an excellent locality for trapping, as the numerous fox and marten tracks testified. We boiled the chynik and partook of a cheerful meal of bacon and biscuit, and then pushed on by moonlight, over wooded hills, to an Indian summer lodge, or *barrábora*, built of spruce poles and birch bark. Here we camped, and passed a rather uncomfortable night, as the frail walls retained the smoke and admitted the cold wind. This point is about eight miles from the Sópka.

Friday, 23d. — Rose early, and after reloading the sleds and discussing chy, with accompaniments of bacon, biscuit, ukali, and molasses, we passed on over hillsides sparsely wooded with spruce and alder, through valleys, and up and down some rather bad hills, occasionally along the river on the ice. About dark we came upon some open tundra, just beyond a low marsh, known as Beaver Lake, as it is covered with water in the spring; here a strong north wind was blowing full in our teeth, carrying the

* Unless otherwise stated, English statute miles are meant.

snow along the ground in blinding sleet. The atmosphere was six below zero. The other sleds were some distance behind, but as our sled carried the teakettle and axes, we felt pretty sure the Indians would follow, though much against their will. We struggled on until we arrived at an old camp of Ketchum's, where one tree mocked us with its inefficient attempt at shelter. We decided to camp here, no more suitable locality being within reach. By placing the sleds to windward, with a piece of cotton drill stretched around them, we managed to keep off the driving snow a little. The hot tea in our tin cups burned the hand on one side, while the keen wind gnawed it on the other. Smoking was out of the question, and we lay down, using the bacon as pillows, and watched the dogs, who, growling their disapprobation, sheltered their noses with their tails, and, more fortunate than ourselves, soon sank into unconscious slumber.

Saturday, 24th.—About four o'clock in the morning an old Indian called Iván, from Nuláto, came along with his son. They pulled their own sled, and had a few marten skins with which they were going to Unalaklík to buy oil for winter use. Shortly after, we broke camp and proceeded. About nine o'clock the sun rose, attended by three beautiful mock suns, or *parhelia*. One was nearly thirty degrees above the real sun, and there was one on each side, similar, but more brilliant. All were connected by an arch resembling a rainbow, except that it was of an orange color with a dark reddish band on the inner side, and threw out rays of light from the outer edge. About a quarter of another similar arch was reversed, touching the lower arch at the point where the upper mock sun was seen, and a cross of brilliant light was noticed at each junction of the arch with the mock suns. This beautiful exhibition continued for six hours, from sunrise to sunset, and Mike tells me they are not uncommon here in winter.

Shot a Canada jay, or whiskey jack (*Perisoreus canadensis*), with a dark brown "woolly bear" caterpillar in his mouth, just killed. Where it had come from was a mystery I do not pretend to solve, probably from beneath the snow.

We decided to camp early, as we were all very tired, and after descending a deep declivity called by the Russians *Periválli*, we stopped on the bank of a small stream, made a good camp, enjoyed our supper, tea, and pipes, and slept soundly.

Sunday, 26th.—Off at six. Passed over the flanks of some high hills, from one of which I caught my first glimpse of the great river Yúkon, broad, smooth, and ice-bound. A natural impatience urged me forward, and after a smart tramp of several miles we arrived at the steep bank of the river. It was with a feeling akin to that which urged Balboa forward into the very waves of a newly discovered ocean, that I rushed by the dogs and down the steep declivity, forgetting everything else in the desire to be first on the ice, and to enjoy the magnificent prospect before me.

There lay a stretch of forty miles of this great, broad, snow-covered river, with broken fragments of ice-cakes glowing in the ruddy light of the setting sun; the low opposite shore, three miles away, seemed a mere black streak on the horizon. A few islands covered with dark evergreens were in sight above. Below, a faint purple tinged the snowy crests of far-off mountains, whose height, though not extreme, seemed greater from the low banks near me and the clear sky beyond. This was the river I had read and dreamed of, which had seemed as if shrouded in mystery, in spite of the tales of those who had seen it. On its banks live thousands who know neither its outlet nor its source, who look to it for food and even for clothing, and, recognizing its magnificence, call themselves proudly *men of the Yukon.*

Stolid indeed must he be, who surveys the broad expanse of the Missouri of the North for the first time without emotion. A little Innuit lad, who ran before the dogs and saw it for the first time, shouted at the sight, saying, amidst his expressions of astonishment, "It is not a river, it is a sea!" and even the Indians had no word of ridicule for him, often as they had seen it.

A half-mile above the point where we struck the river bank is a cluster of winter houses and caches, which goes by the name of Kaltág. Thither we turned our steps, a piercing northwester sweeping down the river being an effectual argument against further progress. We entered one of the houses, a large, clean, and well-constructed building, where we found a very old man known as *Kaltág Stareék* by the Russians (*stareék* meaning old man), and his wife, with another woman, busily at work on some winter clothing. They made room for us, spread some clean mats, and Mike, who was a general favorite, especially among the indigenous female population, by a present of a pair of scissors

induced the old woman to give us three or four ptarmigan, with a promise of six more on his next visit. He then proceeded with the aid of some rice to concoct a stew which did great credit to his culinary abilities.

We went out together to feed the dogs, and returning unexpectedly, I found one of the Indians investigating with his fingers the recesses of a spare chynik which contained our molasses. Such incidents are not uncommon, when travelling with the natives.

After discussing our supper and congratulating ourselves on the accomplishment of the portage without storm or accident, we turned in early, to enjoy a good night's rest and thereby prepare for an early start the next day.

Monday, 26th. — Pushed off quite early, travelling on the middle of the river, finding the ice, which seemed so even and smooth from the bank, to be broken, strewed with numerous cakes, and diversified by hummocks, over which about eighteen inches of snow had already collected. Here and there were patches of smooth ice, evidently of recent formation, and once or twice a light cloud over an opening indicated that the surface was not entirely frozen. Numerous long islands, covered with spruce, poplar, and willow, obstructed the view of the opposite shore, which is quite low, while here and there we could catch glimpses of the summits of the Káiyuh Mountains, a range of high hills to the eastward. The right bank consists of rounded bluffs following each other like waves, reaching a height of fifty to one hundred and fifty feet, caused by the bending of the strata, which are composed of layers of brown tertiary sandstones of Miocene age. The sides of these bluffs, with the ravines between them, are well wooded with spruce and birch, which often attain a considerable height. The left bank is uniformly low and densely wooded. The thermometer to-day fell to thirty-two below zero, but the air was still, and travelling was not uncomfortable. About six o'clock we reached a broad ravine, through which a small brook ran, and where an Ingalik named Álikoff had built a small house, known as Álikoff's barrábora. This is about twenty miles from Kaltág, which, I forgot to state, is about twenty-five miles from Iván's barrábora and thirty-six from Nuláto, perhaps a few miles more by the road we took.

Here we decided to camp for the night, and found the house, which was empty, rather smoky and uncomfortable.

Tuesday, 27th.— Making an early start for Nuláto, we proceeded up the river, the temperature being about twenty-eight below zero. About eleven o'clock, arrived at an open space nearly two miles long, bounded on the south by a sharp bluff known as the Shamán Mountain. Here a seam of coal had been reported, and, stopping for a moment, I ascertained that the report was correct. Reserving a careful examination for some other occasion, I started ahead of the dogs, following the old tracks on the snow, and soon left the brigade behind me. In half an hour I reached a point on the river where a party of three Russians were engaged in setting fish-weirs under the ice. An old fellow, whose head shook like that of a Chinese mandarin, informed me that the post of Nuláto was only a mile beyond. A steady walk of nearly an hour convinced me that it was nearer three miles, but I soon espied the stockade and two turrets at no great distance. Ascending the bank, I went into the enclosure, and, inquiring for the Americans, was directed to a low building on one side. On entering I was soon shaking hands with Ketchum, and with Whymper, who was already engaged in sketching.

We were congratulated on our quick trip from Ulúkuk, and exchanged items of news. The noise of the dogs was soon heard, and we were busily engaged in unloading and storing the goods, as well as unharnessing the dogs, who seemed as glad as anybody that their journey had come to a satisfactory conclusion.

CHAPTER II.

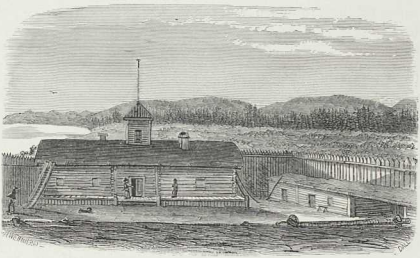
Arrival at Nulato, and introduction to the Creole bidarshik. — Description of the post and its inhabitants. — Adjacent points. — History. — The Nulato massacre and its cause. — Barnard's grave. — Daily life at Nulato. — Larriown. — Koyukun Indians. — Ingaliks. — Kurilla. — Plans for the coming season. — Examination of a coal-seam. — Nuklukahyet chief. — Christmas festivities. — New Year's and erection of the first telegraph pole. — Aurora. — Return of Ketchum. — Collections in Natural History. — Indian rumor. — Cannibalism. — Russian ingenuity. — Founding of Fort Kennicott. — Departure of Ketchum and Mike on their winter journey to Fort Yukon. — Arrival of our bidarra. — Trip to Wolasatux' barrabora. — Scarcity of food. — First signs of spring. — Robbing a grave. — First goose. — Indian children. — Rescue of the bidarshik. — Anecdote of Major Kennicott and erection of a monument to his memory. — Formation of alluvium. — Preparations for our journey. — Breaking up of the ice on the Yukon.

HAVING finally arrived at Nuláto, which I proposed to make my head-quarters, and having rested from the fatigue of the journey, I was introduced to Iván Pávloff, the bidárshik or commander of the trading-post. He was a short, thick-set, swarthy, low-browed man, a half-breed between a Russian and a native of Kenái, and was legally married to a full-blooded Indian woman, named Marina, the widow of a previous bidárshik, by whom he had a large family of children. He appeared to be a good-humored fellow, though the Indian clearly predominated in him. While evidently understanding nothing of the object of the collections and observations which I proposed to make, he yet assured me that I should be welcome to any information or assistance I might need. A disagreeable servility marked his intercourse with the Americans and full-blooded Russians, the latter regarding him with unconcealed contempt on account of his Indian blood, notwithstanding his responsible position. This accounted for the expression which might often be observed on his face while conversing with him. It seemed a mixture of stupidity and low cunning, as if he were apprehensive that some covert ridicule, or attempt at overreaching, lay hidden in the conversation addressed to him. He was an insatiable drinker,

and ungovernable as a mad bull when drunk, though at other times quiet and unexcitable. He was continually pestering us with requests for liquor, until I was obliged to poison all the alcohol intended for collecting purposes. Notwithstanding his faults, most of which were hereditary, he brought up his children and treated his wife as well as his light allowed him to do. He had a large proportion of generosity and hospitality in his character, was unusually free from any disposition to immorality, and was never known to sell any furs, purchased by him and belonging to the Russian American Company, to any of our party, as he might easily have done. He could not read or write, and the accounts were kept by an assistant called Yágor Ivánovich. He cherished in his heart a dislike to the Americans on account of their superior energy and intelligence, which led them to regard him with no very respectful eye. When he was drunk, the bitter and unfounded prejudices which he cherished came to the surface; otherwise we should hardly have suspected them. I have been thus careful in drawing his portrait, not because the individual is of any particular consequence, but because he is in many respects a type of the largest class of the civilized inhabitants of Russian America. They are known among the Russians as Creoles. The other inhabitants of the post of Nuláto were two Russians, the only whites beside ourselves, named Kárpoff and Paspílkoff (the *Pomóghnik*, or assistant, who kept the accounts, was a Creole, like the bidárshik); an old Yakút, named Yagórsha, who was a curiosity in himself; two half-breeds; and a few Indians; while a nearly equal number of Indian women were employed in and about the post.

The fort was a large one, two sides and a part of the third formed by buildings, the remainder a stockade, thus enclosing a large yard. On one side was a long structure, containing two rooms, which served for the bidárshik and his assistant and their families. These rooms were separated by a covered space from the rest of the building, which contained a magazine for trading-goods and furs, a store-room where fish were kept, and another, which was principally occupied by our goods. Opposite to this was another building of the same size, containing one large room, separated in the same way from a small one, in both of which workmen and their families lived. Each of them was surmounted with a

turret pierced for guns, and in one of these were two antique, rusty, and almost useless six-pounders. The third side was occupied by a low-studded building, about twenty feet long and ten wide, which we occupied; a shed, where fuel might be kept dry; the bath-house, and a shed used to cook in, and called by courtesy the *povárnia*, or kitchen. The front of the yard was closed in by a stockade about sixteen feet high, of pointed logs set upright in the ground, and was provided with a large gate. The houses were of round logs; the roofs, nearly flat and covered with earth, could be reached by means of steps provided for the purpose. The windows were all of the parchment, or seal intestines, before mentioned, and the buildings were warmed by the universal peechkas, the seams of the walls being calked with dry moss.

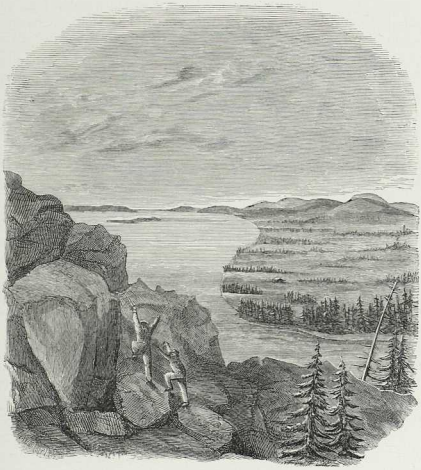


Interior of Fort Derábin, from above.

Directly across from the fort, which faces the river, is a low island, less than a mile long. The river is narrow here, being by exact measurement only a mile and a half wide. The latitude of the fort is nearly 64° 42′ north, and the longitude 157° 54′ west. The variation of the compass is nearly thirty-two degrees to the eastward.

A mile and a furlong east-northeast is a small creek, a raging torrent in the spring, called *Klat-kakhátne* by the Indians, literally "Stop-a-bit River." Half a mile west-southwest is the mouth of

the Nuláto River, from which the post takes its name, though it was originally called Fort Derábin, from its builder and first bidárshik. Between these two streams the land is low, gradually rising from the river into low hills, and for the most part densely wooded. A short distance from its mouth the Nuláto River



Nuláto and the Yukon from the Bluffs.

receives two streams of no great size. Its total length is about twenty miles, inclusive of windings. The opposite bank of the *Klat-kakhátne* rises abruptly into a rocky, precipitous bluff, affording a fine view down the river. Not far below the mouth of the Nuláto the river-bank rises, but not so abruptly, into bluffs

about one hundred feet high, with higher hills behind them. Neither deer nor moose are often found in this vicinity.

In 1838, Málakoff, a Creole, explored the Yukon as far north as Nuláto. Here he built a small trading-post, without a stockade, consisting of several small houses. This was occupied during the summer and fall, but in consequence of the scarcity of provisions, at the approach of winter the Russians, under Notármi the bidárshik, left it and returned to the Redoubt. On their return, in the spring, it was found that the Indians, jealous of the permanent settlement of the whites in their immediate vicinity, had destroyed it by fire. The same thing was repeated in 1839, the buildings being burned and contents carried off.

In 1841, according to Tikhménief, the historian of the Russian American Company, Derábin was sent to Nuláto and rebuilt the fort, after arranging the difficulty with the natives by means of numerous presents given to the most influential chiefs. Yet, not having benefited by previous experience, the post was composed of several detached log-houses, strongly built, but several hundred yards apart, and without a stockade or other efficient means of defence. Other buildings were added as necessity called for them, and in 1842, Lieutenant Zagóskin, I. R. N., a special explorer of the Company, arrived, and assisted at the erection of some of these.

For ten years, though frequently threatened, the little settlement escaped injury, Derábin meanwhile carrying on a lucrative traffic with the natives for furs. In the spring of 1851, Lieutenant Barnard, of H. M. S. Enterprise, arrived at Nuláto with the bidárshik, in search of information in regard to the fate of Sir John Franklin. He was a member of Captain Collinson's Expedition, and, with Mr. Adams a surgeon, and one man, had been left by the Enterprise at St. Michael's the preceding fall Being probably a blunt, straightforward Englishman, with no knowledge of Indian character and suspicion, he made the remark, in the presence of others, that he intended to "send" for the principal chief of the Koyúkun tribe of Indians, whose head-quarters were on the Koyúkuk and Kotelkákat Rivers, and who were then holding one of their annual festivals, about twenty-five miles from Nuláto. This unfortunately-worded remark was conveyed to the chief in question, through some of the Indians at the post, by a passing native.

This chief was the most wealthy and influential in that part of the country, widely known and distinguished by a remarkably large and prominent Roman nose, from which he had received a name which, literally translated, means "humpbacked nose."

He was not accustomed to be "sent" for. When the Russians desired to see him they respectfully requested the honor of his presence. His Indian pride rose at the insult, and he immediately called a council to discuss the rumor. The shamáns were of course first consulted, and they unanimously declared that it boded no good to the chief in question. The council then decided that, if the report proved true, they would, with all the Indians there assembled, go together to the fort and demand satisfaction. They waited some time, and finally were about to disperse to their homes, when a single dog-sled appeared on the river.

This sled was accompanied by Iván Búlegin, a Russian, and an Indian workman of the Nuláto tribe, who had been sent up to see if any information were attainable, and if so, to bring down the Tyóne of Koyúkuk.

The ill-fated Búlegin drew his sled up on the bank, sending the Indian who accompanied him for water to boil the chynik. Sitting down on his sled to rest himself, he was approached stealthily from behind and, being struck on the head with an axe or club, was instantly killed.

The sled was dragged away and plundered; when the Nuláto Indian returned and saw what had been done, he turned to run, but the Koyúkuns called to him, saying, "Are you not one of us? We will not hurt you." Overcome by fear, he returned and unwillingly assisted in the atrocity which followed. Búlegin's body was stripped, the flesh cut in slices from the bones, and the savages, infuriated like wild animals by the sight of blood, roasted these remains and devoured them. An Indian, who noticed the reluctance with which Búlegin's companion joined in the horrid feast, crept up behind him and drove his knife up to the hilt in his neck. The fighting men present then stripped themselves of all incumbrances except their bows and arrows, and, putting on their snowshoes, set out at once for Nuláto. Less than a half-mile below the trading-post were three large winter houses, crowded with Ingaliks of the Nuláto tribe, — in all, about a hun-

dred men, women, and children. These houses were situated near the river-bank, a few rods northeast of the mouth of the Nuláto River. It being in the month of February, and an unusually warm spring, the Nuláto Indians had taken the precaution to clear away the snow from above their birch-bark canoes, forty or fifty of which were lying about. Intending to forestall retaliation for the death of Búlegin's companion, the Koyúkuns approached with the greatest quietness, not to disturb the sleeping inmates. The canoes were seized, broken up, thrust into the apertures in the roofs and the narrow underground entrances of the houses, and fired. The frightened inhabitants, wakened by the noise and crackling of the flames, endeavored vainly to force a passage through the fire. Some of the men, seizing axes, cut their way out through the wooden walls, but were mercilessly shot down by the arrows of the Koyúkuns. Many were suffocated in the smoke. A few women were taken by the victors, and one or two children were able to save themselves in the woods, through the negligence or pity of the conquerors.

A young man called Wolasátux, renowned for his skill with the bow, escaped to the mountains, eluding the vigilance of the pursuers by his swiftness of foot. All the rest were smothered or fell beneath the knives and arrows of the assailants. But little noise was made, except by the screams of the women and the shouts of the destroyers, for at that time the Indians had no guns. The slumbers of the Russians were not disturbed.

It is said that two Indian women who were employed at the fort, having risen early to boil the chyniks for the morning meal, heard and understood the cries of the victims, but, overcome by fear and anguish at the death of their kindred, stupidly shut themselves into the cook-house, and did not alarm the Russians.

The Koyúkuns next made for the trading-post, and found the bidárshik, just risen, sitting behind one of the houses. Saying to Iván, one of their tribe who had been employed at the fort as interpreter, "If you do not kill the bidárshik, we will kill you," they forced him to consent. He approached Derábin and stabbed him in the back repeatedly, so that he fell to rise no more. The Russian interpreter, a man said to have understood seven languages, happening to come out, saw the act, and turning unarmed to the Indians, upbraided them for the murder, but fell

in the doorway, pierced with seven arrows. Rushing over his prostrate body, they entered the house. Barnard was lying on his bed reading; at the sight of the hostile Indians he raised himself up to reach his gun, which hung above his head. Twice he fired, and twice the barrel was struck upwards, the balls taking effect in the ceiling. An Indian shamán — christened Larriówn by the Russians — and his brother seized the arms, and one plunged his knife into the Englishman's abdomen, so that when it was withdrawn the intestines followed it, and he fell back mortally wounded. Several shots were fired, and one struck Larriówn in the groin. Three children and their mother were killed; their father, Teléezhik, being absent in the Káviak peninsula, as interpreter, with Captain Bedford Pim.

Leaving the bidárshik's house, the Indians next attacked the *casármer*, or room where the workmen lived, where there were two Russians and several Creoles. They had barricaded the door, and being at some distance from the other house, knew nothing that had happened. One of them aimed through the window at the crowd of Indians; when the other, hoping to avoid bloodshed, advised him to fire above their heads, in hope that they would disperse. The crowd separated, but did not retreat, and only answered by a shower of arrows. The next shot, better aimed, killed one of the Indians, when a panic seemed to seize them, and they immediately retreated with their booty and prisoners to Koyúkuk. Larriówn sat in great agony in the outer room of the bidárshik's house. A Russian lay in the inner room, helpless from fever, who had been overlooked by the Indians in the excitement. His wife, an Indian woman named Maria, brought him a loaded pistol, and held him up while he fired at the shamán. His trembling hands could not direct the ball, and Larriówn dragged himself out to the river-bank. Here he found a Koyúkun woman, who had been staying at the fort, with her baby on a little sled, which she was drawing by a band over her forehead. He threw the child into the snow, and ordered her to draw him to Koyúkuk. She refused, and he stabbed her to the heart! How he finally got away, no one knows. Thus ended the Nuláto massacre.

An Ingalik, named Lófka, was sent by the Russians with a letter to the Redoubt. He placed it in his boot, fortunately, for

he was stopped on the river and searched by two Koyúkuns, who suspected his errand. Finding nothing, they let him go.

Mr. Adams, the surgeon, immediately started, with Telcézhik and a party of Russians, for Nuláto. Captain Pim, having returned from his adventurous journey frost-bitten, could not accompany him, and remained at Unalaklík.

The Russians had sewed up the wounds; but, before Mr. Adams arrived, Lieutenant Barnard was dead. It only remained for him to perform the last sad offices and to erect a cross over his grave, with the following inscription: —

LIEUTENANT J. J. BARNARD,
OF H. M. ENTERPRISE,
Killed Feb. 16, 1851,
BY THE KOÜKUK INDIANS.
F. A.

The Russian American Company, as is the wont of trading companies, never took any measures of retaliation for this massacre. Larriówn, and Iván, the murderer of the bidárshik, are frequent visitors at the fort. Presents were sent to the Koyúkun chiefs, and there the matter ended. A stockaded fort was soon built on the present site, and the graves of Barnard and Derábin lie a stone's throw behind it. The excavations where the Indian houses stood are still to be seen, and form the graves of those natives who perished by the massacre.

On the 29th of November the indefatigable Mike started again for Ulúkuk. I occupied myself with putting my instruments in order for meteorological observations. The thermometer, a standard one, registered thirty-six below zero. Our cook and principal assistant about the house, in the absence of the fairer sex, was Peetka, the son of Iván, previously mentioned as the murderer of Derábin. His father was acting as an interpreter for the Russians. In an Indian house, outside the stockade, Larriówn was domiciled with his wife and child. The appearance of this man was remarkable. A small round head and face, piercing eyes, thin scattered hair, a short pug nose (unusual in an Indian), a tremendous development of the muscles of the jaw, a very dark complexion, and a fiendish expression of countenance combined to make his appearance the reverse of attractive, even when in good humor.

His wife possessed some of these characteristics in a lesser degree, but was equally repulsive. Both of them had gained, by a long list of evil deeds, a reputation as sorcerers or shamáns, which made their influence among the Indians immense. Both of them were well acquainted with the uses of intoxicating liquors, which for some years the Koyúkuns have obtained from traders at Kotzebue Sound. This circumstance has done much to render the tribe, naturally cruel and turbulent, one of the worst in the territory. Fortunately, disease and the scarcity of food, annually increased by the use of firearms in killing reindeer, have reduced their numbers, and at present they can hardly muster over two hundred families. From increased immorality, due to the introduction of liquor, the births are few, and hardly replace the deaths. Few women have more than two children, while many have only one, a large proportion being barren. The tribe, therefore, may be regarded as on its way to extinction.

They are of the family of Tínneh, belonging, with the Ingaliks and Nowikákat Indians, to the division of Eastern Tínneh. Their dialect is closely allied to the Ingalik, hardly differing more from it than the widely separated local dialects of Ingalik differ from one another. Their principal villages are on the Kotelkákat and Kotélno Rivers, the largest being known as Kotelkákat.

The Indians living on the Yukon between Koyúkuk and Nuklúkahyét are known to the Ingaliks as Unakatána, or "far-off people," and call themselves, with most other Indians living on the river, Yukónikatána, or "men of the Yukon."

The Nuláto Ingaliks are nearly extinct. The Ingaliks living on the other side of the Yukon, between it and the Káiyuh Mountains (known as Takaítsky to the Russians), bear the name of Káiyuhkatána, or "lowland people," and the other branches of Ingaliks have similar names, while preserving their general tribal name.

The Ingaliks are, as a rule, tall, well-made, but slender. They have very long, squarely oval faces, high prominent cheek-bones, large ears, small mouths, noses, and eyes, and an unusually large lower jaw. The nose is well formed and aquiline, but small in proportion to the rest of the face. The hair is long, coarse, and black, and generally parted in the middle. But few of them

shave the crown, as is the custom among the Eskimo. Their complexion is an ashy brown, perhaps from dirt in many cases, and they seldom have much color. On the other hand, the Koyúkuns, with the same high cheek-bones and piercing eyes, have much shorter faces, more roundly oval, of a pale olive hue, and frequently arched eyebrows and a fine color. They are the most attractive in appearance of the Indians in this part of the territory, as they are the most untamable. The women especially are more attractive than those among the Ingaliks, whose square faces and ashy complexion render the latter very plain, not to say repulsive. The women do up their hair in two braids, one on each side; but among the Koyúkuns it is not uncommon to see the hair cut short, especially after a death in the family. The detached hair is tied up in a little bundle and placed in the crotch of a tree, or anywhere where it will not be disturbed by animals. Parings from the nails are treated in the same way, as they have a superstition that disease will follow the disturbance of such remains by wild animals.

The original dress of the male Koyúkuns consists of a pair of breeches of deerskin, with the moccasins, or coverings for the feet, attached, and a deerskin parka without any hood, long and pointed before and behind. At present they buy many articles of clothing from the Eskimo and from the Russians, especially for winter wear. They are fond of ornaments and gay colors, while the Ingaliks, who wear clothing much like that adopted by the Eskimo, care little for ornaments or beads. Both build houses similar to those already described, while the other tribes of the same family, to the eastward, build only temporary lodges of skins and poles, which they transport from place to place. The habits, utensils, and mode of life of the Ingaliks and Koyúkuns are very similar, and will be more fully described hereafter.

They depend for food upon the reindeer and moose, salmon and other fish, and small game, more or less, according to the resources of the locality in which they live. At Nuláto the only dependence is fish, and some small game, such as grouse and water-fowl in their seasons. There are no deer or moose at Nuláto, and food is often very scarce.

I found a constant current of cold air, with a temperature from

— 32° to — 55° Fah., entering our room by means of the cracks in the floor, which was composed of logs squared on the upper side. Needles, forks, spoons, and other articles of use and ornament followed each other into the abyss. The matter, though laughable, was also serious, as our stock of the last-named articles amounted to only one apiece. After consultation we employed Kurílla, one of the few surviving Nuláto Indians, to calk the seams with moss. Our stock of this was soon exhausted, following the spoons, and we made the best of a bad job by covering the floor thickly with straw, that again with mats, and over all nailing some old blankets. By placing a few reindeer-skins about for rugs, we managed to improve matters a good deal. Previously, one day when the freshly heated peechka was pouring out a generous supply of hot air, I tried the thermometer at the eaves, where it stood at ninety ; four feet above the floor gave a temperature of forty-five, while on the floor the mercury indicated several degrees below freezing. The walls were anything but tight, and the warm air of the room deposited its extra moisture in hoar-frost, like feathers, near the fissures.

Peetka proved very unreliable, disappearing and staying so, just when we wanted him, and Kurílla, the Indian before mentioned, was secured as a substitute. His history was romantic. Son of a wealthy and influential chief and shamán, at the time of the Nuláto massacre he was but three or four years old ; in it his father, mother, and all their family perished. The boy and his sister, a year older, were in the trading-post at the time, and escaped unharmed, from their extreme youth. Some of the Russians had taken pity on them and brought them up, until, as they grew older, they were able to earn their own living.

His sister, christened Anna, was one of the most comely Ingaliks who came under our notice. Both of them were unusually tall ; both had acquired habits of neatness and an excellent knowledge of the Russian language, from their residence in the trading-post. Anna was married to a very good kind of fellow, an Ingalik, who had accompanied us in our journey from Ulúkuk and who was named Little Sidórka, to distinguish him from another of the same name but of greater longitude.

Kurílla proved to be a faithful and intelligent fellow, and having had some experience in cooking for our parties during the previ-

ous year, was well qualified to assist in the culinary department. To be sure, our style of living was simple and unostentatious, consisting principally of fried white-fish three times a day, varied by bacon, of which we were very sparing when fish was obtainable.

Finding a blanket on the bare boards, even alleviated by a deerskin, rather uncomfortable sleeping arrangements, we purchased several large feather-beds, filled with spoils from the wild geese and ducks, and had a small mattress made from them for each one of the party. With the addition of a pillow from the same source, we felt as if we could enjoy the sleep of the just, without danger of rheumatism.

Our plans for the coming season were now discussed and approximately settled. Whymper and myself decided to ascend the Yukon together, as far as Fort Yukon, by water in the spring. Ketchum proposed, in company with Mike Lebarge, to make the same journey over the ice, with dogs and sleds, in February. Dyer was to descend the Yukon and investigate the delta. On the 4th of December the temperature was fifty-six below zero. Faint parhelia appeared. In a short walk I observed that the atmosphere seemed filled with an icy mist, small acicular crystals of ice suspended in the air. On the 7th, the weather being milder (twenty-two below zero), I decided to visit the coal seam below Nuláto before the snow should cover it. Only one dog was available; so, getting a small sled, and packing our blankets, chynik, and mess-pan upon it, with a bag for bringing some coal from the vein for trial, I started ahead, while Kurílla followed with the sled. We met Yagórsha on the way, who with many gesticulations declared that we were going to have a severe snow-storm, and that we had better turn back. I concluded to risk it, however, and we finally arrived at the Shamán Bluff, where we soon found a sheltered ravine with plenty of dry wood; spreading a blanket as an awning to keep off the snow, which came thick and fast, we built a cheerful fire and enjoyed our tea. After a good night's rest and a hearty breakfast of bacon, biscuit, and tea, I went to the end of the bluff, where the coal was situated. A thorough examination of it showed that the seam was much contorted, running out at each end completely; that the only mass of coal was in a large pocket or elbow of the contorted

seam; and that the whole deposit contained less than a ton. What there was of it was of excellent quality, hardened by heat and compression; it was enclosed on each side by thin layers of shale and the brown Miocene sandstone previously alluded to.

Filling a bag with fragments of coal and geological specimens as trophies, we started homeward. The poor dog, I am afraid, had a hard time of it, what with the soft new snow and the weight of the bag, but we arrived without detention or accident, though rather tired.

Kurílla, who was an excellent shot and an enthusiastic sportsman, liked nothing better than to spend an hour every day shooting specimens for our collection. I obtained many more than I had dared to hope for in this way, — redpolls, downy and three-toed woodpeckers, pine grosbeaks, titmice, hawk-owls, and (strange to say) a bullfinch (*Pyrrhula*), the first ever shot on the American continent. On the 11th, Mike returned from Ulúkuk with Francis, and this event, with the news that our friends brought from below, was quite a relief to the monotony of our daily life.

On the 12th, a chief arrived at the fort from Nuklúkahyét, where the Tananáh River joins the Yukon. He greeted Ketchum as an old acquaintance, and promised to have plenty of moose meat for us when we should come that way in the spring. He remained several days at the fort, and on one of them assembled a number of Indians in our room and discoursed to them at the top of his lungs for nearly two hours. I expected to see him drop from exhaustion, every minute of the last half-hour, but long practice had doubtless inured him to it, and I resigned myself, while one of the party took up a concertina and played "Tramp, tramp" by way of diversity.

The return brigade was intrusted to Scratchett, who left, with Francis, for Unalaklík on the 17th, while Mike rested his weary bones for a season.

I continued adding to my collections and vocabularies, and setting traps for foxes, who had a fashion of carrying off the bait without disturbing the trap. Iván Pávloff, however, succeeded in trapping several, of which I secured the skeletons. Whymper was busily at work on his sketches, while Mike and Ketchum

were getting ready for their proposed journey. Altogether, time did not hang very heavily on our hands.

We found the Indians to be a great nuisance in one way. They had a habit of coming in and sitting down, doing and saying nothing, but watching everything. At meal-times they seemed to count and weigh every morsel we ate, and were never backward in assisting to dispose of the remains of the meal. Occasionally we would get desperate and clean them all out; but they would drop in again, and we could do nothing but resign ourselves to the annoyance, as we did not wish to offend them. They intended no offence, doubtless, but wanted an opportunity of studying the Anglo-Saxon species of the genus *homo* in its lair.

Fish growing scarce, Kárpoff was fitted out with some trading-goods, and sent to Koyúkuk in hope that he might obtain some grouse or rabbits from the Indians of that locality.

Christmas time approaching, we joined in endeavoring to celebrate the day appropriately. Our knowledge of chemistry and the domestic arts was taxed to the utmost in the production of pies, gingerbread, and cranberry dumplings; while a piece of Ulúkuk reindeer meat, which had been kept frozen ever since our journey across the portage, performed the office of the customary "roast beef of old England," and a brace of roasted ptarmigan represented the Yankee turkeys. Green peas, tomatoes, and other preserved vegetables were produced for the occasion; and, with the company of the bidárshik and his assistant, we sat down to the best dinner ever eaten in that part of the continent. The day was enlivened by the reading of several original literary productions, and the brewing of a mild bowl of punch from a supply of old Jamaica, which we owed to the kind thoughtfulness of Mrs. Scammon. Altogether the occasion was one which will long be remembered with pleasure by those who took part in it.

The 27th of December an observation was made, which showed the day to be just three hours long. As nearly as our watches could determine, the sun rose at a quarter before eleven, and set at a quarter of two. Proposing on New-Year's day to raise the first telegraph pole in the division of the Yukon, Mike went out with Kurílla, and returned with a fine

spruce, of the orthodox dimensions, for the purpose. An Indian, with the euphonious Russian name of Squirtzoff, was employed to peel and trim it.

On the 31st we sat the Old Year out, and hailed the New with its prospect of successful explorations. We had hoped that our party might all be present on New-Year's day; but there was no sign of the expected arrival of Mr. Dyer. After breakfast we went out in a body and raised the first telegraph pole, ornamented with the flags of the United States, the Telegraph Expedition, the Masonic fraternity, and the Scientific Corps. A salute of thirty-six guns was fired, — one for each State; and the enthusiastic Kurílla was brought to the ground by the recoil of a great Russian blunderbuss, which he had undertaken to discharge.

A few days after, Iván Pávloff returned from a journey of several hundred miles with dog-sleds, bringing about five hundred marten or American sable skins.

The Russians throughout this territory compute their time according to Old Style, and hence are always eleven days behind time. They celebrated Christmas and New-Year's day on the 5th and 12th of January, respectively.

Dyer arrived on the 3d, and on the 5th Captain Ketchum started on a last visit to the Redoubt.

Strong endeavors were made to construct some sleds for Ketchum's trip, after the style of the Hudson Bay Company; but, having no patterns, much good birch was spoiled without satisfactory results.

We had entertained great expectations of seeing exhibitions of the Aurora Borealis of unusual beauty; but they were not realized. The few displays which were observed were of an insignificant character. No colored lights were noticed, and the brilliancy of the light was far below what we had anticipated. Several of these displays, however, presented phenomena which may not be uninteresting to the general reader, as showing distinctly some points not previously established in regard to the mode of appearance of the aurora under some circumstances. February 11th, 1867, an aurora was observed under the following conditions. From a gap in the hills north of Nuláto, a white light was seen to issue, early in the evening. The sky was

much overcast with cirro-stratus clouds, which were rapidly passing in a different direction from the wind at the surface of the earth, which last was from the north. The light before alluded to approached with the wind, at about half the pace of the wind, in a cloudlike shape or condition, not far from the surface of the earth. The form of this luminous cloud was in successive waves, or ripples, and resembled the rings of smoke rising from a pipe, one within another, gradually expanding. The inner or focal rings were more intense than the outer ones, and the light was more intense in some parts of the rings than in others. They advanced as the ripples do when a stone is thrown into still water, and these ripples were compressed in an oval form by the wind, the longer diameter being east and west, across the current. It showed unmistakably that the shining medium was in consistence similar to cloud or mist. From the brighter portions of the rings, light streams of the same medium occasionally dripped, and dissipated at some distance below the point whence they originated; from which it might be inferred that the more intense portion of this medium was denser than the atmosphere. No rays or streamers issued upwards from the upper edges of the rings, which were clearly defined and below the real clouds, of which the altitude seemed less than fifteen hundred feet. The hills from between which the auroral cloud had issued, and the tops of the higher trees between the fort and the hills, were dimly seen, or obscured by the lower portion of the haze, or cloud, which seemed not more than a hundred feet above the earth, as seen from the roof of the higher building. It followed the air-currents entirely; and all its motions seemed guided or controlled by them. Wavy outlines in the ripples seemed caused by the differing velocity of the air in different parts of the current. It covered the whole sky in about two hours from the time of its first appearance. As it spread and enlarged, the light became fainter. It did not give out a positive light, but had a mildly luminous appearance, like phosphorescence.*

Captain Ketchum and Mike had returned February 1st, bringing with them Captain Everett Smith, of the Wilder, and a

* These remarkable phenomena were observed, in a greater or lesser degree, in several instances, of which an account was communicated to the National Academy, at its session in September, 1869, by the writer.

good budget of news. Several miles of poles had been erected in the vicinity of Grantley Harbor and Unalaklík. Provisions, especially tea and sugar, were at a high premium. Our supply of tea had been very small, and coffee in this climate is worthless.

A point near the Klatkakhátne River was decided upon for the location of the head-quarters of the Yukon division, and a bargain was made with Paspílkoff, the shaky-headed Russian, to put up the building, which was to be of logs.

I prepared the specimens of natural history which had been obtained during the winter, for transportation to Unalaklík and the Redoubt. They filled two large boxes, many acceptable additions having been made through the kindness of my companions.

A walk with Captain Smith, near the fort, resulted in obtaining a fine specimen of the Hudson Bay titmouse (*Parus Hudsonicus*), a bird which I had not previously collected, and the first specimen of which I owe, with many other valuable birds, to his quick eye and unerring aim.

About this time a little excitement occurred, owing to a rumor, started by one of the Indian women in the fort, to the effect that Larriówn had planned the destruction of one of the proposed parties which were to ascend the Yukon. A council of inquiry proved, however, that the rumor had no more reliable foundation than a dream.

The Indians are exceedingly suspicious in the most unimportant things, and the following incident is a good illustration of it. In talking over the scarcity of provisions, some one had jokingly remarked, that, if we were driven to the wall, we should have to make soup of Paspílkoff's baby, a new addition to our population. This was repeated by one of the women, and very soon old Iván the interpreter made his appearance, saying that the Indians wished to know if we were cannibals. He added that, since the time of Búlegin's murder at Koyúkuk, there was no instance known where the Indians had eaten human flesh. After indulging in a hearty laugh, we relieved his apprehensions, which seemed to be serious, and thereafter were more guarded in our remarks.

Peetka, his son, had been very active in procuring birds for my collection, and much to my regret appeared one day with

three fingers of his left hand nearly blown off, by carelessly pulling his gun through the bushes by the muzzle. The injury was so serious that amputation seemed necessary, but by careful application of water dressings twice daily, I was enabled to preserve them, though in a stiff and useless condition. Sometime after, the little fellow brought me in a marten, one of his own trapping, the only fee for medical services I received in Russian America during two years' practice.

The details of our Yukon trip were settled, and the boatmen engaged, so that we felt a reasonable confidence in the successful result of our proposed explorations. In the mean time I occupied myself taking angles and measurements for a chart of the Yukon and the small rivers near Nuláto, in the constant addition of specimens to the collection, with the meteorological records, and the enlargement of my vocabularies.

One of the Russians took occasion one evening to express his dislike of the Americans by beating and abusing, without cause, a boy in our employ called Antóshka. Without recourse to the bidárshik, Ketchum treated him to his deserts, — a well merited thrashing. This timely protection to our Indian servants much increased our popularity among the Indians, and enforced respect from the Russian convicts employed by the Russian American Company, in a salutary manner.

Breaking the minute-hand of my watch one day, I repaired the damage by unwinding the silver thread from a violin-string and twisting a portion of it around the barrel of the broken hand. Opportunities for the exercise of ingenuity of this kind are frequent in this country, where few mechanics of any kind are to be found. The remarkable facility with which the Russian peasant can turn his hand to anything was well exemplified among the men in the fort. All of them, with the *tapór*, or short-handled Russian broad-axe, could accomplish almost any piece of carpentering, from squaring a log to building a boat or a house. Many of them could handle blacksmiths' tools, and even manufacture, from sheet copper (provided by the Russian Company), chyniks, kettles, and lamps for burning the seal oil used in winter. There are several good blacksmiths in the country, and Aleuts, Creoles, and even Indians learn the use of their tools with remarkable ease.

On the 6th of March the plans for our proposed new station were decided upon, and the exact location selected. The enclosure was to be one hundred feet by sixty-five, and to contain a barrack, officers' quarters, bath-house, cook-house, and several store-houses. Paspílkoff promised to set about the work at once, and it was agreed that the members of the party would assist him in bringing and raising the heavy timbers.

On the 11th of March, having completed his preparations, Captain Ketchum set out on his adventurous journey with Mike over the ice to Fort Yukon. It was undertaken under the most discouraging circumstances. Neither his provisions nor his dog-feed were sufficient to last during the journey of over six hundred miles. Russians and Indians alike shook their heads and declared their disbelief in his prospects of success. The snow would be soft and impassable. The dogs would run away, or give out for want of food, and die. He could not feed himself or his Indians, and all would perish of starvation. The Ulúkuk Indians who had engaged to go backed out at the last moment, and there was extreme difficulty in obtaining two men and two boys to take their place. This was finally done through the intervention of old Iván, who sent his own son Peetka, and induced the others to go. The very day was dull and cloudy, with indications of snow. For two white men to undertake such a journey, in the face of all this discouragement, through a country of which the resources were known to be very precarious, with the prospect of certain starvation if their guns did not supply them with sufficient game to feed the dogs and party, was resolute and courageous in the extreme. From this point of view the journey was unquestionably one of the most remarkable undertaken by modern explorers.

As their heavily laden sleds moved slowly away over the soft snow, we hoisted the stars and stripes, gave them three volleys from the big gun, a hearty cheer, and any number of salutes from guns and pistols. As they passed out of sight, the chances of success and failure seemed so unevenly balanced that we hardly dared to anticipate the realization of the plans which they were so bravely and energetically endeavoring to carry out.

Our party now consisted only of Messrs. Dyer, Whymper, and myself, with Scratchett the constructor, and two Indians.

On the 18th our eyes were gladdened by the appearance of old Yagórsha, with the little skin boat, purchased at Ulúkuk last fall, for which he had been sent. It came up from Ulúkuk entire, on a sled drawn by five dogs, and had sustained some slight injuries. In this boat, Mr. Whymper and myself were to ascend the Yukon after the spring freshet. Antóshka and another Indian were sent by Dyer down the Yukon to a place called *Yakúts-kalátenik*, where a three-holed bidárka was supposed to lie, which he proposed to use in descending the Yukon and pursuing his examination of the delta.

We determined, although it was not strictly in the line of our duty, to cut and erect the poles necessary to bear the line between the Nuláto post and the proposed site of our new Fort Kennicott. The distance was a few rods over a mile, and required about thirty poles. The work was done entirely by the four members of our party, except clearing away the brush and trees for twelve feet on each side, which we intrusted to one of the Russian workmen.

Dog-feed and fresh provisions giving out, I proposed to make a trip to the Káiyuh villages, and endeavor to purchase any supplies which the Indians might be able to spare. I arrived with Kurílla and the dogs at a small village of two houses, on the left bank of the river, nearly opposite Alikoff's barrabora, and being the residence of the old veteran Wolasátux. The village is known by his name. I found all the Indians away, and was obliged to take some fish out of his cache to feed the dogs with.

Wolasátux' barrabora is a well built Indian winter house, and stands near another smaller one, with two or three caches about it, on a small clearing in a dense growth of poplars and willows. These trees grow so close together, that they have reached the height of some thirty or forty feet, almost without branches, and so slender that it gives one a feeling as of standing on a flat pincushion beset with enormous needles and pins. An old man finally appeared, who sold us a few ukali and some grouse. The next morning, Kurílla went out, and in the course of his hunting met some Indians, who informed him that Antóshka had not been able to obtain any dog-feed here or at Kaltág, and that it was not improbable his dogs might be starving. Also, that all the Indians were away after deer, and that it was uncertain when they would

return. This determined me to return to Nuláto, so that Dyer might send some fish from our slender store to Antóshka, and thus prevent his journey from coming to an unfortunate conclusion. There was no prospect of buying anything where we were.

The next morning we set out for Nuláto, and found that the moist snow rendered the travelling very hard. The weather was so warm that the snow adhered in large lumps to the snowshoes, adding a weight of ten or twelve pounds to the foot at each step,

Wolasatux' barrabora in winter.

until the masses would break off by their own weight, the same process being repeated indefinitely. We were exceedingly fatigued upon our arrival, near dusk.

It was immediately determined to send Scratchett down to Kaltág with some fish for Antóshka. Our prospects of food at this time were anything but encouraging. Wherever the blame should have fallen, the fact remained, that if it had not been for the flour and fish we obtained from the Russians, we should have been in a starving condition ; while it was said, and never denied, so far as I know, that the Nightingale, on her return, carried with

her ten thousand rations. The preposterous folly of issuing food by ordinary rations to men in an arctic, or nearly arctic climate, was never more fully demonstrated. On the resources of the country as developed by the natives, who have all they can do to feed themselves, a large body of men cannot support themselves in this part of the territory, unless their time be devoted to nothing else.

On the 8th of April, Scratchett returned with a load of fresh reindeer meat, which he had obtained from the Indians, a number of whom accompanied him. Among them was Wolasátux and his foster-son Mikáishka, and Tékunka, a noted shamán and tyone among the Káiyuh Indians. The latter proved to be a very good kind of fellow; he sold us a large amount of meat, refusing the offers of the Russians, who saw his sled-load taken into our store-house with unconcealed disgust. The day had gone by when they could control the trade of that kind, and force the reluctant Indian to sell against his will his hard-earned booty for a leaf or two of tobacco and a few balls.

We paid liberally, but not extravagantly, for provisions of all kinds, and as the supply was very limited, the Russians, unwilling to raise their tariff of prices, were often obliged to go without.

The continued warm weather was melting the snow rapidly, and although we had cleaned off the roof as much as possible, still the melting ice caused a constant dripping during the day. The evening frost would put an end to it for a while, but it returned with the heat of the morning sun.

The Nuláto and other small rivers had felt the effects of the melting snow, and the ice on the edge of the Yukon, which rests on and is frozen to the beach, was covered with water from them.

Flies, to all appearance the common universal house-fly, as well as the bluebottle, had appeared in large numbers, and might be seen on the sunny side of every wall.

On the 10th I found the first fully expanded willow catkins, and the pretty red catkin of the alder. A white-winged crossbill, the first so far obtained, was shot in a grove of poplars not far from the post.

On the roof of the house I obtained a large number of small

musk-beetles, of a steel-green color and strong odor. Several other species were obtained from the stumps and mossy hillocks which began to project above the level of the snow. The field-mice were also beginning to be active, and the children about the fort eagerly scanned with their keen eyes, bow and arrow in hand, the various stumps and crevices where they might find them; when successful they flocked with their prizes to me, sure of a few beads or some other trinket to repay them for their labor.

The white ptarmigan began moulting, or rather brown feathers began to appear in their necks and on the edges of the wings, where the first change may be looked for.

While skinning a hawk-owl I discovered in the ovary an egg, nearly perfect. Kurílla, on his return from a foraging expedition, brought fine specimens of the great gray owl (*Syrnium cinereum*), which measured four feet across the wings, and the white owl (*Nyctea nivea*). The latter frequently flies by day without difficulty, and he is a sharp hunter who can approach it within gunshot, even at midday.

April 23d being a good snowy day, I took advantage of the opportunity, to visit a grave on the point, near the Nuláto River. Carefully lifting the cover, I removed the cranium, and putting it into my haversack, I returned by a roundabout way to the fort. I had long had my eye upon this grave, and had been waiting for weather which would cover up my tracks, in order to secure the skull. The Indians are very superstitious in regard to touching anything that has belonged with a dead body, and would have been highly incensed had it become known. Therefore I took the first opportunity of packing safely away the only Ingalik cranium ever collected.

An expedition to the bluffs above Nuláto resulted in my obtaining a number of fossils, which probably indicate a Miocene age for these beds. There are very few and very poor fossils in these sandstones, notwithstanding their wide extent and great thickness.

Birds became more plentiful as spring advanced, many summer visitors arriving in April and the early part of May. The hawks and owls were already laying their eggs, and the young of the Canada jay, as I afterwards learned, were already hatched. Scratchett started for Unalaklík April 25th, with the last mails,

and on the last trip possible this season. The Russians prophesied that he would not be able to get through, and the weather gave some probability to their croakings.

The 25th of April was a great holiday, or *prásnik*, of the Russians. It was their Easter, and was a day of rejoicing for us also, as Antóshka returned from a foraging expedition on the Káiyuh River with a good load of deer meat from Tékunka. Out of our plenty we sent a haunch in to Iván Pávloff, to his great satisfaction.

The walls of Fort Kennicott already began to assume their proportions, and we frequently went up to assist Paspílkoff in the work of raising the logs to their proper places.

On the 28th old Maria died. She was an Indian woman, long domiciled with the Russians, and had been present at the Nuláto massacre.

On the following day the first goose was seen, the solitary advance-guard of the thousands to come. Strolling on the beach, I obtained a small hawk and the first snipe of the season. The weather had become exceedingly warm. Shirt-sleeves were the rule, and the little children enjoyed themselves on the broad river-beach, building houses with pebbles and making mud pies, much as their brothers and sisters do all over the world when a vacation or a holiday releases them from restraint and the mother's watchful eye. I never saw a young child punished in Russian America, except the well-grown boys of the Russian bidárshik. They behave quite as well as civilized children, and grow up with quite as much respect for their parents. An Indian baby, unless sick, never cries; and why should it? It has no one to rub soap in its eyes, and never feels the weight of the parental hand. The mother makes it a doll, if a girl, out of bits of squirrel-skin and fur. If a boy, the father builds for him a little sable-trap, a miniature cache, in which to put his shining pebbles and other childish treasures, or a tiny fish-trap, in which the mother takes care that a choice bit of ukali, a rabbit's head, or a piece of reindeer fat shall be caught in some mysterious way. As soon as they can toddle about they are instructed in the mysteries of setting snares, and the pride with which the boys or girls bring home their first grouse, or even, by great good luck, an unfortunate rabbit, is fully shared by the parents. Their dresses

are ornamented with the choicest beads; the sweet marrow or tongue of the fallen reindeer is reserved for them by the father successful in the chase. They travel hundreds of miles with the dog-sleds, and from these little children I have often obtained dozens of mice or small birds, caught near some solitary lodge far away among the mountains, which rumor had informed them I would purchase with beads or trinkets. They carried these proudly home again as their own earnings and the prize of their own industry. I always paid something for such specimens, even if quite worthless, to encourage them to perseverance, and in this way I obtained many invaluable specimens.

Scratchett arrived from Unalaklík on the 4th of May, having had a very hard journey, and getting up to his neck in water while crossing some of the small rivers, swelled with the melting snow. The scurvy had attacked the parties at Unalaklík, from the absence of fresh provisions, but was fortunately stayed in its progress by the providential advent on the Unalaklík plains of large herds of deer, of which many were killed.

On the 3d, Kurílla killed a goose, a white-cheeked brant (*B. leucoparcia*), and two ducks, — a mallard and a Golden-eye. He received the annual pound of tobacco, the perquisite of him who kills the first goose in the spring. From this time we hoped to obtain an abundance of water-fowl, which are the only support of the inhabitants of Nuláto until the freshets subside and the salmon begin to ascend the river. Curiously enough, there are no fish in these rivers which will take the hook.

On the 7th of May the first swans were seen. They are the small American species, the trumpeter not being found in this region, and very rarely visiting Fort Yukon. The geese did not arrive in large numbers until the 9th of May, ten days later than on the previous year. The commonest ducks were the pin-tail and the green-winged teal.

On the 12th of May the water came down with a rush, breaking up the ice on the Nuláto River, and flooding the ice on the Yukon. At the same time a torrent poured down the Klatkakhátne River. Iván Pávloff, having gone shooting over to the island, on his return was caught between the two currents and swept into a hole in the ice. Paspílkoff gave the alarm, and, catching up two paddles, I hurried to the beach, where Scratchett

had already launched a birch canoe. With Antóshka, he rapidly made his way among the fragments which threatened to crush the frail boat, and succeeded in extricating the Russian in safety. To his credit be it said, the act was very handsomely done. The Russians were shouting and running wildly about, like chickens when a hawk is preparing for a swoop, and were not of the slightest assistance.

A year before, the ice having broken up, a convict named Taréntoff had been to the island in a birch-bark canoe. Returning, he was nipped between the ice-cakes and was sinking, when Major Kennicott saw him from his seat on the roof of the fort, and hurried two men to his assistance, unquestionably saving his life. When the Russian had changed his clothes, he came with protestations of gratitude to his preserver, who answered, "Do not thank me, Taréntoff; thank God." The next day, while walking in the early morning on the beach near the fort, taking the angles of the mountains for his proposed map, and with thoughts perhaps intent on the long anticipated journey, then only awaiting the disappearance of the floating ice, the Major was called to his eternal home! His remains were found where he fell; struck down by disease of the heart, aggravated by exposure, privation, and anxiety. On the sad anniversary of his death we erected, on the nearest hillock not swept by the spring freshets, a cross, which was hewn out by the blacksmith Paspílkoff, and which upheld a tablet with the following inscription:—

IN MEMORY OF
ROBERT KENNICOTT,
NATURALIST,
who died near this place,
May 13th, 1866, *aged thirty.*

On asking Paspílkoff what he wanted for his labor in hewing out the arms of the cross, he replied, "We Russians take nothing for what we may do for the dead; we do not know when it may be our turn."

On the 12th of May the mosquitoes made their appearance, though the snow still lay on the ground in abundance. They were larger than our home mosquitoes, and very bloodthirsty. After a few days it was impossible to sleep without a net.

We had abundance to do, getting our bidarrá in order for the journey, and packing our stores into the smallest possible space, knowing by experience that every ounce counted. Collecting was not neglected; and many specimens of birds were obtained which are only summer visitors. A walk to the bluff above the Klatkakhátne River was rewarded by the discovery of a few more fossils, and some very minute land-shells, similar to, if not identical with, Eastern American and Northern European species.

I had at this time a good opportunity of observing the formation of the alluvial soil of the islands and banks of the Yukon. Two or three feet below the surface, the ground is frozen, and probably always continues so, as there are no roots of living trees below that depth. The soil is composed of distinct layers, each layer consisting of a stratum of sand, overlaid by mud, and covered with a thin sheet of vegetable matter. These layers evidently mark the annual inundations, the materials brought down settling according to their specific gravity. They varied in thickness from half an inch to three inches, but averaged about about an inch. I counted one hundred and eighty of them in one bank, exposed by the undermining and washing away of the soil by the river, leaving a perpendicular bank about ten feet high. This action of deposition and denudation is constantly going on; and so great is the amount carried out to sea by the Yukon water, that the water of Bering Sea is discolored by it for many miles, even quite out of sight of the land.

Occasionally the roots and stumps of trees might be seen exposed, in their natural position, but deep below the surface. These had evidently been broken off in some ancient flood, and finally buried under new deposits of alluvium. I even thought I detected, in the lower and older layers, indications of carbonization, or transformation into a kind of lignite, among the strata of vegetable matter.

The Russians had already put their large bidarrá in order, and, looking with contempt upon our little boat, which was shaped like a dory, about fifteen feet long and four and a half wide, asserted that we could not keep up with them; that it was impossible to row such a bag-shaped contrivance against the rapid river current; that it would not bear a sail as large as the one we had had made; and, finally, that, with such a boat, it

was useless to attempt ascending the river, for we should certainly fail. We did not fail to appreciate the consideration for our weakness and inexperience, which was indicated by such comments; and it but strengthened our determination to reach Fort Yukon at all hazards, even if the boat had to be replaced by a raft.

We had provided a mast, and Kurílla exercised his taste and ingenuity in carving an arrow, with a broad tail to which some blue cotton was attached, to serve as a fly. The square sail was composed of stout linen towelling, purchased of the Russians; and we were provided with an A-tent, and a large piece of drill, with which our Indians might make a tent for their own shelter.

Our boat was too small to admit of a rudder, and an enormous paddle for use in steering was made by Kurílla, and ornamented with bars and stripes of red ochre. We had provided several oars cut out of seasoned spruce, no harder wood being attainable, except birch, which is too brittle.

On the 16th and 18th of May we all united in erecting the poles between the Nuláto post and Fort Kennicott. Dyer had decided to take Antóshka, and a Creole called Alóshka, who understood the Eskimo dialect of the Innuit of the Yukon-mouth, serving as an interpreter as well as an assistant in paddling the three-holed bidárka in which the journey was to be made. Scratchett was to remain at Nuláto and secure logs for the buildings to be put up at Fort Kennicott after the ice had passed out of the river.

The ice on the Yukon was separated from the shore by a wide belt of water, and we hourly looked for a rise which should give it a start down stream.

On the 19th of May, about one o'clock, as Whymper and myself were sitting on the roof, we perceived a slight motion, and upon our raising a shout to that effect, the whole population of the fort was soon out on the bank, watching the slow progress of the great sheet of ice between us and the island. The previous year the ice had broken up on the 21st. The water began to rise very rapidly, and soon covered much of the beach. We watched it with a great deal of interest; but the sight was by no means as grand as we had anticipated. It passed very quietly

for a time, and finally stopped, a jam having occurred somewhere below, and the water being still too low to carry all before it.

On the 21st it began to move again; and the water had risen to the foot of an inclined plane opposite the fort-gate, where the bank is usually ascended. The Russians do not start up the river until the ice is well out of it, as the danger to skin-boats would be too great to risk.

Our necessary trading-goods and provisions amounted to nearly eight hundred pounds, which, with the men, oars, sails, and other baggage, made up nearly eighteen hundred pounds. Of this we intended to put a bag of flour and one of bread on board the large Russian boat, making about sixteen hundred and fifty pounds that our little bidarrá must carry.

On the 25th, all our preparations being completed, we took our last night's rest in the old Nuláto trading-post.

CHAPTER III.

Our departure from Nulato. — Sukaree. — Crossing in the ice. — Peculation. — Camp. — Koyukuk Sopka. — Barter on the Yukon. — Indian grave. — Ooskon. — Indian pipes. — Tohonidola. — Koyukun dress. — Catching butterflies. — Melozikakat River. — Arrival at Nowikakat. — Trading for meat. — Shamanism. — Indian theology. — Treating the sick. — Departure from Nowikakat. — Birch canoes. — Runaway from Fort Yukon. — Tozikakat River. — Nuklukahyet and the Twin Mountains. —Nuklukahyet tyone and other Indians. — Departure from Nuklukahyet. — The Ramparts and Rapids. — Moose killing. — Pass the Ramparts. — Mosquitoes. — Plains north of the Yukon. — Kutcha Kutchin camp. — Sachniti. — Arrival at Fort Yukon. — History of the fort. — Five years without bread. — Degradation of the servants of the Hudson Bay Company. — Intense heat. — Arrival of the bateaux. — The annual trade. — Tenan Kutchin Indians. — Other tribes. — Drowning of Cowley. — Red Leggins. — Arrival of Ketchum and Mike. — Missionaries and their value. — Course of the Hudson Bay Company with the Indians. — Massacre at Fort Nelson. — Indians of the Western United States. — Furs in the storehouse. — Departure from Fort Yukon. — Arrival at Nulato. — Unexpected orders. — Start for the Yukon-mouth. — Seal and beluga in the river. — Arrival at St. Michael's.

EARLY in the morning of the 26th of May we helped our companion, Mr. Dyer, to pack his baggage into the bidárka, and about seven o'clock saw him fairly started, with Antóshka and Alóshka, on their journey to the Yukon-mouth. We gave them a parting salute, and immediately placed our own boat in the water and proceeded to load her. The Russians had already finished, and were assembled at a pseudo-religious ceremonial before their departure. At eight o'clock we pushed off. Yagor and the two Russians who remained behind saluted the flotilla with several discharges of the rusty howitzer. The Russian boat took the lead, with eight oarsmen and a light freight. We followed them at a short distance. Our party was composed of Mr. Frederick Whymper and myself; Kurílla; a little Ingalik called Mikáishka, or in the Indian dialect Menohólnoi, meaning beetle, in allusion to his diminutiveness; and lastly, a Koyúkun, whose name was so remarkably long and unpronounceable, that we decided to call him Tom. All these had arrived early in the morning in single birch canoes, a large number of

which, with their owners, were to accompany us to Nuklukahyét.

The rain poured down on us and made everything wet and uncomfortable. I realized, for the first time, the size and power of the logs and fragments of ice which, seen from the banks, seemed so small and insignificant. Kurílla, whose Indian name was *Unóokuk*, had had much experience in this sort of navigation, and proved himself active, energetic, and efficient.

The boat had been hurriedly loaded, and the goods were not arranged to the best advantage. It always takes a day to get the party and boat into good working order. After pulling about six miles we felt the necessity for taking some breakfast, and, the Russians setting the example, we hauled close into the bank and boiled the chyniks. It is, of course, impossible to take or make soft bread on such a journey, as it would very soon mould. The traditional "damper" is a humbug. It is invariably heavy, and a fruitful cause of heartburn, indigestion, and consequent ill humor. Hence, in the absence of biscuit, a substitute being necessary, the Russians are accustomed to bake a large quantity of bread which, after slicing, they dry in the oven, so that, without browning, it becomes as hard as a rock. This hardness, however, immediately disappears when the *sukarée*, as the Russians call it, is immersed in hot tea; and in this respect it is preferable to biscuit, which takes a long time to soak. It is, however, more liable to break up than biscuit, when carried in a bag, and not unfrequently retains dust and grit from the mud walls of the peechka, unless very carefully dried. We had both biscuit and sukarée; some of the latter having been made of white flour, it proved execrable, the Russian sukarée being always made of groats or Graham flour.

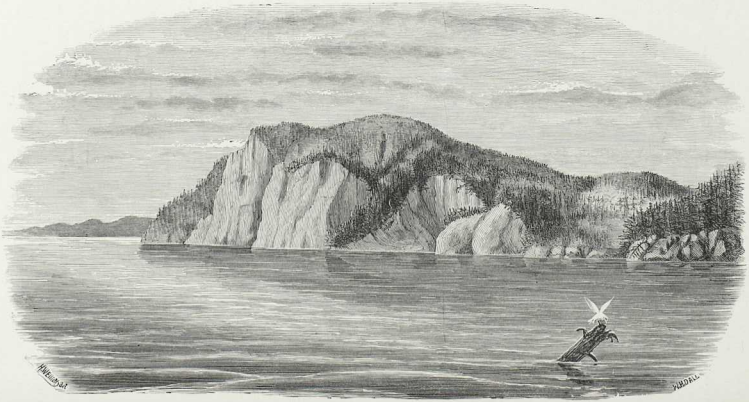
Just above the ravine and little brook where we took our tea was a rounded rock, boldly jutting out into the river. Around this a constant stream of ice-cakes, logs, and driftwood was pouring. The Russians first reached this point, and after one or two trials turned back and camped, hoping that the ice would cease running before the next morning. Kurílla saw this move with great disgust. "The Russians retreat: Unóokuk will not retreat," said he, and struck boldly out into the stream of ice and driftwood. For ten minutes all had their hands full, staving off logs

and ice-cakes, and the danger was too imminent to think about. A clearer part of the river was soon reached in safety, the drift always running most thickly in the strongest current. Paddling up stream a mile or two, the severity of the rain induced us to camp on an island, where we pitched our tent in a willow grove, and endeavored to dry ourselves. The evening meal consisted of salted white-fish and tea. We now discovered that Scratchett had availed himself of the confusion of our starting to appropriate sundry spoons, and other articles of use and necessity, to his own advantage. Although of iron, the loss was as great as if they had been of gold; for who can eat bread and tea without a spoon? We had just two left, and our Indians must take turn and turn about in using them. Another loss which we all regretted was three pounds of sugar, which I had purchased with a shirt, of the individual above mentioned. It is to be hoped that he has duly repented in his subsequent retirement.

Several canoes had followed us through the ice in fear and trembling. Their inmates, camped near us, presented a melancholy spectacle. A woman whose long upper garment consisted of white cotton, with her hair streaming down her back, resembled a drowned rabbit; and an old man seemed to have received a more thorough washing than for many years previous. We were all very wet, but our clothing repelled the rain much better than deerskins or cotton drill.

Blessed be the man who invented rubber blankets! Mine, after a season in the Lake Superior region, did noble service, as well as Whymper's, which he had obtained in British Columbia. Laying them down on the mud in which our camp was situated, only covered by a little willow brush, we spread out our blankets, and were soon at rest. The Indians, except Kurílla, who, as coxswain, slept in our tent, made their tent out of a great sheet of drill, after their own fashion. Bending down the tops of several slender willows, they crossed them in different directions, and spreading the covering over that, the whole was nearly circular. It was always a marvel to me how they could lie down in it, it was so small. After all got inside, the edges were carefully tucked in and the mosquitoes effectually excluded.

The rain prevented the latter from being very troublesome, and we slept comfortably.



THE KOYUKUK SOPKA FROM ABOVE.

The brown Miocene sandstones before mentioned are succeeded here by blue sandstones, which at Nuláto lie below them. The latter contain few fossils, — mostly sycamore leaves (*Platanus*), and other vegetable remains.

Monday, May 27th. — Starting about three o'clock in the morning, we soon passed the Russians, who had gone a little farther in the night and camped above us. We passed through a small slough or *pratóka* between some islands. About ten o'clock we arrived at a fine bluff near the mouth of the Koyúkuk River, a landmark in this part of the country, and known as the Koyúkuk Sópka. Here is a small Koyúkun village, where we stopped and took tea. I bought a large pike (*Esox estor*) and a quantity of dry reindeer meat.

After passing the Sópka the river is very winding, and we frequently crossed it in order to shorten the distance. When in doing so we came to the main channel, it was a hard tug to cross it, and we invariably lost ground, sometimes as much as a mile.

On rounding a turn in the river we saw a large number of canoes lying near the bank and a crowd of dark figures on the shore. These proved to be Koyúkuns, who proposed to accompany us. Iván the tyone, Larriówn, and a handsome fellow in a red shirt, named "Cousin" by Ketchum on his last season's trip, accosted us with gesticulations of welcome. As rain threatened, and we wished to keep our provisions dry, we camped in the best place we could find among the dense thickets of willows which line the shore everywhere. There were a few hills in the distance, but no mountains. The foliage was not fully out, but the delicate green of the young leaves made the river banks very beautiful. Close to the water grow willows and alders. A little farther back are belts of broad-leaved poplars (*P. balsamifera*), and on the dry ground spruce (*Abies alba*), growing to a very large size and mixed with aspens (*Populus tremuloides*), whose light-colored bark and silvered leaves contrast finely with the dark evergreens. On the rocky bluffs a species of juniper is abundant, crawling over the rocks, but not rising from the soil.

On the left bank, which is everywhere low, the willows and poplars appear to predominate. The banks in many places are undermined by the rapid current, and frequently fall into the

river in large masses, with the trees and shrubs upon them, startling the unaccustomed ear with a noise like thunder.

The ground where Ketchum camped the previous year, according to Kurílla, was under water; we had camped on a low island somewhat in advance of the Russians. The Koyúkuns brought their stores of dried meat and fat, and I purchased about fifty pounds of the former. The tariff of prices was high, compared with what we had paid for the same things on the coast. We gave five loads of powder for a duck, seven for a goose, if fat; five balls or a small bundle of leaves of Circassian tobacco, called by the Russians a *papoósh*, for a beaver-tail; six to eight balls for the dry breast of a deer; four or five for a deer's tongue; and for fat, especially the marrow of the long bones of the reindeer, whatever would buy it, usually a pretty high price. A ball, a charge of powder, or two caps, are the units of trade, and will buy almost anything. Knives, beads, flints and steels, needles, small looking-glasses, handkerchiefs of various colors, woollen scarfs, and cotton drill or calico are all useful, but tobacco and ammunition are the great staples. The Circassian or Cherkátsky tobacco, imported only by the Russians, and exceedingly strong, is the prime favorite where the Russians trade; but those who deal more with the English at Fort Yukon like the long natural Kentucky leaf best. The latter we used for our own smoking, obtaining an excellent article from the Russians for thirty cents a pound.

Swans, brant, and sandhill cranes were seen, the former abundantly. Iván Pávloff sent me two eggs of the white-cheeked goose (*B. leucoparcia*), which were found on a bit of sandy beach near the camp, and every step added some new plant, insect, or bird to our collections. The Koyúkuk Sópka is composed of a soft crystalline rock apparently unstratified.

In this kind of journey, sluggards are out of place. We allowed ourselves but four or five hours for sleep, and after a cup of tea continued on our way.

Tuesday, 28th.—Iván the tyone, and old Wolasátux came along in their little canoes with some half-dried fish for sale, which we purchased for our Indians. Passing through a narrow pratoka between two islands and the shore, we came to a solitary Indian house, quite empty. On the hillside near it stood a

solitary grave. A little fence of white spruce stakes was built around it, and from several long poles streamers of white cotton were floating. Kurílla said that it was the grave of an Indian who had died in the previous fall, and that the house was occupied by his wife, who spent all her time (except when procuring food) in watching the grave, and devoting all her property to the purpose of adorning it. The house looked neat and clean, the hillside was green, and the sun shone brightly on the lonely grave, as we passed by on the other side of the pratoka. Just beyond, a perpendicular and solitary bluff fronted the river. Close to its face rushed the swift current, with its burden of driftwood, at the rate of seven knots an hour. There was no backing out: we had to cross here. The swift part of the current appeared to be narrow. The canoes first essayed it, and were swept like straws a mile down stream in the twinkling of an eye.

This made us careful. We kept close to the rock, where there was a little slack water, and then, driving our paddles into the water with a will, we passed the current, and reached the opposite bank, not more than a quarter of a mile below. Waiting to rest, we saw the Russians kill a beaver in the water, and then cross the stream with about the same success as ourselves. Continuing on our way, about six o'clock we stopped to boil the chynik and to rest. Iván Pávloff was invited to take tea with us. Sugar being a very scarce article in this country, it is usually boiled with water into hard cakes, which, when properly done, are not affected by the weather. Soft sugar will waste away imperceptibly with the dampness. The orthodox way is to take a fragment of this hard sugar, bite off a small piece of it, and drink your tea without putting any into it. This is much more economical, and is hereby recommended to boarding-house keepers. I was much amused by observing Pávloff, who after finishing his tea replaced the lump from which he had been biting in the common sugar-box.

About ten o'clock we came to a very wide part of the river, where the Russians lay to for a while, and fired a small boat-gun which they carried in their bidarrá. This was to notify the Indians, if any were in the vicinity, that the Russians were ready to trade; but none made their appearance, and the bidarrá soon continued on its way. On a low sand-bar, where the sun poured

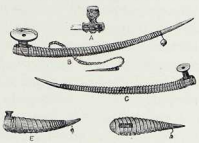
down with double force, and mosquitoes hummed in myriads, we also found an old man and his old wife. I afterwards heard that he had a young one. His hair stood out in every direction where it was not matted down by dirt. His clothing hung in the filthiest rags, and his voice sounded like that of a fishhawk with a cold. His name was Ooskón, or Rabbit, and it was stated by Kurílla that he was noted for his good-humor and generosity. He might have given away all his clothes, which would account for his appearance. His wife was his duplicate, except that she was silent, which is an excellent thing in women. The old fellow brought me a gull's egg, which I gratefully accepted, wished to sell me some fish, which I respectfully declined, and finally brought out two stuffed skins of the beautiful northern phalarope, which I purchased, as they were in very fair condition. I afterwards discovered they were stuffed with a very sweet-scented grass. On pointing this out to Wolasátux, he shook his head gravely, and said, "They are rotten!" These Indians have no appreciation of sweet odors. The wild rose (*Rosa cinnamomea*), which is one of the few fragrant flowers to be found on the Yukon, is called among them by an untranslatable name, on account of its perfume. The only odor they appreciate lies hidden in the steam arising from the soup-kettle.

Rain coming on, we camped on a steep bank, and the Russians followed our example.

I afterwards added a green-winged teal and hooded grebe (*Podiceps cornutus*) to our collection. A high sandy bluff near our camp was full of the nests of the bank swallow. It seemed like a gigantic honeycomb swarming with bees, as the light-winged swallows darted about. The eggs are white, and are laid on a few very fine twigs, which keep them off the sand. I counted nearly eight hundred holes, all of which seemed to be occupied. I obtained from the Indians quite a number of ducks and geese for our kettle.

Wednesday, 29th. — We broke camp about five o'clock in the morning. Nothing occurred to break the monotony of constant steady paddling. Two Indians in the bow of the boat would row until tired, and then we would stop for a few minutes to rest, and let them smoke. The last operation takes less than a minute: their pipes are so constructed as to hold but a very

small pinch of tobacco. The bowl, with ears for tying it to the stem, is generally cast out of lead. Sometimes it is made of soft stone, bone, or even hard wood. The stem is made of two pieces of wood, hollowed on one side, and bound to the bowl and to each other by a narrow strip of deerskin. In smoking, the economical Indian generally cuts up a little birch wood, or the inner bark of the poplar, and mixes it with his tobacco. A few reindeer hairs, pulled from his parka, are rolled into a little ball, and placed in the bottom of the bowl to prevent the contents from being drawn into the stem. A pinch of tobacco, cut as fine as snuff, is inserted, and two or three whiffs are afforded by it. The smoke is inhaled into the lungs, producing a momentary stupefaction, and the operation is over. A fungus which grows on decayed birch trees, or tinder manufactured from the down of the poplar rubbed up with charcoal, is used with flint and steel for obtaining a light. Matches are highly valued, and readily purchased. The effect of the Circassian tobacco on the lungs is extremely bad, and among those tribes who use it many die from asthma and congestion of the lungs. This is principally due to the saltpetre with which it is impregnated. The Indian pipe is copied from the Eskimo, as the latter were the first to obtain and use tobacco. Many of the tribes call it by the Eskimo name. The Kutchin and Eastern Tinneh use one modelled after the clay pipes of the Hudson Bay Company, but they also carve very pretty ones out of birch knots and the root of the wild rose-bush. The Chukchees use a pipe similar to those of the Eskimo, but with a much larger and shorter stem. This stem is hollow, and is filled with fine birch shavings. After smoking for some months these shavings, impregnated with the oil of tobacco, are taken out through an opening in the lower part of the stem, and smoked over. The Hudson Bay men make passable pipe-stems by taking a straight-grained piece of willow or spruce, without knots, and cutting through the outer layers of bark and wood. This stick is heated in the ashes, and by twisting the



PIPES.
A. — Kutchin. C. — Koyúkun.
B. — Innuit. D, E. — Chukchee.

ends in contrary directions, the heart-wood may be gradually drawn out, leaving a wooden tube. The Kutchin make pretty pipe-stems out of goose-quills wound about with colored porcupine quills. It is the custom in the English forts to make every Indian who comes to trade, a present of a clay pipe filled with tobacco. We were provided with cheap brown ones, with wooden stems, which were much liked by the natives, and it is probable that small brier-wood pipes, which are not liable to break, would form an acceptable addition to any stock of trading-goods.

For the first time we were able to use our sail, as a fair wind sprang up in the afternoon, and for a short time we made excellent progress.

About five o'clock we camped at a place where in summer the Indians have a fishery, and which is called *Kamén-sikhter*.

Thursday, 30th. — The sealskin of which the bidarrás are made, by long continuance in the water becomes soft and unsound. Hence, as the weather continued rainy, we decided to lay over a day, take the boat out of the water, dry and oil it; the Russians doing the same with their bidarrá. During the interval, many additions were made to our collections. I observed a fine-looking Koyúkun, called *Toho-nidóla*, who wore a mantle made of a dressed deerskin. It was cut to a point behind, and into fringes around the edge. It was ornamented with a few beads, hanging in short strings, and was colored on the inside with red ochre; making a very graceful article of apparel. The breeches had the moccasins continuous with the leg, and were heavily embroidered with large black and white beads. The pattern universal among the Koyúkun men consists of a band of beads in front, from the thigh to the ankle, a short one crossing it at the knee. At the ankle the long band bifurcates, and the two ends, after reaching the sides of the foot,

Tohonidóla.

continue all around its edge, except over the heel. The pattern for females is similar, but the perpendicular band on the leg is omitted. The Koyúkun male parka has been described. The pattern of ornamentation is a broad band of beadwork across the breast and back, and over the shoulders, with fringes on the pointed ends, and a few short tails of beadwork in front and on the sleeves. The female parka comes below the knee, and is cut round like an ordinary dress, but a little shorter in front than behind. They are ornamented with a similar band around the shoulders, sometimes one around the wrist, and one around the edge of the skirt in lieu of fringes. Before the introduction of beads by the Russians, this work was done in porcupine quills, often in very tasteful patterns, and among the *Tenán Kutchín*, or Tananáh River Indians, this practice still obtains White and black or brick red are the only colors I have seen used on clothing, and they are always embroidered in alternate bands. Other beads, of various colors, in strings seven feet long, are valued by the natives as property, having a fixed value of two martenskins a string. They pass from hand to hand, much as we use money. Small beads, of various kinds, are much in demand among the women, who use them as ornaments for their children. Strong beads, over which the hand passes smoothly, are the only kind suited for fur-trading. Red, black, white, dark blue, and amber are the desirable colors.

Friday, 31*st*. — Making an early start, we passed a point known as *Sakatalóntan*, about half past three in the morning. Large stacks of driftwood, as big as houses, came floating down in the current, and great care was necessary to avoid collision. These were piles of logs thrown upon sandbars by previous freshets, which the unusually high water had floated off entire. We passed many low bluffs of blue sandstone and a few gravel-banks. Tom found a mallard's nest on the bank, with nine eggs in it, which were devoted to an omelet, after carefully emptying the shells with a small blowpipe. We camped on a high bank without taking the tent out of the boat, as the night was remarkably pleasant and the mosquitoes unusually quiet.

Saturday, *June* 1*st*. — The next morning at one o'clock we were on our way again, working hard against a strong current. The sandstones were now succeeded by conglomerate and meta-

morphous quartzose rocks. Many butterflies, including the familiar swallow-tail (*Papilio Turnus*), and another species somewhat similar (*P. Aliaska*), were hovering over the surface. Upon mentioning that I would give a needle apiece for good specimens, a commotion was aroused amongst the little fleet of birch canoes which accompanied us. All was excitement, paddles were flourished in the air, the light canoes darted about after the slowly sailing, unsuspecting butterflies, and the result was a considerable number of passable specimens. I saw, also, several wax-wings (*Ampelis garrulus*) in the bushes along shore, and obtained a sandhill crane. A fair wind sprang up and sent the

Mt. Hohonila from the Melozikakat.

Russians scudding around a six-mile bend under their large sail. Our boat proved a very slow sailer, the wind soon dropped, and we had to pull all the way around the bend.

After camping we employed Larriówn's wife to sew up some cuts in the sealskin of our bidarrá. These were made by the constant stream of driftwood; but when sewed up and the seam well rubbed with tallow, the boat was as tight as ever. The skin was old and very rotten, so that we had to exercise the utmost precaution in landing and in avoiding driftwood or rocks.

Sunday, 2*d*. — About ten o'clock the next day we took our tea at the mouth of the *Melozikákat* or Clear River. From this

point a fine view may be had of a mountain which rises perhaps two thousand feet above the river, and is known to the Indians as Hoho-nila. The upper portion still retained snow in many ravines, though later in the season it disappears entirely. The mosquitoes were exceedingly troublesome. The night had ceased to be dark, as the sun remained only about two hours behind the high hills which shut out the horizon.

Monday, 3*d*. — Passed the *Uka-wútne* or "Look-and-see-it" River. It is a small stream. Near its mouth the Yukon is very broad and full of islands. About noon the sun was so scorching (90° in the shade) that we pulled into the bank and rested for a couple of hours. We then proceeded to the point on the right bank where the Russians had camped, waiting the report of a messenger who had been sent to the village of Nowikákat on the left bank a few miles above. As he did not appear I turned in, and had hardly got under the blankets, when I heard the well-known voice of Larriówn, who poked his ugly head into the tent, saying there was plenty of dry meat and many Indians at Nowikákat, and begging a little tobacco for his information.

I put on my boots and stepped out of the tent, around which a number of Indians had gathered. The old Nowikákat tyone was there, and one of the men who had gone up with Ketchum suddenly appeared. He gave us the welcome information that Ketchum and the party had reached Fort Yukon in safety, and had started with open water for Fort Selkirk, having sent the Indians and six remaining dogs down the river in a bidarrá made of moose-hide.

Tuesday, 4*th*. — We struck our tent, broke camp, and started for Nowikákat, in company with the Russians and Indians. We hoisted the American flag over the blue cross and scallop-shell of the Scientific Corps, and came into Nowikákat Harbor with colors flying. We received and returned a salute of musketry, and, finding with difficulty a place among the myriads of birch canoes where we could moor our boat, we pitched our tent in the middle of the village. We informed the tyone, or chief, that we were exceedingly tired, and must sleep before any trading could be done. This was quite true, as I, for one, had slept but about two hours out of the last forty-eight. We tied the flaps of the tent closely, but even this did not prevent the Indians from

raising the edge of the canvas and peering in upon us with as much curiosity and pertinacity as country boys at a circus After a few hours' rest we rose and dressed. We could not keep out the Indians, until we admitted the tyone, whose repeated orders kept them outside for a time. He watched the process of washing with great interest, from which I inferred that he did not indulge in that luxury. He was very anxious that we should present him with our brushes, combs, soap, and other articles for the toilet, which we were obliged to refuse him ; but we made up to him for the disappointment by presents of tobacco, powder, and ball. We heard that Antoine Houle, the Fort Yukon interpreter, was at Nuklukahyét with a trading party, and we desired to send a letter to him ; but old Iván, the tyone, prevented our doing so, by frightening our messenger with an account of the danger of making such a journey alone. For this piece of mischief he got a scolding, which astonished him and made him less officious in future.

After breakfast, which we shared with the Nowikákat tyone, we proceeded to business. Whymper was busy with his sketch-book, and left the trading to me.

All accounts of the country between Nowikákat and Fort Yukon agreed in representing it as a district where provisions were very scarce, and so we had determined to provide them in advance. I purchased, for seven fathoms of drill, three papooshes of tobacco, and five balls, a birch canoe of the largest size, with its paddles. From the abundant stores of dried meat and fat which the Indians had laid in, I obtained about three hundred pounds of dry deer and moose meat, clear moose fat in birch dishes, and dried entrails of the deer, which were filled with fat of the best kind. I was able to secure, besides, a large number of moose and deer tongues, and dried moose noses, the latter making a delicious dish when thoroughly boiled. We also succeeded in engaging two more men to take this canoe-load of meat at least as far as Nuklukahyét. A large number of birds'-nests, mouse-skins, and other specimens of natural history, were also secured. I had then an opportunity to make a few observations on the place and its inhabitants.

Nowikákat Village is situated on a beautiful little enclosed bay, into which the river of the same name enters, with several smaller streams. This river is about one hundred miles long, and its

mouth is about one hundred and thirty miles from Nuláto in a direct line. By the Yukon the distance is considerably greater. The head-waters are on the southeast side of the Nowikákat and Káiyuh Mountains, and, according to Indian accounts, a short portage can be made to the head-waters of the *Shágeluk* or so-called Innoko River, or, by crossing the mountains, to the Káiyuh River. These portages are frequently made by the Indians who trade with the Ingaliks.

A narrow entrance connects the basin with the Yukon. Through this a beautiful view is obtained, across the river and

Looking out of Nowikakat Harbor.

through the numerous islands, of the opposite shore and the Yukon Mountains in the distance. The feathery willows and light poplars bend over and are reflected in the dark water, unmixed as yet with Yukon mud; every island and hillside is clothed in the delicate green of spring, and luxuriates in a density of foliage remarkable in such a latitude.

The village appeared to be a mere collection of huts, temporary lodges, and tents; one or two winter houses seemed as if long deserted and rapidly going to decay. All these were crowded together on a low bank, from which the willows seemed to have been recently cut away. The shore was absolutely covered with

birch canoes. The dress of the Indians was similar to the Koyúkun, already described; but a few specimens of fine bead-work and fringed hunting-shirts showed the effect of English intercourse. The guns were all English single-barrelled flint-locks, while the Koyúkuns are provided with double percussion guns from the traders in Kotzebue Sound, through the Eskimo. The principal supply of food seemed to be moose meat. Fish was evidently scarce, and deer less abundant than near the coast. As evening approached, Larriówn the shamán, and his wife, were called upon to exercise their art for the relief of a sick man who apparently had not long to live.

The belief in shamánism is universal among the natives of Alaska, Eskimo as well as Indians. Even the Aleuts, long nominally converted to Christianity, still retain superstitious feelings in regard to it. It is essentially a belief in spirits who are controlled by the shamán; who come at his call, impart to him the secrets of the future and the past, afflict or cease afflicting men by sickness at his behest, and enable him to advise others as to seasons and places of hunting, good or evil omens, and the death or recovery of the sick. These however are not spirits who were once men.

Many Indians — in fact, all the Tinneh that I have conversed with, who have not been taught by the English or Russian missionaries — do not believe in the immortality of man. Of those who have a dim notion of the kind none have any idea whatever of future reward and punishment, of any Supreme Power or Deity, of good and evil in a moral sense, or of anything which can be called a religion. Assertions to the contrary proceed from the ignorance or poetical license of the author, or from an intercourse with tribes who have derived their ideas from missionaries.

The support which the spiritual instincts of human nature demand is met among the Indians by a belief in shamánism. All animals, woods, waters, and natural phenomena such as the aurora borealis or thunder and lightning, are supposed to be either the abodes or the means of manifestation of spirits. The latter have power and knowledge limited by their respective spheres. The most powerful and beneficent of all are the objects of ridicule and contempt, as often as of fear or reverence, in the Indian legends which relate to them. The whole relation,

between the Indians and these spirits as they believe in them, is one of self-interest and fear. They preserve all bones out of reach of the dogs for a year, when they are carefully buried, lest the spirits who look after the beavers and sables should consider that they are regarded with contempt, and hence no more should be killed or trapped. Other singular superstitions, the result of accident, some local incident, or unexplained coincidence, are found to be peculiar to each narrow territory or small tribe.

The younger Indians look on these things with contempt and ridicule; it is only when starvation or sickness impends, or the continued threats of some greedy shamán create alarm, that they pay any heed to them. It is with age alone that these superstitions become firmly implanted in their minds. The strange effects which firm belief and vivid imagination have frequently produced among civilized and intelligent human beings are too well known to require further confirmation. Hence it is not to be wondered at among ignorant Indians, whose imagination is untrammelled by knowledge of the simplest natural laws, that the self-deluding frenzy of the shamán should, as it frequently does, produce seemingly supernatural effects, which confirm his influence.

Among the Indians who frequent the trading-posts many may be found who have imbibed a few indistinct ideas from Christian theology, without renouncing their native superstitions, or gaining any comprehension of the cardinal principles of morality or religion. It is from intercourse with such, that many of the popular delusions about the "Great Spirit" of the Indians have arisen.

In the present instance, the Indians formed a circle around a fire, near which lay the sick man wrapped in a dressed deerskin. Larríówn had donned a suit of civilized clothing, which he had obtained from some trader. He wore a very large black felt hat with a broad brim, and his wife had a similar equipment, so that it was difficult to distinguish them. They walked in contrary directions around the fire, gazing at it or into vacancy. At intervals he uttered a deep bass sound between a shout and a groan, which she answered in a higher key, both quickening their pace and occasionally stopping short and shuddering convulsively from head to foot. At last the responses were more rapid and assumed a kind of rhythm; the whole circle of Indians acted as chorus in

the intervals. In the midnight dusk the circle of tall swarthy forms in strange apparel, the fitful gleams of firelight, the groans of the sick man, and the mysterious writhing forms before him, all united to give to the strange chorus an intensely dramatic effect.

Contortions which were almost convulsions shook those two black forms, while the fiendish eyes of Larriówn rolled until the whites alone were visible. Between the spasms both made mesmeric passes over the sick man, keeping time with the deep monotonous chorus, which might well have been the despairing wail of a lost spirit. The muscular contortions gradually grew less violent, from sheer weakness. The ring of Indians gradually broke up, the chorus ceased, and the ceremony was over.

Wednesday, 5th. — We rose at five, and putting our meat into the canoe and our baggage into the boat, we followed the Russians out of the basin. This is the only place on the Yukon which appears to me safe for wintering a steamer, unless she were beached. The ice descending in the freshets would at any other point carry her away or crush her. The heat of the sun was so great that we lay over from eleven until two, and rested in the shade of some magnificent birches. Nowikákat is noted for the beauty and good workmanship of the birch canoes made there. The single canoes are easily carried in one hand. They are about twelve feet long, just wide enough to sit down in, and have the forward end covered for three or four feet with a piece of bark, to keep water out. They are exceedingly frail. The frame is made of birch wood steamed, bent, and dried. They are sewed with the long slender roots of the spruce, and calked with spruce gum. The bark is put on inside out, shaped, and sewed over a clay model just the shape and size of the proposed canoe. The regular price for a single canoe is a shirt, or five marten skins. The paddles are of the usual lance-head shape, with a ridge in the middle on each side, running down to the point and strengthening the blade. They are four or five feet long, with a cross-piece at the end of the handle, and gayly colored with red ochre, blue carbonate of copper, or a green fungus which is found in decayed willow wood. The single canoe will carry a man and a bag of flour.

The large canoes are of the same shape, but will carry three men and their baggage, in all about six or eight hundred pounds. They are sometimes sixteen feet long, and do not turn up at the

ends, as the canoes of the Lake Superior Indians do, but are straight, and furnished with a Y-shaped prow above the cut-water. Each carries a dish of spruce gum, some extra pieces of bark, and a bundle of spruce roots, to repair damages, which frequently occur; and a small framework of slats for the occupants to sit on.

In the afternoon we were surprised to see a wreath of smoke curling over the trees beyond a point on the river. The small canoes immediately fell back; and Iván, with his usual cowardice, called out to us to stop, for fear of hostile Indians. Disregarding his warning, we took the lead, and saw a white man and two Indians standing by a large fire. We supposed it was a guide, or Antoine Houle himself, whom we had expected to join at Nuklukahyét. It turned out to be a man from Fort Yukon, who stated that he had left the fort on account of long-continued ill-treatment, and that he had trusted to fortune to enable him to escape from a tyranny which he had resolved to bear no longer. He had started from the fort, with a little powder, a gun, and a few bullets, in a small canoe, and had supported himself by killing game; cutting up his bullets into shot, and when these failed using gravel from the beach. He had just been upset, lost his gun and everything except what he had on his person. He had passed Antoine at Nuklukahyét, telling the latter that he had been sent down with letters for us, as he knew from Ketchum that we were coming up. Antoine had given him a letter which Ketchum left for us, and was now on his way back to Fort Yukon with the furs he had bought. The man gave his name as Peter McLeod, and stated that he had been fourteen years in the Hudson Bay Company's service. We called upon him and Iván Pávloff to join us at our noon-day meal, and treated them to bacon, biscuit, and tea. He assured us that he had not tasted bread for four years.

Assuming his story to be true, we could not advise him to return. I furnished him with trading-goods sufficient to purchase provisions until he should arrive at Nuláto. Pávloff, with his habitual generosity, insisted on furnishing him with a blanket, to replace that which he had lost, a flint and steel to obtain fire, and an order to Yagor to feed him until his return. We all united in wishing him a safe arrival, and in supplying him with

such necessaries as we could spare, and then continued on our way.

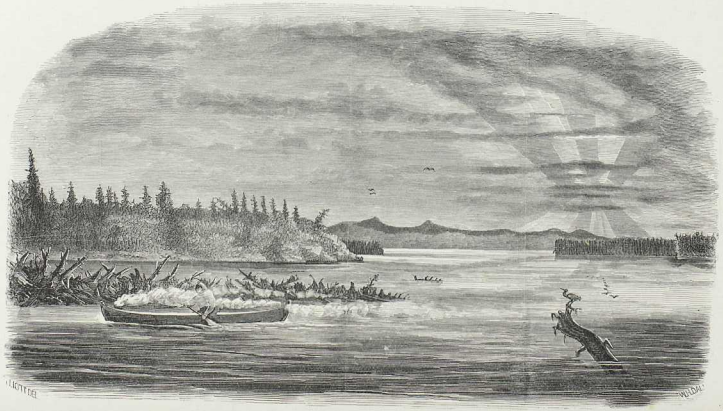
Thursday, 6th. — We passed through an exceedingly long pratoka, which was so winding and narrow that I suspected we had got into a small river instead of a slough of the Yukon. We had intended to travel by night and take our rest in the hot noontime; but the sight of some fresh deer meat in the camp of the Indians who had preceded us induced my companion to defer this arrangement until we should leave the Russians at Nuklukahyét. We therefore camped, and indulged in the luxury of some hot venison steaks.

Friday, 7th. — We had hitherto been unable to use the tracking-line, except at short intervals; but the slight fall in the water had left a narrow beach, which we now availed ourselves of.

The little river tern, whose bright colors and graceful motions cannot fail to attract the traveller's eye, was very common in this part of the river. One of our men in tracking passed near one of their nests, and the parents immediately attacked him. Swooping and returning, in long curves, they almost brushed his cap, uttering loud cries, and keeping it up for several hundred yards. At last, annoyed by their conduct, which he did not comprehend, he brandished a large stick in the air. Even then they did not rest until we were a quarter of a mile from their breeding-place. I obtained a fine piece of black obsidian on the beach, and noticed syenitic rocks for the first time in the Yukon territory.

Saturday, 8th. — About eleven o'clock the next day we reached the mouth of the Tozikákat, which empties into the Yukon some fifteen miles from Nuklukahyét. Here we boiled the chynik and rested for a while. We usually sent one of the small canoes up a little distance when we camped near a small river, in order that we might obtain clear water for making our tea. The Yukon water is full of sediment. The mosquitoes were exceedingly troublesome; without gloves and a net nothing could be done. The Indians always placed a dish of wet moss with a few coals in it on the bows of their canoes; this produced a smoke which kept the insects away from the canoe when in motion. We smoked them out of our tent, when camping, in the same way.

The mouth of the Tozikákat is obstructed by a bar, on which lay piled hundreds of cords of driftwood.



THE TWIN MOUNTAINS FROM THE MELOZIKAKAT MOUTH.

To the east the broad mouth of the Tananáh River was seen, where it joins the Yukon. The latter curves abruptly to the left, and between them lies the low land, forming a point or island. This is Nuklukahyét, the neutral ground where all the tribes meet in spring to trade. Behind it rose the mountains. Two summits rose above the others, known by the Indian names of *Mo-klán-o-klikh* and *Mont-klag-at-lin'*. The latter is really on the right bank of the Yukon, and the former on the left, but from our point of view this was not perceptible. At the junction the Tananáh is much broader than the Yukon, yet into this noble river no white man has dipped his paddle.

Below the junction the Yukon attains a width of five miles at least. A fair wind sprang up, and, as usual, the Russians left us far behind. By dint of hard paddling, about half past five in the afternoon we rounded the bluff opposite Nuklukahyét. Here we found Pávloff, who, with unexpected consideration, was waiting for us. We crossed together, with our flags flying. The Nuklukahyét tyone, who had been at Nuláto during the winter, hailed us from the beach. Pávloff answered him, and we landed, drew up our boats, and prepared to go through the ceremony for such cases made and provided. We formed in line, with blank charges in our guns. The Indians did the same. They advanced on us shouting, and discharged their guns in the air. We returned the compliment, and they retreated to repeat the performance. After ten minutes of this mock fight the tyone appeared between us. He harangued the Indians, who answered by a shout. Turning to us, he informed us that we were now at liberty to transact our business.

Antoine and his Indians had left for Fort Yukon two days before. There was little or nothing to eat at Nuklukahyét. Some men had been sent by the tyone after moose, and meanwhile the annual dances which take place here were performed on empty stomachs.

The tyone came in with a little dish of fat as a present. He regretted that there was nothing better to offer us, and gave us a note which Ketchum had written during the winter; in it he requested that we would give the tyone, who had materially assisted him, any powder and ball we could spare. The powder and ball furnished by the Company was exhausted at Nowikákat, but I

made him a present of a can of powder and forty balls from my own private supplies, and asked him to keep a little meat for us when we should return, which he promised to do. He was a rather good-looking Indian, possessed a good deal of intelligence, and was younger than any other tyone we had seen. He wore an English hunting-shirt of red flannel, ornamented on the shoulders with large pearl buttons, and fringes of mooseskin. Around his waist was a long Hudson Bay sash. He wore moccasins, and mooseskin trousers cut in the English fashion, with fringes down

Young Nuklukahyet tyone.

the outside of the leg, and blue leggins tied with a band of bead-work below the knee. His black glossy hair was cut straight around the neck, and parted a little on one side. Altogether, he appeared much cleaner and more attentive to dress than any of the Indians of the Lower Yukon.

All these Indians paint their faces. Black is obtained by rubbing charcoal and fat together. Vermilion is purchased of the traders, and supplies the place of the red oxide of iron which they formerly used. I saw one who appeared to have used graphite, or plumbago, on his face, but on examining the article itself it

proved to be micaceous oxide of iron, and was said to be obtained on the banks of the Tananáh.

They wear an ornament made of dentalium, the *sookli* of the Russians, and "money-shell" of American traders. It is here

Nose ornament of the Yukon Indians.

represented of natural size. A hole is pierced through the skin of the nose, below the cartilage, when very young. Women and men alike wore it; while at Koyúkuk we noticed it only among the women.

These Indians are fond of ornaments, and among other things I noticed in use as such were necklaces of bears' claws and teeth, sable tails, wolf ears, bands of beads and dentalia, embroidery of dyed porcupine quills, small ermine skins, hawk and eagle feathers, beavers' teeth (with which they whet their knives), and the bright green scalps of the mallard. Some wore hoops of birch wood around the neck and wrists, with various patterns and figures cut on them. These were said to be emblems of mourning for the dead.

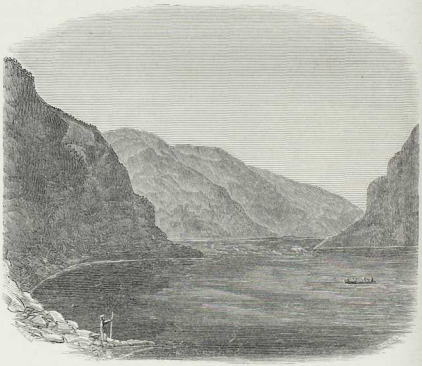
I noticed several graves in which the dead were enclosed, in a standing posture, in a circle of sticks squared on four sides and secured by hoops of green wood, thus looking much like a cask. From the sticks hung strips of cloth and fur.

In the afternoon we witnessed one of their dances. The spectators formed a circle around two men who were the performers, and joined in the usual monotonous chorus of "Ho, ho, ha, ha," &c. The dancers were stripped to the waist, and held in each hand eagles' feathers tipped with bits of swan's-down. Their heads were shaved, and bound with fillets of feathers. The dance consisted in motions of the head, arms, legs, and every muscle of the body in succession; putting themselves in every imaginable posture, joining in the chorus, and keeping exact time with it and with each other. I could not find out its emblematic meaning.

We engaged two Indians to take the canoe of meat to Fort Yukon. One of them, whom we had called Bidárshik, had come with us from Nowikákat. The other was a wild specimen of the Nuklukahyét tribe, whom we decided to name Dick. A number

of others indicated their intention to travel with us to Fort Yukon and trade there. One of them had been employed by Ketchum the previous summer. About three o'clock in the afternoon we left Nuklukahyét and the Russians behind us, receiving a salute from them, which we duly returned.

The river was becoming deeper and narrower, and the hills were rising and approaching more closely to the Yukon, as we ascended. Late in the afternoon a sunken rock cut a hole in the



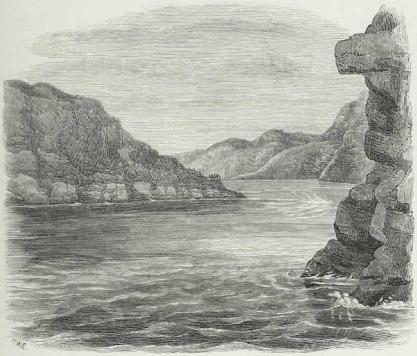
In the Ramparts.

bidarrá, and we halted for repairs. On account of the extreme heat we now decided to travel by night and camp in the hottest part of the day.

Monday, 10*th*. — We entered, about three o'clock in the afternoon, between high bluffs and hills rising perhaps fifteen hundred feet above the river, which here was exceedingly deep and rapid and not more than half a mile wide. The bends were abrupt, and the absence of sunlight and the extreme quiet

produced a feeling as if we had been travelling underground. The appropriate and expressive English name for these bluffs is "the Ramparts."

We were approaching the so-called Rapids of the Yukon, of which we had heard so many stories. The Russians had predicted that we should not be able to ascend them. The Indians joined in this expression of opinion, and had no end of stories about the velocity of the current and the difficulty experienced in



Looking back at the Rapids.

ascending them. We all felt a little anxious, but were confident of overcoming the supposed difficulty in some way. We met some Indians and obtained a little fresh meat. About midnight we arrived at the Rapids. The river is very narrow here, and the rocky hills rise sharply from the water. The rocks are metamorphic quartzites, and a dike or belt of hard granitic rock crosses the river. The fall is about twelve feet in half a mile. The rapid current has worn the granite away on either side,

forming two good channels, but in the middle is an island of granite, over which the river rushes in a sheet of foam during high water. There are several smaller "rips" along the shore, especially near the left bank, but nothing to interrupt steamer navigation, except the very rapid current.

Several Indians attempted to ascend in their small canoes. We saw them reach a point just below the island, and by dint of the hardest paddling keep stationary there a few minutes; when, their strength being exhausted, away went the canoes down stream like arrows.

We joined our tracking-line with several rawhide lines belonging to the Indians, and by keeping close to the rocks succeeded in tracking over the worst part without much difficulty. Taking our seats again, we had a hard pull to pass one jutting rock, and our troubles were over. We then enjoyed a well-earned cup of tea, and took a parting glance at the Rapids from above. From this point only a broad patch of foam in the middle of the river indicated their existence.

Tuesday, 11th.— Coal has been said to exist in this vicinity, but erroneously. There are no sandstones or other fossiliferous rocks, and the granite is immediately succeeded by quartzites. I found plenty of wild garlic on the rocks, and currant and gooseberry vines in blossom. The Indians were attended by numerous little dogs, which ran along the shore, following the canoes, and sometimes swam across the Yukon two or three times in a day. These were excellent hunters, but too small to use with sleds. During the day they dislodged a porcupine, of which I secured the skull.

Several women were with their husbands, who intended to leave them somewhere on the road until their return from trading. They were hideously ugly and dirty, — far worse than the Koyúkuns or Ingaliks whom I had seen. They took charge of the large canoes with the baggage, while the husband carried the furs in his small canoe. There were several babies, all very dirty, but otherwise like most Indian babies. During the day they were tied into a kind of chair made of birch bark and packed with clean dry moss, which was changed when occasion required. The object itself looked much like an ordinary willow baby-chair, but had a projection in front between the child's legs, which came

up as far as its breast, and prevented its tumbling out when untied.

It is remarkable that there are no terraces along the river, and the flinty rocks show ice-markings only for a foot or two along high-water mark.

Wednesday, 12th. — The water, which had fallen some two feet, rose about six inches during the day. The Indians assert that this second rise always takes place, and precedes the starting of the salmon up stream. We passed a dead moose in the water, and shortly after the Indians killed another, some of the meat of which we purchased. Passed a wrecked canoe on some shoals. The next day we passed the Yukutzchárkat River, which Captain Ketchum had called, on his sketch-map, the Whymper River, in compliment to our friend and companion, Mr. Frederick Whymper.

Thursday, 13th. — The long handle of our frying-pan having broken off, as they invariably do in travelling, it had been bent, so that it might be used to catch hold of the pan, put it on and off the fire when hot, &c. We were much annoyed at finding that our Indians had left it behind at the last camp. This may seem trivial; but it is no small undertaking to use a frying-pan without a handle on an open wood-fire. Such accidents in an uninhabited country bring forcibly before the mind the great value of many small conveniences which we never think of at home. The night was spent in tracking around a very long bend, which left us in the morning only a few miles in a direct line from the point which we had left in the afternoon. We cut the skin of our bidarrá again, but pushed on, keeping her dry by bailing.

Bidárshik and Mikáishka, who kept in advance of us, killed a large moose, and we were well supplied with fresh meat.

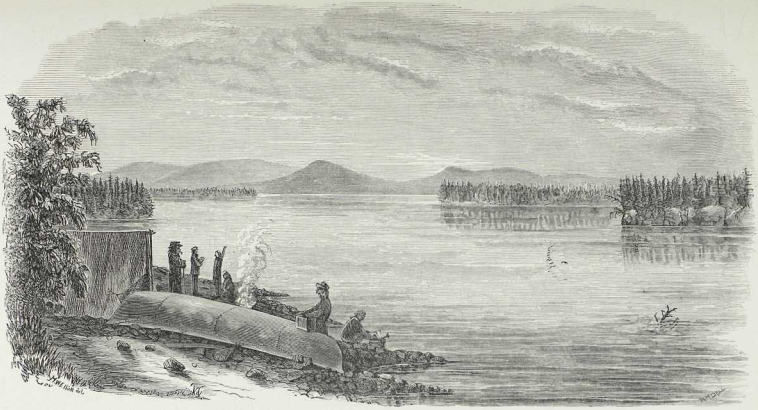
Friday, 14th. — Passed a very small stream called by the Indians *Tátsun-tkhtun*, or "Caught-in-the-rocks." I found a fossil skull of the musk ox (*Ovibos moschatus*) on the beach. Wild roses, snowballs, and gold-thread were in blossom on the hillsides, and the fragrant juniper scented the air. A fine bluff, with a rocky face like a great staircase, marked the mouth of the Tséetoht River on the right bank. After this the river begins to widen, and numerous small islands occur.

Saturday, 15th. — The next day we left the mountains be-

hind us. Just beyond them the Notokákat, or Dall River of Ketchum, enters the Yukon from the north. The latter river is very broad at this point. We passed through some very strong water. Not the least annoyance in this kind of travel is the constant complaining of the Indians, unused to steady hard work and ever ready to shirk, doing on principle the least they can.

Monday, 17th. — We enjoyed from our camp a fine view of the end of the Ramparts and the intervening islands. Passed by several deserted houses formerly inhabited by some Indians of the Kutchin tribes, who all died five years ago of the scarlet fever. This fever was introduced by a trading-vessel at the mouth of the Chilkáht River. From the Chilkáht Indians it spread to those of the Upper Yukon, and down the river to this point, where all died and the disease spent itself. These are known to the English as the Small Houses, and the locality is an excellent one for game and fish of all kinds. The women were left behind on an island in the morning, and the Indians, relieved of the heavy canoes, were already far in advance of us.

Tuesday, 18th. — One of the few who accompanied us followed a cow-moose in the water until tired out, when he killed her with his knife, and with some difficulty we towed her ashore. We occasionally saw a black bear or a Canada lynx on the bank. For several days we kept steadily on, little of interest occurring. It was noticed that the trees began to grow smaller and more sparse as we ascended the river. The sun hardly dipped below the horizon at midnight, and his noontide rays scorched like a furnace. The mosquitoes were like smoke in the air. Through constant and enforced observation, I came to distinguish four kinds, — a large gray one, and another with white leg-joints, a very small dust-colored one which held its proboscis horizontally in advance, and another small one which carried its probe in the orthodox manner. All were distinguished from the civilized species by the reckless daring of their attack. Thousands might be killed before their eyes, yet the survivors sounded their trumpets and carried on the war. A blanket offered them no impediment; buckskin alone defied their art. At meal-times, forced to remove our nets, we sat until nearly stifled in the smoke, and, emerging for a breath of air, received no mercy. My companion's hands, between sunburn and mos-



LOOKING BACK AT THE END OF THE RAMPARTS.

quitoes, were nearly raw, and I can well conceive that a man without a net, in one of these marshes, would soon die from nervous exhaustion. The mosquitoes drive the moose, deer, and bear into the river, and all nature rejoices when the end of July comes, and their reign is at an end.

Both banks had become very low and flat; the region had a dreary appearance. Only five snow-covered peaks, supposed to be part of the Romántzoff range, rose above the level of the plains. These are the only mountains near the Yukon, in Russian America north of the Alaskan range, which bear snow throughout the year.

The plain here described reaches to the shores of the Arctic Ocean, broken only by a few ranges of low mountains near the coast, of which the Romántzoff are the highest. To the eastward it rises almost imperceptibly, attaining its highest elevation between the head-waters of the Porcupine and the left bank of the Mackenzie. This table-land, somewhat broken and rocky, as seen abutting on the Mackenzie River has the appearance of high hills. These are the "mountains" of Richardson. There are no true mountains north of the Yukon, except the Romántzoff. Nothing of less than five thousand feet in height has a right to the title of mountain; but in the careless speech of the Hudson Bay trappers and traders anything more than two hundred feet high is a "mountain."

Saturday, 22d. — After passing the Birch River of the English, called by the Indians *Tohwún-nukákat*, we came upon a camp of the Kutchá Kutchin'. Camping here, I purchased a number of fish, which they were catching and drying. There were four or five men, a boy or two, and five women. All were much finer-looking than the Únakhatana we had left behind us at Nuklukahyét. All wore many articles of English make; one of the women had a calico dress on. They had many dogs, all of the black, short-haired, long-legged English breed.

The men wore the Hudson Bay moccasins, leggins, and fringed hunting-shirts of buckskin, originally introduced by the English traders, who obtained them from the tribes to the southeast. They had abundance of the fine bead-work in which the French Canadians delight, and which those women who frequent the forts learn to excel in.

The next afternoon, when we awoke we found the old chief from Fort Yukon waiting to see us. After a liberal present of tobacco and a tin cup, he returned the compliment by a small piece of very fat moose meat. The old fellow's name was *Sakhni-ti*, which the traders have corrupted into Senatee. The heat was so extreme that we deferred our start until half past eight in the evening.

Sunday, 23*d*. — We stopped for tea and rest twice; and when opposite the mouth of the Porcupine River we delayed a few moments, to set the colors and load our fire-arms. Rounding a bend of the river, about noon we saw the white buildings of the fort on the right bank, about a mile above the mouth of the Porcupine. We gave them a hearty salute, which was returned by a fusillade from a large crowd of Indians who had collected on the bank. Landing, we received a cordial greeting from an old French Canadian and two Scotchmen, who were the only occupants. The commander and Antoine Houle were daily expected, with the remainder of the men and the annual supply of goods from La Pierre's house, by way of the Porcupine River.

We were shown to a room in the commander's house, where we deposited our baggage; and, after putting our boat and equipment in safety, we turned in for a good nap.

The journey, exclusive of the time spent at Nowikákat and Kaménsikhter, had occupied less than twenty-seven days, and the distance travelled we estimated as about six hundred and thirty miles. In a straight line the distance from Nuláto to Fort Yukon is over four hundred and eighty miles.

We were much elated at the successful issue of our journey, and I confess to having felt a pardonable pride in being the first American to reach Fort Yukon from the sea.

This trading-post was founded by McMurray in the season of 1846–47, and the original fort was a mile or more farther up the river. The present fort was commenced in 1864, and at the time of our visit needed only the erection of a stockade to complete it. The cause of the change of location was the undermining and washing away by the river of the steep bank on which the old fort was built. At this period, the old houses had been removed, and some of the remaining foundation-timbers projected far over the water.

FORT YUKON, IN JUNE, 1867.

The present buildings consist of a large house, containing six rooms, for the commander; a block of three houses, of one room each, for the workmen; a large storehouse; a kitchen; and four block-houses, or bastions pierced for musketry, at the corners of the proposed stockade. Outside of the fort is a small house of two rooms, belonging to Antoine Houle the interpreter.

All the houses were strongly built, roofed with sheets of spruce bark pinned and fastened down by long poles. The sides were plastered with a white mortar made from shell-marl, obtainable in the vicinity. Most of the windows were of parchment, but those of the commander's house were of glass. The latter was provided with good plank floors, and the doors and sashes were painted red with ochre. The yard was free from dirt, and the houses, with their white walls and red trimmings, made a very favorable comparison with any of those in the Russian posts.

The fort is situated about two hundred miles from La Pierre's House, by the Porcupine River, the journey there and back being performed in about twenty days. Further particulars in regard to its geographical position will be found elsewhere. The inhabitants are all employés of the Hudson Bay Company. Most of them are from the Orkney Islands and the north of Scotland, while a few are French Canadians, with a mixture of Indian blood. At this time the garrison consisted of Mr. J. McDougal the commander, and six men, of whom four were Scotchmen. The Rev. Mr. McDonald, a missionary of the Established Church, was also expected with the boats.

The next day we got up a good breakfast, and invited the three men who had received us. The repast consisted of flapjacks, bacon, tea with sugar, and moose meat. As several of them had been some years without tasting bread, it may be imagined this was a rare treat to them. The fare for men and dogs at this place is the same, i. e. dry moose meat alternating with dry deer meat, occasionally varied by fresh meat of the same kind, and the slight supply of game and fish which is now and then obtainable. The trading-goods which are designed for this point take two years in transportation from York Factory on Hudson Bay. One portage of over fifty miles has to be made, between Fort McPherson, on Peel River, to La Pierre's House on the Upper Porcupine. Here the goods are carried on sleds in winter, across

the high, rough, and broken table-land between the two rivers. On account of these difficulties in transportation, few provisions are ever sent to this isolated post. These few find their way to the table of the commander, or to the Indian tyones who bring large quantities of furs to the annual trade. The men should receive three pounds of tea and six of sugar, annually, to flavor their diet of dry meat; but I was informed that this supply was exceedingly irregular, and often failed entirely.

The Indian chiefs often obtain a small present of tea, sugar, or flour, but the latter is quite inaccessible to the men, except through the favor of the commander. These men are allowed two suits of clothes annually, if the supply holds out; but for anything else they must wait until the furs are all purchased, and then, if anything remain after the Indians are satisfied, the men are allowed to purchase. Even if by their own skill they trap furs enough to buy articles of clothing, the Indians still take the precedence. They are allowed to purchase what they can from the Indians, but must turn it all in to the Company, and, if they need it, must buy it at Company's prices. The standard of value is the beaver-skin. One "made beaver," as they express it, is worth two shillings, or two marten skins. A man buys a dressed mooseskin, to make moccasins of, at its regular value of two "made beaver," or four shillings. He cannot set his wife at work making moccasins, but must sell it to the Company for what he paid the Indians, and buy it back for *twenty* shillings, which is the Company's selling-price. If he does not do this he is liable to lose all his past earnings which happen to be in the Company's hands, and take a flogging beside from the commander. Every effort is made, to make these men marry Indian wives; thus forcing them to remain in the country by burdening them with females whom they are ashamed to take back to civilization, and cannot desert. They perform a larger amount of manual labor for smaller pay than any other civilized people on the globe.

The hardships and exposures to which they are subjected are beyond belief. In fact, the whole system is one of the most exacting tyranny; and only in the north of Scotland could men of intelligence be found who would submit to it. The systematic way in which the white "servant of the Company" is ground down below the level of the Indians about him, is a degrada-

tion few could bear. They are not even furnished with good tools. The Hudson Bay axe is a narrow wedge, which an American lumberman would reject with contempt. The Hudson Bay knives — at least such as I saw at Fort Yukon — are so worthless that even the Indians prefer to buy files, and

Knife of Kutchin manufacture.

manufacture their own knives from them. The guns are all flint-locks of the most miserable description; and this rubbish must be bought at treble its value by the Hudson Bay voyageur, in a country where the axe and gun are a man's right and left hands! There is some comfort in reflecting that a few years will put an end to this. Free traders already pass through the greater part of the Hudson Bay territory without restraint, and they will not be long in reaching a district so rich in valuable furs as that of Fort Yukon.

The sun was so intensely hot that in the middle of the day we could do nothing, but during the cooler hours much of interest was added to my collection and my companion's portfolio. At noon, out of the direct rays of the sun, one of Greene's standard thermometers stood at 112° Fahrenheit. The men informed me that on several occasions spirit thermometers had burst with the heat. In the depth of winter the spirit falls sometimes as low as sixty-eight and sixty-nine below zero, making a range for the year of one hundred and eighty degrees Fahrenheit! Nevertheless, potatoes, turnips, lettuce, and other hardy garden vegetables mature during the short hot summer, and barley was said to have succeeded once, but only reached a few inches in height.

We were very well pleased to hear from an Indian runner that the boats were not far off. On the 26th of June, Messrs. McDougal, McDonald, and Sibbeston arrived with the bateaux. The latter were about forty feet long, nine feet beam, and drew two and a half feet of water. They are well adapted to the navigation of the Porcupine, which is full of shoals and sandbars, and they brought a load of nine thousand pounds each from La Pierre's House.

We invited the commander and Mr. McDonald to be our guests for the day, and did our best to provide a good dinner. We found them to be typical Scots,— quiet, reserved, cautious, but hospitably inclined. Antoine Houle the interpreter, who arrived with them, was of mixed French and Indian blood, and was a thorough voyageur. More independent than most of the Company's servants, he had his house to himself outside of the fort; and like many of his Indian cousins, deaf to the remonstrances of the missionaries, had provided himself with one more wife than is usual in civilized countries. This was the more excusable, as the poor fellow suffered from ossification of the knee-joint, and could do but little to help himself. His house was always open to every one, and was a noted resort of the Indians, with whom he was a great favorite. With them he could talk in their own dialects, while the usual mode of communication between the whites and Indians in this locality is a jargon somewhat like Chinook, known by the name of "Broken Slavé." The basis of this jargon, which includes many modified French and English words, is the dialect of Liard River. The native name of the tribe called Slavé is *Achéto-tinneh*, or "People living out of the wind."

The next business for Mr. McDougal, after storing his goods, was the annual trade. Every spring the Yukon, and other Indians who do not trade with the Russians, assemble at Fort Yukon, there await the arrival of the boats with the new supply of tobacco and goods, and then do their trading. After this is over, the furs are put into a large press, which is a conspicuous object in the yard, and pressed into bundles weighing about ninety pounds each. These bundles are covered with beaver-skins of the poorest class, and are pressed so solid by means of wedges that, even if dropped into the river, the water will not penetrate them. Each bundle contains a certain number of marten or fox skins packed in beaver; they are bound with rawhide cut in strips known as "babiche," and each bundle is called a "piece."

After the trade is over and the furs are packed, they are taken in the boats to La Pierre's House, and the boats return empty. Any remaining goods are laid aside, and sent down the river in the following spring to Nuklukahyét. During the remainder of the year but little trading is done, and months pass without an

Indian visiting the fort. A certain amount of tobacco is distributed among the men, and a certain amount is cached, in order that they may not be entirely without the article in the spring. The flint-lock guns sold by the Hudson Bay Company are preferred by the Indians to percussion guns, as caps are not always obtainable, while a flint may be picked up on any beach. These guns are valued at forty marten skins. They cost five dollars apiece, and the skins will average one hundred and fifty dollars in total value.

On the afternoon of the 27th a shout was raised that the Tananáh Indians were coming. On going to the beach, some

Sakhniti.

twenty-five single canoes were seen approaching. The occupants kept perfect time with their paddles, advancing in three platoons, and passed over the water as swiftly and beautifully as a flock of ducks.

Sakhníti, the chief of the Kutchá Kutchin, or Fort Yukon Indians, stood on the bank dressed in his gayest costume, with a richly embroidered blue blanket wrapped about him. He hailed the foremost canoes as soon as they were out of the current. After a harangue of a few minutes a fusillade was commenced by

the Indians on shore, and returned by those in the canoes, after which they landed. The Tenán Kutchin (people of the mountains), or Indians of the Tananáh, are known to the Hudson Bay men as Gens des Buttes. They are without doubt the tribe of all others which has had the least to do with the whites. No white man has yet explored the river on which they live. We only know that its head-waters are not very far from Fort Yukon, and that its general course is parallel with the Yukon. It is represented as running between mountains, and obstructed with rapids and cascades. The Tenán Kutchin are regarded with fear by the adjacent tribes, and are doubtless a wild and untamable people. Their numbers are supposed not to exceed one hundred and fifty families. Of their mode of life nothing is known, except that they obtain their subsistence principally by hunting the deer. No women accompanied this party. They were all dressed in the pointed parkíes, which were once the universal male dress of the family of Tinneh, and from which they have been called Chippewayans, meaning "pointed coats." These coats were ornamented in the same manner with beads or quills as the dress of the male Koyúkuns, already described. Their parkies and breeches were smeared with red ochre. All wore the dentalium nose-ornament previously noted. The most striking peculiarity about them was their method of dressing their hair. Allowed to grow to its full length, and parted in the middle, each lock was smeared with a mixture of grease and red ochre. These then presented the appearance of compressed cylinders of red mud about the size of the finger. This enormous load, weighing in some of the adults at least fifteen pounds, is gathered in behind the head by a fillet of dentalium shells. A much smaller bunch hangs on each side of the face. The whole is then powdered with swan's-down, cut up finely, so that it adheres to the hair, presenting a most remarkable and singular appearance. The dressing of grease and ochre remains through life, more being added as the hair grows.

The fat is soon rancid, and a position to leeward of one of these gentry is highly undesirable. This method of dressing the hair is peculiar to the men. Among civilized nations such practices are confined to the fairer sex. The gulf between pomatum with gold powder and tallow with red ochre is not as wide as it seems at first sight; and the addition of swan's-

down is a suggestion which is worthy of consideration by the ladies.

The tribes now represented at the fort, beside the Kutchá and Tenán Kutchin, were the following: the *Natché Kutchin*, or Gens de Large, from north of the Porcupine River; the *Vuntá Kutchin*, or Rat Indians, from farther up the Porcupine; the *Han Kutchin* (wood people), or Gens de Bois, from the Yukon, above Fort Yukon; and finally, the *Tutchóne Kutchin* (crow people), or Gens de Foux, from still farther up the Yukon.

The tribes resembled each other in appearance and dress. They all belong to the family of Tinneh, which is their name for "people." Their habits of life differ somewhat according to locality, but none have settled villages, — carrying their deerskin lodges wherever food is most abundant.

Those who live in mountainous districts, hunting the active deer from summit to summit, are notably the most savage and unruly. Those who live by hunting the more phlegmatic moose, which inhabits the lowlands, are much more docile. Their languages are similar in construction and roots, though not in the forms of many words. The dialect of the Upper Tananáh assimilates closely to the Kutchin languages, while that spoken near Nuklukahyét resembles more nearly the Ingalik. The Tananáh Indians brought the news of the body of a white man having been found in the river below.

A sad event had happened at Fort Yukon in the early spring. A young man named Cowley had been acting as clerk at the fort, and at the time of the freshet was shooting geese on an island across the river. He had crossed in a large canoe with one of the men employed at the fort. He was a new arrival, and not accustomed to the mode of life, and was therefore subjected to many practical jokes from the old voyageurs. Wishing to return, he could not find the canoe, and supposing that some trick had been played upon him, the two embarked in a very small single canoe and attempted to cross. The river was full of ice, and nothing more was ever seen of them. The wrecked canoe which we had passed in the Ramparts was doubtless the one in question. The Rev. Mr. McDonald, being informed of the Indian rumor, immediately started down the river with a companion, to investigate the matter, and if necessary to perform the last rites over the remains.

Among the chiefs at the fort was a man of remarkable intelligence, who had been of great service to the whites on various occasions. He went by the name of Red Leggins, and possessed great influence among the Indians. I applied to him for assistance in obtaining ethnological specimens and vocabularies, and improved the opportunity by taking his portrait.

On the 29th of June we were called out by the Indians, who said that Ketchum was coming. Two canoes were seen in the distance, and before long we had the gratification of shaking the hands of our fellow-explorers, and offering them our hearty congratulations on the complete success of their arduous explorations. They had arrived safely at the site of Fort Selkirk, and brought back as a trophy a piece of one of the blackened timbers which remained. They reported the river to be open to navigation up to that point; but just beyond it was a rapid, where a portage would be necessary. The country was a fine one, well timbered, abundantly supplied with moose and game, and inhabited by friendly Indians. An enumeration of the obstacles which they had encountered would be out of place here, but it may fairly be said that only extreme patience, endurance, indefatigable energy and courage, could have surmounted them. They were principally, however, not such as would impede a well-provided party of regular explorers. We "laid ourselves out," in California parlance, to get up a good dinner for our friends; what with this and the interchange of news and information, it was well into the next day before we sought our pillows.

Mr. McDonald returned, having determined the body to be that of Ward, Cowley's companion. He had buried it near the point where it was found.

After the trade, which occupied several days, we obtained the necessary goods to pay our Indians for the trip. To those who had come up with us from Nuláto we gave each a gun; the Nuklukahyét man received a good capôte; and we gave a knife, shirt, and powder-horn to Bidárshik.

Our diet while at the fort consisted chiefly of boiled dried meat, which when cooked resembles in flavor and stringiness a boiled skein of yarn.

Mr. McDonald during our stay performed several services among the Indians. He was an earnest and well-disposed man,

RED LEGGINS.

a fair type of most missionaries to the Indians. His discourses were rendered into broken Slavé by Antoine Houle. In the evening the Indians, old and young, gathered in the fort-yard and sang several hymns with excellent effect. Altogether, it was a scene which would have delighted the hearts of many very good people who know nothing of Indian character; and as such will doubtless figure in some missionary report. To any one who at all understood the situation, however, the absurdity of the proceeding was so palpable that it appeared almost like blasphemy.

Old Sakhnîti, who has at least eighteen wives, whose hands are bloody with repeated and most atrocious murders, who knows nothing of what we understand by right and wrong, by a future state of reward and punishment, or by a Supreme Being, — this old heathen was singing as sweetly as his voice would allow, and with quite as much comprehension of the hymn as one of the dogs in the yard.

Indians are fond of singing: they are also fond of tobacco; and for a pipeful apiece you may baptize a whole tribe. Why will intelligent men still go on, talking three or four times a year to Indians, on doctrinal subjects, by means of a jargon which cannot express an abstract idea, and the use of which only throws ridicule on sacred things, — and still call such work spreading the truths of Christianity?

When the missionary will leave the trading-posts, strike out into the wilderness, live with the Indians, teach them cleanliness first, morality next, and by slow and simple teaching lead their thoughts above the hunt or the camp, — then, and not until then, will they be competent to comprehend the simplest principles of right and wrong. The Indian does not think in the method that civilized men adopt; he looks at everything as "through a glass, darkly." His whole train of thought and habit of mind must be educated to a higher and different standard before Christianity can reach him.

The Indian, unchanged by contact with the whites, is in mind a child without the trusting affection of childhood, and with the will and passions of a man. Read by this standard, he may be fairly judged. One fact may be unhesitatingly avowed: if he can obtain intoxicating liquors he is lost. Neither missionaries nor teachers can save him while it is within his reach. A general

glance at the condition of the American Indians at this time conveys only one idea, which is, that the trader outstrips all restraints and that the whole race is irrevocably doomed.

In dealings with them they appreciate justice, but do not practise it, and they respect the strong arm alone. It has often been asked why the Hudson Bay Company has succeeded in its intercourse with the aborigines without the misery and bloodshed which has stained our western frontier. The inference has been as often drawn that it was owing to the justice which was characteristic of the Company's dealings with the Indians. That there is no foundation for this opinion I propose to show.

In the first place, while the Hudson Bay traders have had few contests with the Indians, still, in proportion to the number of whites, full as many Indian outrages have taken place as in the Western United States. The following from the pen of Bernard R. Ross, Esq., of the Hudson Bay Company, is pertinent to the question.* Speaking of the Eastern Tinneh, he says: —

"As a whole, the race under consideration is unwarlike. I have never known, in my long residence among this people, of arms having been resorted to in conflict. In most cases their mode of personal combat is a species of wrestling, and consists in the opponents grasping each other's long hair. This is usually a very harmless way of settling disputes, as whoever is thrown loses; yet instances have occurred of necks having been dislocated in the tussle. Knives are almost invariably laid aside previous to the contest. Some of them box tolerably well; but this method of fighting does not seem to be generally approved of, nor is it much practised. On examination of the subject closely, I am disposed to consider that this peaceful disposition proceeds more from timidity than from any actual disinclination to shed blood. These Indians, whether in want or not, will take the life of any animal, however useless to them, if they be able to do so, and that they can on occasion be sufficiently treacherous and cruel is evinced by the massacre at St. John's, on Peace River, and at Fort Nelson, on the Liard River. It may not be out of place here to give a brief account of the latter catastrophe.

"In 1841 the post of Fort Nelson, on the Liard River, was in charge of a Mr. Henry, a well-educated and clever man, but of a hasty temper and morose disposition. While equipping the Indians in the autumn he had a violent dispute with one of the principal chiefs of the

* From the annual Report of the Smithsonian Institution.

Bastard Beaver Indians resorting to the establishment, who departed greatly enraged, and muttering suppressed threats, which were little thought of at the time. In the winter a 'courier' arrived at the fort to inform the whites that there were the carcasses of several moose deer lying at the camp ready to be hauled, and requested dog-sleds to be sent for that purpose. Mr. Henry, never in the least suspecting any treachery, immediately despatched all the men and dogs that he could muster. On their way out they met an Indian, who told them that they had better turn back, as the wolverines had eaten all the meat. This information, as it turned out, was given from a friendly motive; but fear of ulterior consequences to himself prevented the man from speaking more plainly. The fort interpreter, who was of the party, took the precaution to carry his gun with him, and when they drew near to the path which led from the bed of the river to the top of the bank, where the Indians were encamped, he lingered a little behind. On the others mounting the ascent, they were simultaneously shot down, at one discharge, by the natives, who were in ambush awaiting them. When the interpreter heard the shots he was convinced of foul play; he therefore turned and made for the fort as quickly as he could, pursued by the whole party of savages, whose aim was to prevent him from alarming the establishment. The man was a famous runner, and despite the disadvantage of small snow-shoes, which permitted him to sink more deeply than the Indians, who, on their large hunting snow-shoes, almost skimmed over the surface of the snow, he would have reached the houses before them, had not the line that confined the snow-shoe on his foot broken. His enemies were too close upon him to allow time for its repair; so, wishing to sell his life as dearly as possible, he levelled his gun at the nearest Indian, who evaded the shot by falling upon his face, whereupon the whole party despatched him. After perpetrating this additional murder the band proceeded to the fort, which they reached at early dawn. A poor old Canadian was, without suspicion of evil, cutting fire-wood at the back gate. His brains were dashed out with their axes, and they entered the establishment, whose inhabitants, consisting, with one exception, of women and children, were buried in profound repose. They first opened Mr. Henry's room, where he was asleep. The chief pushed him with the end of his gun to awaken him. He awoke, and seeing numerous fiendish and stern faces around him, made a spring to reach a pair of pistols that were hanging over his head; but before he could grasp them, he fell a bleeding corpse on the bosom of his wife, who, in turn, became a helpless victim of the sanguinary and lustful revenge of the infuriated savages.

Maddened by the blood, they next proceeded to wreak their vengeance on the innocent women and children, who expired in agonies and under treatment too horrible to relate. The pillage of the stores was the next step, after which they departed, leaving the bodies of the dead unburied. No measures further than the abandonment of the fort for several years were taken by the Northwest Company, to whom the establishment belonged, to punish the perpetrators of the atrocious deed; yet it is a curious fact that when I visited Fort Liards in 1849, but one of the actors survived, all the others having met with violent deaths, either by accident or at the hands of other Indians. This man, who was at the time only a lad, confessed to have dashed the brains out of an infant, taking it by the heels and swinging it against the walls of the house."

This, and the long list of forts pillaged by the Indians or abandoned on account of their hostility * by the Hudson Bay Company, is sufficient to show that their occupation has not been wholly peaceful. But little has been said of these outrages, as it was evidently for the interest of the Company that they should not be talked about.

It must also be noticed that the policy of the Company has always been to put as few men as possible in these trading-posts. A very few white men can go in safety where a large body would instantly excite hostilities. After the fort has been in operation for years, and a demand created for tobacco and other articles, the Indians feel that it is to their advantage to have them there, and the whites in small numbers no longer excite their jealousy. Then, whenever a new post was established, the influential chiefs were handsomely provided with presents, the whites in the fort were kept in subjection to the extent already described, going about in rags, while the Indians obtained broadcloth and clothing of every description for their furs. This obvious superiority pleased the vanity of the savage. Little or no retribution followed the outrages previously mentioned. In some cases presents were plentifully distributed to appease their anger, and any offence toward an Indian was severely punished. The self-respect of the white man was sacrificed to the desire of obtaining furs. Lastly, the most warlike and bloody tribes had been reduced to comparative quietness in the early colonial wars.

* This includes Forts Selkirk, Pelly Banks, Dease, Frances, Babine, Peace River, and others, — all burnt or pillaged and abandoned.

On the other hand, the Indians of the western plains were races more vigorous and active than their northern congeners. They were met by large bodies of pioneers, bent on settling and occupying the territory. Indian outrages, provoked or unprovoked, met with speedy return from the colonists, and matters were still further complicated by the recognition of the hypothetical authority of the chiefs by the government. Promises were made by the former, of which they had not power to enforce the fulfilment by the Indians, who were erroneously supposed to obey them. The pernicious system of making presents to the chiefs, the introduction by traders of intoxicating liquors, and, above all, the failure of the government in any instance to enforce respect by its strong arm, have created an animosity which will die out only with the Indians themselves.

It would seem brutal to advise force as a civilizer, but the Aleuts, who were thoroughly crushed and subjugated by the early Russian traders, and subsequently by the Russian American Company, are to-day the only large body of aborigines in America who give any promise of ultimate civilization.

After the trade was over, we had an opportunity of looking at the results. It was a sight seldom witnessed by others than traders. The large loft over the store-house was literally overflowing with valuable furs. Among other trophies of the chase were forty-five silver foxes. The commander confessed to five thousand sables purchased the previous year. The men in the fort said that the amount was nearer eight thousand, with half as many beaver, and five hundred foxes of all kinds. Few otter, and very few mink are obtained here, but black bearskins, dressed mooseskins, and black and silver foxes are especially abundant. The value of the furs annually obtained at this post cannot be estimated as less than fifty thousand dollars.

We decided to start down the river on the 8th of July. The women in the fort were very busy filling orders for moccasins, and other specimens of their work, which we designed for friends below. I was indebted to one of the men for a fine pair of otter-skin mittens, which have since done me good service. Ketchum decided to take a small boy, Jean Baptiste by name, who was well qualified to act as interpreter with several tribes of Indians. He spoke comparatively little English, but

understood Canadian French, having a little Canadian blood in his veins.

The commander coolly proposed to Ketchum that he should kidnap, iron, and send back to Fort Yukon the unfortunate runaway McLeod! However, we let it pass without remark, for we were under great obligations to Mr. McDougal for hospitality shown us, and assistance rendered in paying our men. Ketchum arranged it so that, in going back, Whymper and Mike should take the bidarrá, while he and I had each a large birch canoe, with Indians fore and aft to paddle it. Having got everything on board, we shook hands and bade our kind entertainers good by. About two o'clock in the morning of the 8th we left Fort Yukon behind us. A tremendous firing from the assembled Indians announced our departure, and we returned the compliment to the best of our ability.

Travelling down stream is always easy. Our journey seemed easier still as, in the broad channel, out of reach of the mosquitoes, we drifted on without impediment at the rate of four or five miles an hour. Points appeared, were passed, and faded out of view, almost without our perceiving it; while between them, going up, we had passed many hours of hard paddling in the hot sun. No sand-bars or shoal water obstructed our progress anywhere, except where the swift current brought us close to the bank. We tied our canoes together, and floated down, sometimes sleeping, and often in a revery which recalled the lotus-eaters of the Nile. We did not camp anywhere. We boiled the chynik and cooked our meals ashore, and, pushing out into the broad stream, ate them while calmly drifting with the current. Sometimes the mosquitoes would try to follow us, and we could see them vainly endeavoring to make headway against the fresh breeze usually to be found in midstream. They were always unsuccessful, and we discarded our nets and laughed at the discomfited insects. About three o'clock in the afternoon of the 9th we re-entered the Ramparts, and here, in the swifter current, our progress was more rapid.

Large fires were burning in the forests, and on the sides of the hills. They had been kindled by some neglected camp-fire, and spread rapidly over the mossy sod and leaves dried by the midsummer sun. The smoke hung over all the country, obscuring everything with a lurid haze.

About six o'clock on the afternoon of the 10th we passed the Rapids. The water had fallen, and we should not have known the place but for the Indians. One of the party refused to believe it. A long island of rock, smoothed by the water, divided the river, which flowed smoothly but with great swiftness on either side. The riffle which had attracted most of our attention had been caused by an insignificant ledge of rock, now bare. The difference between the level of the ice in winter and extreme high-water mark, as indicated on the rocks, cannot be much less than thirty feet. Some distance below we found the Nuklukahyét chief and his people fishing for salmon with large hand-nets. The little canoes sailed down stream with the current, the Indians keeping in line like soldiers, and joining in a monotonous but not discordant chorus. At a given signal, all plunged their nets below the surface, and on raising them a great salmon frequently was seen struggling in the meshes. In this case all joined in a derisive shout and song. The dried meat which the chief had promised was not forthcoming. A "cash" business is the only safe one with Indians. They never pay old debts, giving as a reason that the articles purchased are already worn out.

We had a good deal of amusement chasing the young geese. Their wing feathers not being grown, they could not fly; but they were very expert divers, and were beneath the water almost as soon as the cap flashed. We obtained quite a number, and found them very delicate eating. We passed numerous fishing-camps, where the banks were red with the salmon, split and hung up to dry.

About eight o'clock on the evening of the 12th we arrived at the bluffs above Nuláto. Here old Yagórsha, the Yakút, was fishing, and hailed us from the bank. He told us that the whole of Russian America had been bought by an American company, and that an American ship and steamer were already at the Redoubt! The pleasure which we felt at this intelligence was marred by doubts of its truth; but, passing on, about ten o'clock we arrived at Nuláto. Here the air resounded with the discharges of cannon, which welcomed our return. Indians and Russians vied in the expenditure of gunpowder, and the enthusiastic Kurílla used up all his ammunition in returning the salute.

Our delight was soon damped, however, by an incomprehensible order which awaited us. This instructed us to trans-

mit, without delay, all movable property belonging to the Telegraph Company to the Redoubt. Various rumors about the sale of the country were current among the Russians. Nothing was certain, and one of them remarked to me with a sneer, "Perhaps, Gospodin Doctor, it is the Americans, and not the Russians, who are about to march!"

The Koyúkuns occupied the beach, fishing, and with characteristic insolence took fish out of the Russian nets before their eyes. The latter were too few in number to resent the insult, the bidárshik and two men being absent at the Redoubt.

We proceeded to carry out our instructions, purchasing the large Russian bidarrá, putting all the collections and other valuable property aboard, and hiring six men to accompany us to the sea-coast. Near midnight, July 15th, we started down the river, full of anxiety, not knowing what changes were at hand.

The river was lined with Indian fishing-camps laying in the winter supplies of úkali. Had we possessed the necessary trading-goods and transportation, we might have bought thousands of salmon.

On the night of the 17th we saw the first star visible since the end of April. On the 19th of July, about eleven o'clock at night, we felt a shock as if we had struck a snag. Next morning we arrived at the Russian mission of the Greek Catholic Church. There we learned that there had been an earthquake shock in the night, of sufficient severity to throw down books and other articles from the shelves on which they were placed. The priest, or "Pope" as the Russians call him, with most of the Russians who belonged here, was absent at the Redoubt. In this part of the river the channel is deep enough for vessels of any size. It is extremely broad, the low left bank being sometimes barely visible. Sloughs and innumerable islands characterize this portion of the Yukon.

The weather was much of it hot, cloudy, and disagreeable, with occasional rain, forming a marked contrast to that which we had experienced farther inland. The white-winged gull (*Larus leucopterus*) replaces the familiar silver gull (*L. argentatus*) of the Upper Yukon. On the morning of the 22d we saw numerous leopard seal (*nerpa*) sporting in the river. Seal have been

occasionally seen at Nuláto, and on one occasion a white whale or *Beluga* was killed only a few miles below Nuláto, at least four hundred miles from salt water. About five o'clock the same day we reached the post of Andréaffsky, occupied by two men only, one of them a native. The other received us as hospitably as his means would allow, and spread us a repast of salted salmon and bread. We made his heart glad by a present of some tea, as his own supply was exhausted, and borrowed his assistant to guide us to the Uphóon, or northernmost mouth of the Yukon, by which the sea-coast is reached. A strong breeze arose, and we scudded before it, reaching the Uphóon and dismissing our guide about three o'clock the next morning.

About noon we reached a Russian house at Kútlik, whose inmates were absent at the Redoubt. Five channels leading in different directions misled us, and we pulled nearly ten miles up a small river, until the tide turned and we saw our mistake. The next trial was more successful, and we soon reached Pastólik, an Eskimo village opposite the Uphóon-mouth, where we camped ashore for the first time since leaving Nuláto.

The next morning we divided our load, hiring another bidarrá and some Unalígmut Eskimo to assist us in our voyage along the sea-coast to St. Michael's. At noon we reached Point Románoff, the Cape Shallow Water of Cook. This is the only hill or landmark north of Cape Románzoff on the coast. Here is a small village of a few huts, where we purchased some fish and game.

About two o'clock in the morning of the 25th we reached the southeastern entrance of the Canal between St. Michael's Island and the mainland. Here we stopped and arrayed ourselves in apparel more suitable for civilized society. We tracked through the Canal, hoisted our flags, and bore away for the Redoubt with a light wind. Here we arrived about noon of July 25th, finding all the members of the exploring and constructing parties gathered to receive us. The news was soon told.

The Atlantic cable was a triumphant success. The United States were in negotiation for the purchase of Russian America. Our costly and doubtful enterprise was abandoned, and the bark Clara Bell was soon expected, to take all hands to San Francisco. The ill-fed and hard-worked constructors hailed their

deliverance with joy; but the weather-beaten explorers, with their carefully matured plans for more thorough and extended explorations during the coming year, felt a regret and disappointment which could hardly be over-estimated, as with a few words these prospects were destroyed. There was, of course, nothing to be done but to pitch our tents on the beach, and there await the return of the vessel, now absent in search of the parties which had been left at Grantley Harbor, Bering Strait.

CHAPTER IV.

Arrival of the vessel. — Arrange to remain in the country. — Departure of the Clara Bell. — Mushrooms. — Plans for the season. — Start for Unalaklik. — The Major's Cove. — Voyage to Kegiktowruk. — Description of the casine. — End of the old bidarra. — Leave Kegiktowruk. — Crossing the bar of the Unalaklik River. — Send back for the goods. — Trip to Ulukuk. — Death of Stareek. — Bears and bear-hunting. — Geological reconnoissance, and discovery of fossils. — Return to Unalaklik. — Purchasing winter supplies. — Innuit of Norton Sound. — Tribes, physique, games, kyaks. — Disposition, morality, marriages, and infanticide. — Treatment of the women, and work allotted to the sexes. — Dress, labrets of the different tribes. — Property, method of computation, and map-drawing. — Fire-drills.— Weapons of bone, flint, and ivory. — Guns and trading. — Intercourse with Indians, and boundary lines of their territory. — Shamanism. — Patron spirits. — Interment of the dead. — Habits, and means of gaining subsistence throughout the year. — Dances and festivals. — Arrival of my new bidarra. — Sudden illness, and departure for the Redoubt. — Storm and detention at Kegiktowruk. — Proceed to the Redoubt on foot. — Return to Unalaklik. — Kill a deer. — Cowardly abuse of the natives by the Russians. — Kamokin and his barbarity to the sick. — Deaths in the village. — Making dog-harness.

A LONG month passed by and brought no signs of the ship. A party of seven bidarrás, manned with Okeeógemuts and other Bering Strait Innuit, arrived at St. Michael's. They brought the news that the Grantley Harbor parties had safely embarked, and departed. We began to fear that some accident had happened to the vessel. Our daily walk was invariably to the northeast bluff, whence we could look seaward. A pound of tobacco was promised to the first person who should see the ship. About three o'clock in the afternoon of the 18th of August an old woman came breathless from the bluff, saying the ship was coming. All started to confirm the report, which proved true, and the venerable Martha was made the recipient of more tobacco than she had ever before possessed.

It was the Clara Bell, and about eight o'clock she anchored in the bay. I had by this time become pretty well versed in colonial Russian, as spoken in the territory. I had also some knowledge of the Innuit and Indian dialects, and understood the mode of life

necessary in the Yukon Territory. I had formed my plans, and immediately took the opportunity of explaining them to Major George M. Wright, adjutant of the Expedition, and now in charge of all the men and materials which were to be shipped on board the Clara Bell.

A pretty thorough reconnoissance had been made of the geology and natural history of the Yukon above and at Nuláto, and on the shores of Norton Sound. The Lower Yukon and the delta had yet to be examined. I felt unwilling that the plans of Mr. Kennicott, so far carried on successfully, should be left uncompleted. I therefore proposed to carry them out alone, and at my own expense, and relied on Major Wright for the co-operation necessary to accomplish this arrangement. With his characteristic politeness he agreed to do what lay in his power. He could leave me no provisions, as they were already short of them. He could sell me, at the Company's prices, a small amount of trading-goods, and he would pay a certain proportion of the salary due me from the Company into the hands of Stepánoff (the chief factor of the Russian American Company at St. Michael's), who could furnish me with some trading-goods and a limited supply of provisions; while for the rest I must depend upon the natural resources of the country.

Explaining to Stepánoff that I had no desire to interfere with the fur-trade, he expressed himself willing to co-operate with me, and the proposed arrangement was carried into effect.

To my companions of the previous year, and to the officers of the vessel, I was greatly indebted for many articles useful in the country, and otherwise unattainable. The boy who had been brought from Fort Yukon was left in my care to be sent home. My mail was made up for transmission by the vessel to San Francisco; the Reports on the Medical Department and the Scientific Corps were placed in the adjutant's hands. The collections of the previous year were also sent aboard. I depended, for the means of reaching civilization again, on some passing trader or the annual store-ship of the Russians. On the 23d of August everything was concluded, and I went on board and bade all hands good by. I returned, with the boy Johnny and Stepánoff, in the Russian boat. About four o'clock in the afternoon the Clara Bell stood out to sea.

As I saw her white sails disappear in the distance I realized more thoroughly the loneliness of my position, and that I was the only person in the whole of that portion of the territory who spoke English. If I needed companions, I must seek them among alien convicts or Indians, in a foreign tongue.

Returning to my room in the fort, I soon stifled any feeling of regret by busying myself in putting on paper a brief sketch of my plan of exploration for the coming year.

Stepánoff called me, saying that there was no meat or other fresh provisions in the fort, and we must go out and get something for dinner. At first I took down my gun, but he informed me that it was unnecessary, and after walking a short distance he pointed out various fungi, which he assured me were eatable. They were of two or three species, all poisonous in our climate; but in this extreme northern region they proved to be innocuous and eatable, though quite tasteless.

During our walk we came to a definite conclusion on the subject of fur-trading. Stepánoff said that he did not believe in the rumor which prevailed as to the sale of the country; that his duty to the Russian American Company would compel him to prevent any one from trading except the authorized employés of the Company; that when the official information should arrive I might trade as much as I chose, but until then I must refrain. I assured him that trading was not my object in remaining in the country, and that I would not do anything of the kind until he had received definite information. The latter might be expected, if at all, by a midwinter courier from Nushergák to the Kólmakoff Redoubt on the Kuskoquím. Such couriers had been sent on rare and important occasions, and a mail was always sent to Nushergák from St. Michael's every December.

Stepánoff begged me to consider myself his guest while at the Redoubt, and offered to have any orders sent to Nuláto in regard to the building in which we had spent the previous winter, if I desired to use it during the coming season.

My plans were as follows: First, to examine the rocks along the shores of Norton Sound and across the portage as thoroughly as possible. Next, to take my trading-goods and such provisions as I could obtain to Nuláto; spend the winter in making explorations in that vicinity, and, if possible, make a winter visit to Kot-

zebue Sound ; to take a boat across the portage and descend the Yukon in the spring, examining the rocks carefully, and making as thorough collections as possible of specimens of natural history ; to spend some time at the Yukon-mouth ; and finally return by sea to the Redoubt, and there await some opportunity of getting a passage to Sitka or San Francisco with the collections.

I therefore requested Stepánoff to order Iván Pávloff to have the house put in thorough repair, the seams calked, floor put in order, and the peechka replastered. The building at Fort Kennicott was too large and too cold to be readily made habitable. The orders were sent by Kurílla, whom I engaged as my permanent assistant. He, with Antóshka and Tékunka, started for Nuláto *via* Unalaklík, in the three-holed bidárka in which Dyer had descended the Yukon. Kurílla was to get our dogs and sleds together, hire Indians, buy úkali for dog-feed, and meet me at Unalaklík as soon as the Yukon was ice-bound. Then we would proceed together to Nuláto. I furnished him with the necessary trading-goods for purchasing dog-feed and hiring Indians, and he departed in high spirits at the responsibility intrusted to him.

One day when Stepánoff was away shooting, on the marshes about the Canal, one of the Russians came to me with a sable, for which he wanted alcohol. I refused him, and added that I had promised Stepánoff not to purchase furs, and should keep my word. The meaning of truth and honesty is incomprehensible to these degraded wretches, and he still urged me, saying Stepánoff would never hear of it. As he did not take any notice of repeated refusal, I became at last so angry that I pitched him heels over head out of the door and down the steps, into the muddy courtyard, greatly to the amusement of old Martha, who had just previously brought in some work, and was waiting for her pay.

Life among the natives is far preferable to being surrounded by white men of such a despicable class. It is not to be wondered at that the knout and the brand were formerly in use in Russia. Nothing else would seem capable of inspiring a respect for the law in such minds.

My time was passed in running lead into balls, adding to the collection, and making general preparations for starting for Una-

laklík as soon as any natives should arrive from Pastólik, where they were hunting the beluga.

I accompanied Stepánoff on several of his shooting expeditions in the Canal, and secured a large number of geese, ducks, and swans. These are salted, and form an acceptable addition to the winter fare.

On September 22d I purchased my supplies, including six hundred pounds of flour, twenty-five of tea, fifty of sugar, and a variety of trading-goods. I also laid in a supply of crockery — a mug, plate, and bowl apiece — for myself, Johnny, and Kurílla. China ware is more precious in this part of the world than silver plate in more civilized localities. I also purchased fifty pounds of sukarée, and some large úkali for use on the road. Several Máhlemuts having arrived, I engaged them to accompany me to Unalaklík. I proposed to take the old bidarrá in which we had descended the Yukon from Nuláto. I had engaged to have a small bidarrá made at Pastólik and forwarded to me for use the coming spring; but it had not yet arrived. The old one was very large, and the lashings and covering very rotten. I hardly dared risk my invaluable trading-goods; but, taking counsel with some of the Innuit, we concluded that we could probably reach Unalaklík in safety with it.

My crew was composed of Johnny, a Máhlemut called Myúnuk, an old man whom I called New-Years, and a young Kaviágemut. The latter had an extremely stupid appearance, but was an excellent hunter.

On the 23d of September I put my goods on board, took a mail for the Russians at Unalaklík, and put to sea. The wind was hardly fair, and rather light, and I was obliged to beat across the southeast arm of the Sound, and put into the Major's Cove. I had hoped to reach Kegiktówruk, but the wind was adverse, and so high I could not risk it. Having pitched our tent under the shelter of the hill, I sent Johnny off to shoot ptarmigan, and rigged some fishing-poles, in hopes to catch some small fish, of a species known here as *waúch-ne*, a kind of tom-cod. Our success was not very great, but we got a mess for supper, and Johnny returned with an arctic hare which had already donned its winter coat of white.

The next day the wind was still high, and it was impossible to

get away. The anchor dragged so much that I was obliged to haul the bidarrá up on the beach. Our sail had proved too small, and we occupied ourselves in sewing on a strip of drill on each side. Having experienced the difficulty of transporting heavy goods by sleds to Ulúkuk, I hoped to get them to that point by water; but the ice was already forming in the ponds on the tundra, and I began to fear that the Unalaklík River would be frozen over before my arrival. The next day the weather was equally bad, and we were compelled to remain. Game and fish were both very scarce, and we lived principally on sukarée and tea, as I had no bacon.

On the 26th the wind was very variable and the waves very high. Toward noon it came from the westward, and against the wishes of the men I decided to start. Just as we left the cove some tremendous rollers came in, but we rode over them safely, and New-Years remarked, "The far-off wind has died away." Looking out to sea, I saw that the rollers mentioned above were the last, and the sea was quite smooth.

The wind grew fresher and fresher, being nearly a-beam. The coast between the cove and Kegiktówruk is rocky, with no landing-places. The wind increased and rain came in squalls. The darkness rapidly closed over us and the clouds were so heavy that the land was indistinguishable. For three hours I held the tiller, almost blinded by the rain, fearing every moment that the wind would haul ahead and drive us on the lee shore; my only guide in steering was the white line of breakers on the rock-bound coast. We passed a rocky point, known as Pallonoi or Burning Point, in safety, and about half past eight the moon suddenly broke through the clouds, revealing the three rounded hills which lie back of Kegiktówruk. We pulled into the cove, and I sent up to the village to obtain help in hauling up the heavy boat, but the inhabitants had gone to sleep or refused to come. We did our best to put her in safety, and went up to the casine, where we boiled the chynik and turned in.

The Kegiktówruk casine is the largest in the country. The annexed section gives an idea of its construction. Its area is about twenty-five feet by thirty, and its height fifteen feet from floor to smoke-hole. The entrance is similar to that of the ordinary houses, but at A is a second opening, by which the cavity beneath

the floor may be reached. In the middle of the floor is a hole (B) where, during their dances, the performers come up from below, not entering by the ordinary door at I. A portion of the floor about twelve feet square (FF) is composed of planks, which may be removed when it is desired to build a fire on the earth beneath. Broad planks about three feet and a half above the floor form seats (S) where the spectators may place themselves. The opening (L) in the roof is for the admission of light and egress of smoke. There are no other windows. The entrance (I) is usually closed by a hanging bearskin. The sides are of logs split in two and placed on end in the earth with the flat side inward. The roof is supported by large logs laid across so as to support each other. These are covered by a layer of small timbers, split, or hewn flat on one side; and the latter are

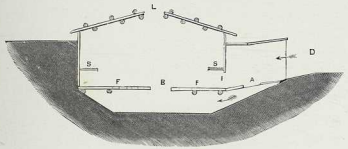


Diagram of Innuit casine.

kept in place by large timbers laid over them outside and attached by a saddle-joint at the four corners of the roof. The latter is covered with straw, and the straw with earth, pounded down hard, so as to be waterproof. There is not a nail or a pin in the whole structure, which is of the most solid description. Some of the logs are two feet in diameter, and the broad seats on each side, previously referred to, are each composed of a single plank forty-four inches wide, thirty feet long, and four inches thick. These enormous planks are from drift-logs, and were hewn with the stone axes of the natives.

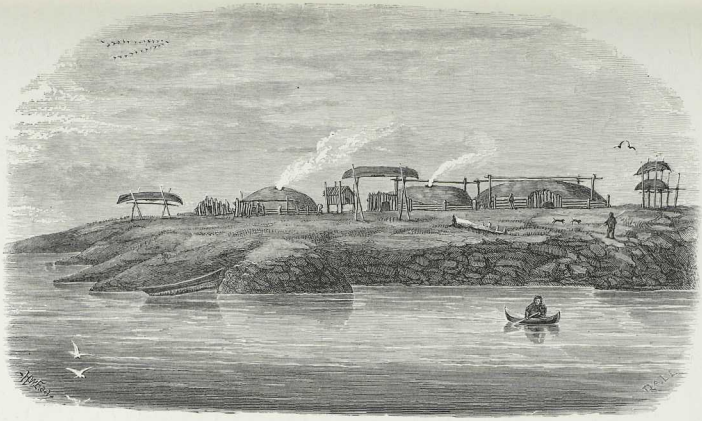
I was informed that, the old casine being decayed, all the Innuit of Norton Sound had joined in building the present one. Many logs were towed from distant parts of the coast. The whole work had occupied six seasons in construction, and had been standing about seven years.

The annexed sketch of the village was taken on the spot. On the right is the casine. There are several ordinary winter houses, which are on the brow of a high bank. Caches are scattered about, and stages, on which the kyaks are elevated out of reach of the dogs. In the engraving, the kyaks are represented too much curved upwards, fore and aft. They are nearly straight, except at the bow.

At the left of the houses is a mass of perpendicular timbers, projecting from the ground. This was the dwelling of an old couple, who died in the summer while the other inhabitants were away. Returning from the chase, rather than touch the bodies, they broke down the house over them, and filled it in with earth; a few projecting uprights are their only monument.

There is no beach, the cove is shallow and full of rocks, and the skin-boats must be hauled up on ways built for the purpose, of logs. The village is a very dirty one. Travellers are usually detained there by adverse winds. The inhabitants have no reputation for honesty, and it is in every respect the meanest place on the Sound. The principal support of the inhabitants is the seal-fishery, but in the fall reindeer abound in the vicinity. Our young Káviak started in search of deer, as the weather would not permit of our continuing the voyage. We started with a fair breeze about noon, but just as we had got well out of the cove the wind shifted dead ahead, and we had to put back.

The boat made so much water that I suspected a hole, and unloaded her. The Káviak and New-Years were away, and Myúnuk was sick; so I had an hour's hard work unloading her alone. I called some of the natives who were looking on to help turn her over. As soon as we raised one side the whole frame gave way, and the sides of the boat shut together like the leaves of a book! The sealskin lashings were quite rotted away, and only the weight of the goods had kept her in shape. Here was a quandary! There was only one bidarrá in the village, and she was very small and narrow. She belonged to an old man, who saw his advantage and used it. After long persuasion I induced him to lend her to me to take my goods to Unalaklík. He required for her hire an enormous price, more than the boat had cost him originally. He demanded his pay in advance, and his



KEGIKTOWRUK IN THE FALL.

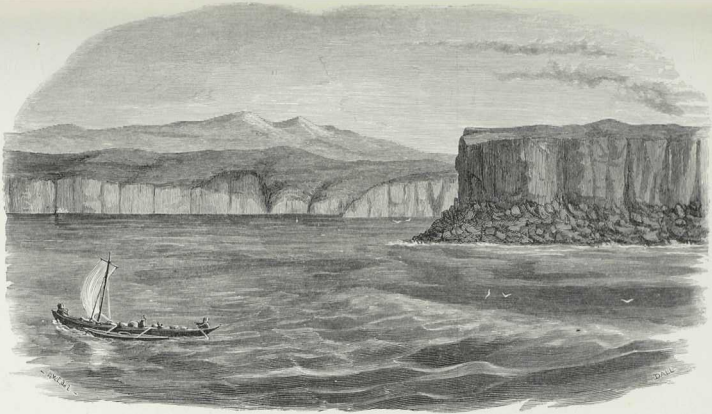
wife stood by him while I measured out the drill, powder, ball, and tobacco, and, as I gave him the required quantity of each, would exclaim, "It is too little, we must have more!" I was very much provoked, but there was no way in which I could help myself, and I was obliged to satisfy her avarice, and make her a present besides, while wishing her at the bottom of the sea. I then loaded the boat, but she was so dry that the water came in at all the seams, and I was obliged to unload her again. It was evident that I must leave a large part of my load at the village, and send back for it. I was very loath to do this, as the Kegiktówruk men are notorious thieves; but there was no help for it. Having picked out the most valuable part of the cargo, including the flour, sugar, tea, lead, and powder, I placed the rest in charge of the old man to whom the boat belonged. I then loaded up for the third time, after greasing the seams with tallow. This day's experience will give a faint idea of the annoyances sometimes endured, and the patience required, in travelling among these natives.

That afternoon an old acquaintance arrived, — a Máhlemut called Ark-hánnok, and his family. His bidarrá was so full that he could not take any goods for me, but he promised to send back his men and boat from Unalaklík, to fetch the goods I left behind. In the evening the absent Káviak returned with two haunches of venison on his back, having killed a deer. We had a good supper off them, and retired early. The next morning I rose at four o'clock and found the wind fair. We boiled the chynik and took a hasty breakfast, getting off about six. Our boat was very low, her gunwale amidships being only four inches above the water. She was so narrow and crank that we were obliged to lash a kyak alongside with two oars, as an outrigger. Even then the Innuit were unwilling to sail from point to point, but insisted on hugging the shore.

The wind was light, and we only reached Golsóva River by noon. We rounded Tolstoi Point with a fair breeze. At Topánika we landed, and found a Máhlemut chief, called Ark-na-pýak, camped with his family. Here we drank tea, and took on board a lad about twelve years old, whom we had named Tommy the previous year. He wished to go to Unalaklík, and to oblige the natives I offered him a passage. We started about three

o'clock, with a strong breeze from the southwest, wind coming in puffs with intervals. The water was perfectly smooth, and we sailed finely for some time. The wind grew stronger rapidly, and soon raised a sea which made me anxious. The tide was high, and the perpendicular sandstone bluffs rose direct from the water, the narrow beach being covered. There was no opportunity for landing until the bluffs were passed. The waves began to don their white caps, and occasionally tossed a handful of spray in our faces, as a foretaste of what was coming. I resigned the steering-paddle into the more experienced hands of old New-Years, and stood by him with another, in case that should break. I distributed tin cups to all hands, as I knew we should have to use them very soon in bailing.

The end of the bluffs was passed, but to my dismay I saw the long low beach piled with driftwood, forming an impenetrable *chevaux-de-frise* at high-water mark. Against it the waves were dashing. There was no choice but to go on. It was rapidly growing dark, but the mouth of the river was discernible. We managed, by constant bailing, to keep her free, though every tenth wave would throw in a dozen bucketfuls. The worst was yet to come. I knew that the sea would be breaking on the bar at the mouth of the Unalaklík River, where there is seldom over five feet of water. The only question was, could we pass through that line of breakers in safety? I hardly dared to hope we could. We already heard them roaring on the bar, and could see their white caps dimly. We were all so thoroughly drenched that we could be no wetter. The old Máhlemut never flinched. With his eye on the breakers, as we drew nearer and nearer, he sat silent and rigid as a carved image. The younger men crouched in the bottom of the boat. The little Eskimo lad looked frightened, but did not stop bailing for a moment. I threw off my hunting-shirt, and made ready for swimming. As we were just upon the breakers I glanced at the steersman. He moved not a muscle of his weather-beaten face. The next moment a crash announced that our outriggers were broken. I threw myself upon the kyak and, with the young Káviak, held it for a moment in place. The crest of the advancing roller struck us on the stern, deluging us with water, and before I had time to realize it another followed it, almost burying us; and for a second I thought



TOPANIKA AND TOLSTOI POINT FROM THE SOUND.

we were going down. She rose again, however, more than half filled; and shaking the water out of his scanty hair, the old man said calmly, "Here is the river, there is the fort." We were in smooth water. The last breaker had carried us over the bar.

All hands bailed for dear life, and as soon as we had freed the boat from a dangerous amount of water we pulled for the shore. Here we found ice, and were obliged to pull half a mile to find a landing-place. The Innuit shouted at the top of their lungs, and we were soon answered. Eskimo of all ages and both sexes came out from their dens, helped to haul up the boat, and unloaded her above high-water mark. I expected to find the flour and sugar, which were in bags, entirely spoiled. Pópoff, the Unalaklík bidárshik, finally awoke, and opened the gates. With the help of the natives, I carried the goods into the storehouse, dismissed the men, who took refuge with their friends in the village, and, quite exhausted, followed Pópoff into the casarmer. Here I stripped off my clothes. I had literally not a dry stitch on me, and there was about a gallon of salt water in each boot. Pópoff kindly supplied me with dry clothing, and we sat down around the hospitable samovar. I dare not say how many cups of fragrant tea I disposed of. I know the last was well among the "teens." The bed was only a plank and a blanket, but, with a tobacco-box under my head, I lost myself in a well-earned slumber.

The next day, thanks to the tea, I arose as fresh as ever, though not until nearly noon. My first act was to overhaul the goods. The tea I had taken the precaution to solder up in an empty tin before leaving the Redoubt. The powder was in tight cans. The lead of course was not injured by wetting. The flour, to my surprise, was but slightly wet. Water does not easily penetrate flour in the bags. Our clothes, except what were in tight seal-skin bags, and our blankets, were soaked. The sugar had suffered most. About half of it was well salted. This was a serious loss, but might be partly made good. Altogether we got off much better than I had dared to anticipate.

Pópoff, another Russian named Óstrofskoi, two native workmen, and a Creole woman comprised the entire garrison at the fort. Pópoff was a much pleasanter fellow than most of the Russians, and I got along with him very well. The village contained very few natives, most of them being still absent hunting

deer. The next day I secured Ark-hánnok's bidarrá, and despatched it with a crew of five to fetch the remaining goods from Kegiktówruk. On the night of October 1st they returned, to my surprise, with their load. The rascals at Kegiktówruk had stolen some thirty pounds of backfat and a hatchet. The remainder of the goods were safe.

The weather continued warm and rainy. A few days cleared the ice completely out of the river. I therefore made immediate arrangements for taking the heavy goods by water to Ulúkuk, thus saving time, and transportation over a very bad portage in winter.

On the 3d of October I took three men and the Kegiktówruk bidarrá, and started up the Unalaklík River. We found the current very strong and the water low. We drew, loaded, a foot and a half, finding occasional difficulty in crossing the sandbars.

Ingalik grave.

Ulúkuk, in a straight line, is only thirty-three miles from Unalaklík. By the river, which is more winding than the ancient Meander, it is at least double the distance, and probably more. On the morning of the 4th we reached Iktígalik. Here we found many of the Ingaliks. They wanted to go up in my boat to Ulúkuk, and attempted to detain me by all sorts of contradictory stories about the river. I had had some experience in estimating the value of such talk, and pushed on. Every night new ice formed in the river, and I used all my energy in travelling, in order that we might not be caught and frozen in. On the morning of the 6th we arrived at Ulúkuk. As we drew near we heard a low wailing chant, and Mikála, one of my men, informed me that it was women lamenting for the dead. On landing I saw several Indians hewing out the box in which the dead are placed.

On inquiry I found that our old acquaintance of the previous year, "Kaltág Stareek," had gone to his long home. He had been for many years the "oldest inhabitant," and was much respected by the Russians. The body lay on its side in a deerskin. The heels were lashed to the small of the back, and the head bent forward on the chest, so that his coffin needed to be only about four feet long.

We lost no time in putting the goods into an empty cache, covering them with walrus hide, and nailing up the door. During a long experience I have never known of goods being meddled with or broken open if properly secured, no matter how lonely the situation of the cache, or how long it remained unvisited. "A cache is sacred" is one of the axioms of the wilderness. This goes far to prove that the average of honesty among these Indians is higher than that which obtains among white men. The Innuit, as at Kegiktówruk, are occasionally less trustworthy.

The Ingaliks had just returned from a bear hunt. Bears are not uncommon in this part of the territory. There are three species: The large brown bear of the mountains, known as the "grizzly" among the Hudson Bay voyageurs; the barren-ground bear (*Ursus Richardsonii* of Mayne Reid), which is confined in Russian America to the extreme northeast; and the black bear, which frequents the vicinity of the Yukon, in the wooded district only. The polar or white bear is found only in the vicinity of Bering Strait, on the shores of the Arctic Ocean, and on St. Matthew's Island in Bering Sea. It has probably reached the latter locality on floating ice; we only know of its existence there from whalers, who apply the name of Bear Island to the locality, from the abundance of these animals. We know that it is not found on the mainland south of latitude 65°. The cubs of the black bear are of the same color as the parent, and the adult is very much smaller than its brown cousin, which sometimes reaches a length of nine feet, with a girth nearly as great. The brown bear, or grizzly, is the only one which manifests any ferocity, and it always avoids any contest unless brought to bay.

The manner of hunting it is as follows. After discovering its lair the natives carefully measure the opening. Timbers of the requisite length, and from four to six inches in diameter, are carefully cut, and carried to the vicinity. During the day, when the

bear is known to have returned to the cave, the Indians collect in large numbers, and approach with the utmost quietness, each carrying a timber or a large stone. The timbers are then fitted into the mouth of the den, forming a barricade, and stones in large numbers are piled up against them, only leaving an opening about a foot square. Burning brands are then thrown in to arouse the animal, who puts his head out of the opening, which is too small for egress. A volley of balls soon puts an end to his existence. After satisfying themselves of his death, the hunters remove the barricade, and divide the body among themselves. The skin is valuable only as a rug or bed, or to hang in the doorway of a lodge to exclude the cold.

The Indians were anxious that I should pass the night at Ulúkuk; but, fearful of being frozen in, I decided to return without delay. Coming up, while examining the rocks I discovered a fossil elephant tusk about eight feet long on one of the bars in the river. I put it up on end in order to see it and take it with me on my return. A snow-storm came on, which obscured everything, so that we passed down without seeing it, and arrived at Iktígalik about seven in the evening. The next morning we left Iktígalik about nine o'clock, and half-way down came upon the three-holed bidárka which Kurílla and his companions had left on the shore when they struck across the summer portage. I thought it might prove useful, and took it aboard. About two o'clock we arrived at Unalaklík, just in time to enjoy a steam bath. While I had been absent some Eskimo from Kotzebue Sound had arrived, bringing alcohol, purchased from the traders.

The whole village was in a turmoil, and the Russians at the fort in no little alarm, anticipating an attack. Some natives having reported a remarkable and unknown object as cast upon the beach, Pópoff and myself walked four or five miles to examine it. It proved to be the carcass of a walrus deprived of its head. These animals, as well as whales, are unknown in Norton Sound, and this carcass had probably been driven by the wind and sea from the north.

On the 9th of October I had the bidárka repaired and well oiled. The next day, with Tommy, Johnny and a Káviak, I started for Topánika, to examine the geological character of the

shore. At night we arrived at a creek where an old Máhlemut chief, Allu-iokán, and his people were camped. Here I purchased some deer meat and a large number of tongues.

The next morning the Innuit left us for Unalaklík. Johnny and Tommy started into the interior in search of deer. Taking my haversack, I proceeded to Tolstoi Point, examining the rocks, and taking notes of the character, thickness, and dip of the strata. I found no fossils except indistinct vegetable remains. Climbing the bluff, I followed the edge of a deep ravine inland for half a mile. Feeling thirsty, I managed to swing myself down the precipitous sides, by the birches which grew sparingly in rifts of the rock. Here I found a stream of pure cold water, and, bending down to drink, some fine fossils attracted my attention. Securing a bundle of about fifty pounds' weight, I had a piece of hard work packing them on my back out of the ravine. I was obliged to walk in the bed of the stream, as the sides were too abrupt to ascend with my load. I finally arrived at camp, after dark, and pretty tired. No one was there, and I built a large fire, fearing that Johnny might be unable to return in the obscurity over the rough and broken hills. The boys arrived at last, having killed two deer, bringing, however, only the tongues and kidneys. I rated them well for the folly of destroying game which they could not use or bring home. Economy in such matters is incomprehensible to the native mind. They are always ready to destroy life even if they cannot avail themselves of the remains.

The next day, having completed my observations, I availed myself of an invitation to take passage for Unalaklík in a passing Máhlemut bidarrá. I occupied myself for several days in purchasing articles which I had found from experience were necessary or useful in the interior. These were principally Eskimo winter boots, of deerskin with sealskin soles; deerskin mittens, parkies, and breeches, some destined for the ethnological collection, and others for use; boot-soles, to replace old ones when worn out; deer sinew, for sewing skin clothing; fine sealskin line, for lashing sleds, bidarrá-frames, dog-harness, and bootstrings; mahout, or walrus hide cut in long strips, for tracking-line; prepared sealskin, for mending boats; oil, for lamps in winter; úkali, by the thousand, for dog and man feed; the white

bellies of the deer, with dried fish skins and wolverine skins, for trimming skin clothes; and the backfat of the reindeer, to supply the total absence of pork, bacon, and butter.

The reindeer, in summer, is furnished with a broad layer of fat, between the muscle and the skin, along the back from the shoulder to the haunch. This layer comes off in a single piece fifteen inches broad and from half an inch to four inches thick. This is called the "backfat." Other fat in smaller quantity is procured from the vicinity of the kidneys, the omentum, and the intestines. A little is also procured with the marrow, by pounding and boiling the bones. All this in its dried state is liable to spoil. Anticipating this, I had all my fat cut, pounded up, and tried out. When thoroughly extracted, I poured the pure fat into empty tin cans, thus preserving it from injury and rendering it compact for transportation. The Hudson Bay pemmican is made by pounding dry meat between stones, until all the meat is reduced to powder. The sinews and gristle are picked out, and the rest is mixed with boiling fat and poured into a rawhide bag, where it becomes perfectly solid. Pemmican is unknown to the Russians, whose chief dependence is fish. Indeed, I do not know of any part of Russian America where meat and fat abound in sufficient quantities to be much used in this way. Pemmican is tasteless, unappetizing food, but contains much nourishment in a very compact form.

I have hitherto deferred any minute account of the Innuit of Norton Sound, preferring to give my own impression of them unaffected by that of other observers. During the time spent at Unalaklík I became moderately proficient in their language, and studied their mode of life with great care.

The Innuit, as they call themselves, belong to the same family as the Northern and Western Eskimo. I have frequently used the term Eskimo in referring to them, but they are in many respects very different people from the typical tribes called by that name in the works of Parry, Ross, Simpson, Kane, and other arctic explorers. Comparative vocabularies and an analysis of the different branches of the family will be found elsewhere in this volume. The present remarks refer more particularly to their mode of life.

It should be thoroughly and definitely understood, in the first

place, that they are not Indians; nor have they any known relation, physically, philologically, or otherwise, to the Indian tribes of North America. Their grammar, appearance, habits, and even their anatomy, especially in the form of the skull, separate them widely from the Indian race. On the other hand, it is almost equally questionable whether they are even distinctly related to the Chúkchees and other probably Mongolian races, of the eastern part of Siberia. This is discussed elsewhere.

The Innuit of Norton Sound and the vicinity are of three tribes, each of which, while migrating at certain seasons, has its own peculiar territory. The peninsula between Kotzebue and Norton Sounds is inhabited by the *Káviaks* or *Kaviágemut* Innuit. The neck of this peninsula is occupied by the *Máhlemut* Innuit. The shore of Norton Sound south of Cape Denbigh to Pastólik is the country of the *Únalcets* or *Unaligmut* Innuit. The habits of these tribes are essentially similar. They are in every respect superior to any tribe of Indians with which I am acquainted.

Their complexion I have described as brunette. The effect of the sun and wind, especially in summer, is to darken their hue, and from observing those who lived in the fort, I am inclined to think that a regular course of bathing would do much toward whitening them. They are sometimes very tall; I have often seen both men and women nearly six feet in height, and have known several instances where men were taller. Their average height equals that of most civilized races. Their strength is often very great. I have seen a Máhlemut take a hundred-pound sack of flour under each arm, and another in his teeth, and walk with them from the storehouse to the boat, a distance of some twenty rods, without inconvenience. They are fond of exercise, and practise many athletic games, such as football or a similar game, tossing in a blanket or rather walrus hide, running races, hurling stones or lances, lifting weights, and wrestling. Their boats — the kyak or bidárka, and oomiak or bidarrá — have been already described. It may be mentioned in this connection that the oomiak is not considered among the Norton Sound Innuit as a "women's boat," nor is there ever any hesitation about men's using them. In this they differ from the Eskimo as described by arctic explorers. It is noticeable that the more northern the canoe, the smaller it is made. The kyak of Núnivak Island is double the

size of those used in Bering Strait. The kyaks are often ornamented with beluga teeth, or carved pieces of walrus ivory, imitations of birds, walrus, or seal. The prow is also fashioned into the semblance of a bird's or fish's head. Securely seated in his kyak, with a gut shirt strongly tied around the edge of the hole, the Innuit is at home. He will even turn over his kyak and come up on the other side, by skilful use of his paddle.

Aziak or Sledge Island is an abrupt rock rising out of the water, with a landing only at low tide in good weather. I was informed by the captain of a trader, a trustworthy person, that he once approached the island to trade, in rough weather, but could not send a boat ashore, as it was impossible to land. He lay as close as he dared under the lee of the island. Here they saw the Innuit tying several men securely into their kyaks, on the top of the rock, some fifteen or twenty feet above the water. When all was done each man grasped his double-ended paddle, and two others took the kyak by bow and stern and tossed it, with its occupant, into the water. For a moment they disappeared under the waves, but instantly rose and righted themselves; in a few minutes they were alongside, and being taken on board, produced furs and ivory from their kyaks, with which they proceeded to trade for tobacco and other articles. When the tide and wind fell they returned to the island. This is an excellent illustration of the wonderful skill with which they learn to manage these little canoes. In his kyak the Innuit does not hesitate to attack the seal, walrus, or whale. Those of Norton Sound have only the seal and beluga, but those of Bering Strait have abundant opportunities for hunting the bowhead and walrus.

They are good-humored and careless, slow to anger, and usually ready to forgive and forget. They are sometimes revengeful; and murders, generally the result of jealousy, are not very rare. The women are modest, but a want of chastity in an unmarried female is hardly looked upon as a fault. Taking this fact into consideration, they are rather free from immorality. Among the Máhlemuts, cousins, however remote, do not marry, and one wife is the rule. Among the Káviaks, incest is not uncommon, and two or three wives, often sisters, are taken by those who can afford to support them. These people have become demoralized by trading liquor for their furs, and wide-spread immorality is the result.

The same is also true of the Kotzebue Sound Máhlemuts. What we should call immodesty is often undeserving of such a term. Where a practice is universal there is nothing immodest in it, and it may be quite consistent with morality. For instance, the Aleutians, men and women, for ages have been accustomed to bathe together in the sea. They do not think of there being any immodesty in it, yet any immorality is exceedingly rare among them. Hence we should not judge these people too harshly.

There is no ceremony connected with marriage among the Innuit, though presents are often made to the bride's parents. Intermarriage between natives of different tribes is frequent. If ill-behaved or barren, the wife is frequently sent away, and another takes her place. Children are greatly prized, if boys. Girls are at a discount. Infanticide is common among them, both before and after birth. As an excuse, they say that they do not want and cannot support so many daughters. Other women do not like the trouble and care of children, and destroy them for that reason. The usual method is to take the child out, stuff its mouth with grass, and desert it. I have seen several children who had been picked up in this condition, and brought up by others than their parents. The women alone destroy children, but the men seldom punish them for it, and doubtless acquiesce in advance in most cases. Sometimes we find females who refuse to accept husbands, preferring to adopt masculine manners, following the deer on the mountains, trapping and fishing for themselves.

The men treat their wives and children well. The latter are never punished, and seldom need correction, being obedient and good-humored. The men have their own work. Hunting the deer and seal, building and repairing the winter houses, making frames for boats, sleds, and snow-shoes, preparing sealskins for use on boats or for boot-soles, trapping, and bringing home the results of the chase, — in fact, all severe labor, — is performed by the men. Snaring partridges, drying and preparing fish, cutting up the meat when brought into camp, picking berries, dressing deerskins and making clothing, cooking, and taking care of the children, — these are solely feminine pursuits. Both sexes join in paddling the oomiaks, celebrating their annual dances, bringing and cutting wood, and other work of a like nature. The women are seldom beaten, except for ill-temper or incontinency. They keep

their persons moderately clean, braiding the hair on each side, and twisting beads or strips of wolfskin in with the braids for ornament. They are often of pleasing appearance, sometimes quite pretty. They preserve their beauty much longer than Indian women. Their clear complexion and high color, with their good-humor, make them agreeable companions, and they are often very intelligent. A noticeable feature is their teeth. These are always sound and white, but are almost cylindrical, and in old people are worn down even with the gums, producing a singular appearance. The eyes are not oblique, as in the Mongolian races, but are small, black, and almost even with the face. The nose is flat and disproportionally small. Many of the Innuit have heavy beards and mustaches, while some pull out the former. The men all wear the labrets, but do not tattoo. The women generally have a few lines tattooed on the chin, from the lower lip downward. The inhabitants of the Diomede Islands tattoo extensively; they also wear large labrets made of hypochlorite and finely polished. The tattooing is in spiral lines and waving scrolls, seldom or never representing objects. The Norton Sound Innuit women never wear labrets,* but occasionally pierce the nose and ears. I have never seen any ornament worn in the nose, but ear-rings are not uncommon. The following sketch represents the usual form. They are carved from beluga teeth. Among the *Mágemuts*, a tribe to the south of the Yukon-mouth, the women wear a peculiar labret. It is flat and curved, like a bent nail, with a broad head, which goes inside the mouth, and prevents the labret from slipping through. They are slightly carved, and ornamented with dots and lines. The holes are pierced through the front of the lower lip and close together, not under the corners of the mouth, as among the men. The curved ends stick out like little horns.

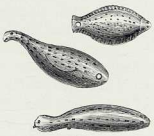
Labrets.

Ear-rings.

In Norton Sound the holes for the labrets are not always pierced

* The figure represents: A, the Magemut female labret; B, C, the Okeeogemut; the rest are Norton Sound labrets of different patterns.

in youth. Whenever the act is performed a feast is given, and the holes are made by means of an awl, with great solemnity. This would indicate that originally the practice had some greater significance than mere ornament. It is now impossible to discover what that significance might have been. At first a mere ivory peg is inserted (F, G) with a hole in which a small wooden peg is put to keep it in place. After the opening has healed, others a little larger are inserted, and so on, until the hole will admit a peg of the full size, and shaped more like a button or stud (D, E). Ornaments carved from beluga teeth are commonly worn. They represent figures of men, animals, or fish. These are some of them, representing a flat-fish, goose, and seal. Walrus teeth, obtained by barter, are also used in carving.



Amulets.

The dress of the men has already been described. It reaches to the middle of the thigh, and is cut around nearly or quite straight. The female dress, on the other hand, is continued in two rounded flaps below the knees, before and behind. They are trimmed with strips of white deerskin with the hair cut short, separated by narrow strips of dried fishskin and edged with strips of wolverine or wolf skin, so cut that the long hair makes a fringe. The hood is trimmed with a broad piece of wolfskin, with frequently a strip of the white skin of the arctic hare inside for warmth. The whole effect is very pretty, especially when the parka is made of the tame Siberian reindeer skin, which is mottled with white and delicate shades of brown. The fishskin referred to, when prepared for use, looks like brown marbled paper. It has no scales, and I have not seen the fish from which it is taken.

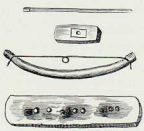
The women wear breeches and boots made in one piece, while the men use deerskin socks, and boots which are not sewed on to the breeches. All use a belt of some kind. The favorite belt among the women is made of the portion of the lower jaw of the reindeer which contains the front teeth. This piece of bone is very small, — I have counted the teeth of one hundred and fifty deer in one belt, — and these belts are not uncommon. They

are sewed on a broad strip of leather, fastened with a large button or bead in front. From the belt hangs the needle-case, usually made of the humerus of a swan, plugged at one end and

Bone needle-case.

having a removable stopper at the other. It is usually ornamented with black lines, as in the above example.

A man's wealth is frequently estimated by parkies. They will buy, with their surplus property, large numbers of parkies. Ten deerskin, or two mink parkies, or one sable parka, are equivalent to a gun. Sealskins, sables, guns, and ammunition are also units of value. They can count up to a hundred, and some of the more intelligent to five hundred. They frequently keep accounts by tying knots in a string or notching a stick. They divide the year by the seasons, and time by lunar months, and days. They can also estimate with much accuracy how much of the day has passed, by the position of the sun or stars. They are very quick at understanding, and can draw very reliable maps, the only difficulty being that far-off distances are exaggerated when compared with those laid down as nearer their homes. They are all provided with flint and steel for lighting fires, but formerly used a different apparatus on the principle of a fiddle-bow drill. This consisted of a mouthpiece of bone or ivory with a small hollow in it, a flat piece of very dry soft wood, a pencil-shaped piece of dry hard wood, and a bow with a slackened string. One end of the pencil fitted into the hollow in the mouthpiece. The latter is held between the teeth. A turn of the bow-string was taken around the pencil; the tablet of soft wood was held in the left hand. The pencil was held firmly against the tablet and the bow rapidly moved back and forth by the right hand. The pencil of course revolved rapidly, the friction created a small pile of dust on the tablet, which was quickly ignited by the heat. A piece of tinder preserved the light, and the fire was obtained.



Innuit fire-drill.

Formerly bows, arrows, and lances were their weapons. In Norton Sound they are now supplanted by guns obtained from the traders. Iron was unknown among these natives two generations ago. All their weapons were of ivory, bone, and slate, except a few native copper implements which came from the Indians of the interior. In early times, the old men say, a knife or a string of beads was worth fifty marten skins. A peculiar kind of knife, shaped like a chopping-knife and called a *pigulka*, is used in cutting skins. It is made of sheet-iron and has a bone handle. It is preferable to scissors in cutting furs, as it only cuts the skin and not the hair.

To this day the Innuit have no knowledge of working iron by means of heat, although with the aid of a file they will make quite useful knives, saws, and other articles, out of scraps of old sheet or hoop iron. While the ancient Indians made their cutting instruments and tools of stone or native copper, the ancient Innuit substituted, in many cases, bone and ivory. Stone arrowheads, formerly the universal weapons among the Tinneh, are now rarely to be found. On the other hand, the ivory weapons of the Innuit are still in use. The Indian discarded the stone arrowhead entirely, for one of iron; the Innuit retains the ivory head, merely adding to it a tip of iron. The Indian leaves the bow to the children; the more aquatic Innuit finds a gun out of place in his kyak, and still uses the weapon of his ancestors to hunt the seal. Ashore, his weapon is usually a gun. The guns most common among them are very light double-barrelled Belgian fowling-pieces, with an average bore of twenty-eight or thirty. These are obtained from the Kotzebue Sound and Grantley Harbor traders. South of Norton Sound the Innuit are provided with very few guns, and these are mostly long Hudson Bay flintlocks, obtained by trading with the Tinneh tribes of the interior.

Pigulka.

Trading is carried on to a large extent between the Indians and Innuit. The former sell their wooden dishes and other household articles, furs, wolf and wolverine skins, to the latter for oil, sealskins, seal and walrus line, and articles obtained by the Innuit from the traders. The Innuit again trade beaver skins, wooden dishes, and other articles of wood to the Tuski and other

tribes of Bering Strait, in exchange for walrus ivory and skins of the tame Siberian reindeer, which the latter obtain from the Chúkchees. In this way a commerce is constantly carried on between the interior tribes of America and Siberia, by means of the Innuit, who act as middle-men. The bitter enmity and constant hostility which are found between the northern and western Eskimo and the Indians do not exist between the latter and the Innuit of the western and southwestern coast. It is true that both exhibit great jealousy in regard to their boundary lines. These lines are generally formed by the summit of the watershed between the small rivers which empty into the sea and those which fall into the Yukon. They coincide nearly with the line of the wooded district to which the Indians are confined. Any man of either race found on the wrong side of the line is liable to be shot at sight, and deaths occur every season from this cause. Nevertheless, a tacit arrangement exists between adjoining tribes of the two races, so that an Innuit who kills a deer on Indian territory may retain the meat, provided he leaves the skin at the nearest Indian village. The Indians cross the Ulúkuk portage every winter, and trade at Unalaklík with the Innuit. The latter cross the Anvik portage at the same season, and trade with the Yukon Ingaliks. Great caution is used by both while in foreign territory, and nearly every year a panic occurs on the coast or in the interior, from some rumor that the hostile race are preparing for invasion and war.

The Indians call the Innuit and Eskimo *Uskećmi*, or sorcerers. *Kaguskećmi* is the Innuit name for the casines in which their shamáns perform their superstitious rites. From this root comes the word Eskimo. The belief in shamánism is much the same among the Innuit as that which is entertained among the Indians, but the rites of the Innuit shamáns differ in the manner of performance from those of the other race, and very much from those of the Chúkchees and other inland races of Siberia.

A Máhlemut shamán covers his head and the upper part of his body with a kamlayka. He holds a wand, often of ivory, in each hand, and beats on the floor of the casine, keeping time with a monotonous chorus. When the frenzy seizes him he rolls on the floor in violent convulsions. His body and face are concealed beneath the kamlayka, which rustles violently with his motions,

while all watch anxiously for any words which may escape him during the fit. Such are regarded as omens of deep significance, and the hearers are implicitly guided by them.

The totemic system is not found among the Innuit. Each boy, when arrived at the age of puberty, selects an animal, fish, or bird, which he adopts as a patron. The spirit which looks after the animals of that species is supposed to act henceforth as his guardian. Sometimes the animal is selected in early childhood by the parents. If he has long-continued want of success in his pursuits, he will sometimes change his patron. They do not abstain from eating or using the flesh and skin of the animal which they have chosen, as do some tribes of Indians. They always wear a piece of the skin or a bone of that animal, which they regard as an amulet, and use every precaution against its loss, which would be regarded as a grave calamity. When desiring assistance or advice they do not themselves seek it, but employ a shamán to address their patron spirit. These customs do not extend to females. The spirits of the deer, seal, salmon, and beluga, are regarded by all with special veneration; as to these animals they owe their support. Each has its season, and while hunting, it is almost impossible to induce them to attempt any other work, as they seem to think each spirit demands exclusive attention while he extends his favors. The homes of these spirits are supposed to be in the north. The auroras are the reflections from the lights used during supposed dances of the spirits. Singularly enough, they call the constellation of Ursa Major by the name of *Okil-ókpuk*, signifying Great Bear, and consider him to be ever on the watch while the other spirits carry on their festivities. None of the spirits are regarded as supreme, nor have the Innuit any idea of a deity, a state of future reward and punishment, or any system of morality. Many of them have been christened by the Russian missionaries, but none have any idea of Christianity.

The dead are enclosed above ground in a box, in the manner previously described. The annexed sketch shows the form of the sarcophagus, which in this case is ornamented with snow-shoes, a reel for seal lines, a fishing-rod, and a wooden dish or kantág. The latter is found with every grave, and usually one is placed in the box with the body. Sometimes a part of the property of the

dead person is placed in the coffin or about it. Occasionally the whole is thus disposed of. Generally the furs, provisions, and clothing (except such as has been worn) are divided among the nearer relations of the dead, or remain in possession of his family if he has one. Such clothing, household utensils, and weapons as the deceased had in daily use are almost invariably enclosed in his coffin. If there are many deaths about the same time, or an epidemic occurs, everything belonging to the dead is destroyed. The house in which a death occurs is always deserted, and usually destroyed. In order to avoid this, it is not uncommon to take the sick person out of the house and put him in a tent to die.

Innuit grave.

A woman's coffin may be known by the kettles and other feminine utensils about it. There is no distinction between the sexes in method of burial. On the outside of the coffin figures are usually drawn in red ochre. Figures of fur animals indicate that the dead person was a good trapper; of seal or deer, show his proficiency as a hunter; representations of parkies, that he was wealthy: the manner of his death is also occasionally indicated.

For four days after a death the women in the village do no sewing, for five days the men do not cut wood with an axe. The relatives of the dead must not seek birds' eggs on the overhanging cliffs for a year, or their feet will slip from under them, and they will be dashed to pieces. No mourning is worn or indicated, except by cutting the hair. Women sit and watch the body, chanting a mournful refrain, until it is interred. They seldom suspect that others have brought the death about by shamánism, as the Indians almost invariably do. At the end of a year from the death a festival is given, presents are made to those who assisted in making the coffin, and the period of mourning is over. Their grief seldom seems deep, but they indulge for a long time in wailing for the dead at intervals. I have seen several women who refused to take a second husband, and had remained single, in spite of repeated offers, for many years.

Their habits are very regular. Every season the same round is gone through as in the previous one, only varied by the differences in temperature and in the prevalence of fish and game.

In February they leave the villages and repair to the mountains, with all their families. They pursue the deer until the snow begins to melt. I am informed that among the Máhlemuts, near their more inland villages, they will not permit any water to be boiled inside of the houses while the deer hunt continues. This is only one of many similar superstitions. The deer are stalked ; noosed in mahout snares, set where they are accustomed to run ; or driven into pounds built for the purpose, where they are killed by hundreds. Since the introduction of fire-arms, about fifteen years ago, the number of deer has been very greatly diminished. At the same time the bow and arrow have fallen into disuse, and it would be impossible at present for them to obtain sufficient food without guns and ammunition. The Káviak peninsula formerly abounded with deer ; at present none are found there.

When the snow melts and the ice comes out of the small rivers, the Innuit return to their homes. Myriads of water-fowl arrive, and breed on the steep cliffs of Besboro' Island, and similar promontories of the coast. About this time the young men seek for eggs and kill the parent birds, while the older and more wealthy start for Grantley Harbor and Kotzebue Sound, where the traders meet them as soon as open water affords opportunity. As June arrives, eggs are more abundant, and form for a while the chief article of diet. Gulls' eggs are rejected by the women and children, who believe that they will grow old and decrepit if they eat them. Seal may also be obtained in small numbers, and immense schools of herring visit the shores, remaining about ten days and then disappearing for the season.

As July advances the salmon arrive, and every one is found upon the shore. Gill nets are stretched out from the beach, and the sands are red with the fish, split and hung up to dry ; dogs and men have as much as they can eat, and large supplies of úkali are laid in for winter use. While the fishery lasts no wood must be cut with an axe, or the salmon will disappear. Near the end of July a small fleet of bidarrás arrive with those who have been away trading, and a deputation of Tuski or Okee-

ógemuts with walrus ivory, whalebone, and tame reindeer skins for barter.

In August many of the women repair to the hills, where they hunt the young reindeer fawns. The latter are caught by running after them, or in snares. Their skins are valued for clothing, and make a very pretty light parka. They are of a uniform brownish red, lighter on the belly, and not spotted like the young of the red deer. The skins are nearly valueless until about a month old, and it is hardly necessary to contradict Zagóskin's fables about the unborn young. The latter, I believe, are not eaten by the Innuit; at least, I have frequently seen them thrown to the dogs. The stomach of the adult deer, filled with half-digested willow-tips, is regarded as a delicacy, and eaten as we do salad. The supply of backfat is also laid in at this season; later it disappears.

In September many repair to Pastol Bay and Norton Bay, where they kill the beluga, left in shallows by the tide. The seal fishery is at this time in full blast, and the natives will not work on the frames of boats or kyaks. As the cold weather comes on, the rutting season of the deer comes with it, and most of the Innuit repair to the mountains after them. At this season the supplies of deerskins, sinews, and meat are laid in for the winter. About the middle of October the shores of the Sound are girded with ice. The seal disappear, but myriads of a small fish, like tom-cod, are found all along the shores, and are fished for through holes in the ice. The hook is peculiar. It is made of a small oval piece of bone with a sharp pin inserted into it diagonally. It is not baited, as the fish bite at the ivory, which is tied on a whalebone thread, whose elasticity gives the hook a tremulous motion in the water. The sinker is also an oval piece of bone or ivory. These little fish are excellent eating, and are caught by thousands at Unalaklík.

Innuit fish-hook and sinker.

By this time the majority have returned to the villages, and trapping commences. The women are at work on the winter clothing, and the season of festivity sets in.

The greater part of November and half of December is occupied by dances and festivals. About January the trade with the Indians commences, and in February they again repair to the

mountains as before. This gives a sketch of their mode of life during the year. The dances and winter festivities deserve more minute description.

All the Innuit are fond of dancing and singing together. The principal point, in both Innuit and Indian dances, is, to make as many different kinds of motion with the body and arms as possible, always keeping the most exact time with the chorus and with each other. The dances take place in the casine of the village, and time is kept by a number of old men, who lead the chorus and beat time with an elastic wand on a sort of large tambourine. Their festivals may be divided into two classes, — one where they meet simply to dance and sing, and the other when there are also other ends in view. In the former the singers confine themselves strictly to the chorus "Ung hi yah," &c., which has previously been described. These dances are held whenever a sufficient number happen to meet in the casine and desire it, but always in the evening. The other festivals also take place in the evening, and are of different kinds. First, there is the opening festival of the winter, which differs from all the others. Then there are festivals at which the givers desire to indicate their friendship for each other by making presents in a manner which will be afterwards described. A third kind of festival is given a year after the death of a relation. A fourth, when a wealthy man wishes to make himself the reputation of a public benefactor. A fifth, when a man wishes to redress an injury which he has done to another, and a sixth, when the village unites in inviting the inhabitants of another village to partake of their hospitality.

The opening festival of the season is usually held early in November. No women participate, except as spectators. The invariable chorus is begun, and kept up until all the young male inhabitants are collected in the casine. As soon as all are present, dishes of charcoal ground up with oil are brought in; all the young men strip themselves and proceed to paint their faces and bodies. No particular pattern is followed, but each one suits his own fancy. When all are duly adorned they leave the casine in single file, ending with the boys. Attired in Adam's original costume, they visit every house in the village, chanting as they go. Each family has prepared dishes of eatables according to their means. These are given to the performers; and when all the houses have been visited,

— the atmosphere meanwhile perhaps many degrees below zero, — they return laden to the casine. Passing under the floor, each one stands a moment in the central opening, chants for a few seconds while the old men beat the drums, and then springs out and deposits on the floor the dish he carries. When all have come in they form in a hollow square, each one holding a dish in both hands. A peculiar chant is begun by one of the old men, and the others join in with him; they then turn towards the north corner of the building, chanting, and at a given signal all raise the dishes of food which they carry, above their heads in a northerly direction, at the same time looking down and uttering a hissing sound. This is repeated several times; the chant then continues for a few minutes, when they turn to the east and repeat the performance; and again to the south and west. This is to exorcise evil spirits. This being done, all set to and dispose of the eatables. When the feast is over they proceed to wash off the paint, at which stage of the performance most civilized spectators are obliged by the odor to retire. After the washing is concluded all join in the ordinary chorus and disperse to their homes.

The third kind of festival is given by the relatives of the dead, both male and female. They appear by the underground passage, carrying food and presents. Placing them on the floor, they join in the usual chorus. The motions of the females are graceful and easy. The men strive to outdo each other in jumping and extreme exertions of every muscle of the body, always keeping perfect time. Between the meaningless syllables of the chorus, words are interpolated, eulogizing the virtues of the deceased and relating his exploits in hunting and fishing. The men imitate in their actions the motions of approaching the deer, of shooting, pursuing, and of taking off the skin. The same dumb show is carried out until the relation of the history of the dead man is completed. The women then distribute the eatables to the friends of the family. The men distribute the presents. Some trifle, such as a leaf of tobacco or a pair of sealskin boot-soles, is given to every spectator. A handsome gift falls to him who made the coffin, and smaller presents to others who assisted at the interment. After this is over a more lively chant begins, indicating that the season of mourning is over, and that the relatives have performed their duty. With this the exhibition closes.

The fourth festival is not a very common one, and is more practised among the tribes of the Yukon-mouth and to the southward. The man who proposes to give it often saves up his property for years, and retains nothing, being reduced to poverty by the festival. He accumulates deerskins, beaver, sealskins and furs, beads, and other articles of value. He exerts himself to the utmost in preparing food for his guests. When the preparations are complete he sends to all the natives of the vicinity, who crowd to the feast. It begins with dancing and singing, each guest doing his utmost to excel in each and do honor to the occasion. The festival lasts as many days as the provisions will hold out. On the last day the host, dressed in a new suit, welcomes his friends in the casine. To each he gives presents of whatever he may like best; when all the store of gifts is exhausted the host strips himself, replacing the new clothing by the poorest rags, and gives the former to whoever has not previously received a gift. His wife does the same. The guests put on their new clothing on the spot in silence. The host then addresses them, saying that he has nothing left, and depreciating his own generosity as much as possible. He then dismisses the assembly, who go back to their homes. No return is asked or expected, and the host is often reduced to extreme destitution, which he regards as a slight matter compared with the reputation which the festival has given him. At some of these feasts ten guns, two hundred beaver, a hundred sealskins, fifty deerskins, five hundred sable, two hundred fathoms of strung beads, ten wolf or wolverine skins, and as many suits of clothing and blankets, have been given away by one man. Stepánoff told me of a man who saved for fifteen years, until he accumulated such a store of valuables, and then made a feast and gave everything away.

The fifth kind of festival is also of rather rare occurrence. I witnessed but one. The man who had originated the quarrel sent a messenger some seventy miles to the man who had been injured or offended. The messenger was dressed in a new suit, with a red shirt, and carried a wand ornamented with feathers in his hand. Intimation of the intention had of course reached the recipient in advance. The messenger found him at his work. Chanting as he approached, he made known his errand, striking the receiver with his wand; and suddenly seizing a knife, he

grasped him by the neck and brandished it above his head. The other, understanding the intention, made no resistance; and concluding his chant, the messenger inquired what restitution was desired. The other told what he wished for, and the messenger informed him where and when it would be made. The herald then returned to him who sent him, and his errand was done. Several weeks later the feast was given. The required restitution and much more was presented to the offended party, who, as well as the offender, was dressed in an entirely new suit of clothes. After the gifts had been accepted the two stood up and danced together, keeping time with the drums. They then exchanged clothing, as a sign that they were friends again, and the person who received the presents divided tobacco and sealskins among the spectators, which finished the ceremony.

The sixth sort of festival is frequent. Every winter several take place. In December, 1867, the Máhlemuts residing at Unalaklík invited the Máhlemuts of Shaktólik to participate in a festival at the former place. The guests arrived about the middle of the month, and were quartered in the different houses in the village. On the opening of the performances all gathered in the casine. The guests were merely spectators. The principal men of the Unalaklík village, eight in number, appeared by the subterranean passage and formed in line on the floor. Six women, the best dancers in the place, took their places opposite. Alluiánok and one or two old men, whose age forbade their joining in the dance, took the drums and led the chorus. The men were stripped to the waist. They wore breeches of tame reindeer skin, and had each a tail of wolf or wolverine attached to the belt behind. They had on gloves trimmed with wolverine skin, and boots ornamented with strips of fur and marten tails. Around the head each had a fillet of deerskin ornamented with feathers, which came down on the shoulders behind. The women were provided with long shirts made of the intestines of the seal, cleaned, split, and sewed together. These shirts were translucent, embroidered with bits of colored worsted, and ornamented with short pendent strings of beads. Through the semi-transparent dress the motions of the body were perceptible. Their breeches were of the white Siberian reindeer, embroidered, decorated with strips of wolfskin, and made to fit the limbs

perfectly. The upper dress came a little below the knees. Their hair was arranged and braided on each side, with the greatest care. Strips of white wolfskin and strings of beads were incorporated with the braids, and pendants of beads and bead necklaces ornamented the shoulders. Their hands were encased in snow-white gloves, fitting closely and made with great care from the tender skin of the reindeer fawn. These were trimmed around the wrist with a fringe of wolfskin. In each hand they held long eagle feathers, to the edges of which tufts of swan's-down were attached. The opening chant was slow and measured. The motions of the dancers were modest and pleasing; the extreme gracefulness of the women, especially, would have excited admiration anywhere. They kept the most perfect time with the chorus and drum taps. Between the syllables of the former, words of welcome to the strangers were interpolated in such a way as not to interfere with the rhythm. The slowly waving feathers and delicate undulations of the dancers rendered the scene extremely attractive.

As the performance went on, the spectators joined in the chorus, which became more animated. Other villagers entered into the dance, and all joined in dumb show to imitate the operations of daily life. New songs, invented for the occasion, descriptive of hunting the deer, bear, and fox, of pursuing the seal in kyaks, of travelling in the oomiaks, of fishing and other pursuits, were introduced in the chorus. The excitement increased, and was added to by the applause of the spectators. All entered freely into the enjoyment of the hour. Children appeared from below, dressed in new and beautifully decorated clothing. With the greatest gravity, and keeping time in all their motions with the song, they deposited on the floor dishes of boiled fish, meat, oil, and reindeer marrow; berries in a cream-like mixture of snow, oil, and fat; and other delicacies. This done, they scampered out, to return again. The dance came to a close, and the feast began. That over, all joined in a lively chorus, tobacco was distributed to the spectators, and the performance closed for the night. The next evening a similar exhibition took place, which was repeated every night for a week. The best dancers took occasion to exhibit their proficiency singly; new and original songs and symbolic pantomimes were introduced

every evening. During the whole of the festival only the most necessary labor was performed, and it would have been quite impossible to induce anybody to do any outside work. When it came to an end the guests departed, to reciprocate another winter at Shaktólik. In this way the hospitable Innuit vary the monotony of their existence, and by constant interchange of hospitalities produce the most friendly feelings between different tribes. Those about the Yukon-mouth seldom take part in these festivities on Norton Sound. The latter embrace the different tribes from Pastólik to Kotzebue Sound and Bering Strait.

The dialects of those to the southward are so different that they would have difficulty in intercourse with the former, which is probably the reason of their absence; but among themselves they carry on an equal amount of such festivities. The semi-religious masked dances and midnight mysteries of the ancient Aleutians find no counterpart among the Innuit of Norton Sound.

It is impossible to doubt that, among all American aborigines, much in their mode of life, customs, and ceremonials is of a local nature, and due to extraneous circumstances. Much is also due, unquestionably, to the similarity of thought and habit which must obtain among human beings of a low type, and who gain their living by similar means. Hence, a general similarity of many customs may naturally be expected between both Innuit and Indians, as well as far-distant aborigines of different parts of the world, and this similarity can afford no basis for generalizations in regard to their origin.

Pópoff and myself determined to join in giving a festival of the second class, which has not yet been described. Myúnuk was chosen as the messenger. He was dressed in a new suit of clothes, which was his perquisite; he wore a fillet of wolfskin around his head and carried a wand in his hand. This was about six feet long, and curiously ornamented and carved, somewhat resembling the Roman palms carried in procession by high dignitaries of the Catholic Church on Palm-Sunday. He received his messages and departed. Pópoff had designated Alluiánok as the one whom he desired to honor. I chose Ark-napýak, another chief; and Ostrofskoi another, called André.

The messenger, first finding where the person indicated is, runs at the top of his speed. On approaching him he shouts, "Oh ! oh !" as loudly as possible, and chants a lively chorus. At the same time he delivers his message, waving his wand about the head of the other, and tells him that Pópoff, or whoever it may be, is desirous of giving a festival, and having selected him as a suitable person to honor, desires to know what would be acceptable to him as a present. The other replies that he will accept the honor, and mentions whatever he may want. In this case, Alluiánok asked for tobacco and a new shirt, André for wolverine skin, and Arknapýak for a glass of water, meaning liquor. A day was set for the festival; all who chose to come were welcome. We had a large kettle, containing some ten gallons of rice, cracked wheat, and oil, boiled into a general mush, and flavored with molasses; and another full of tea. Each guest was served with the former, and received with the latter a slice of bread and a lump of sugar. The presents were then given, and the practice is to give as much as possible over and above what was asked for. Being without the liquor which was so much desired, I chose to understand the request literally, and presented Arknapýak with a large bowl full of scarlet beads, much coveted by the Innuit, and filled up with water. Powder, lead, caps, drill, and a little case of portable tools made up his present, and after the others had received theirs, I distributed among the guests small pieces of black tobacco, careful that none should be overlooked. If the festival had been given by natives only, dances and the chorus would have preceded the feast, but the casarmer of the fort was unsuitable for dancing. The assembly then dispersed, and we were notified to attend at the next stage of the proceedings, in the casine of the village.

A day or two after, the messenger came to us to know what we desired in return, using the ceremonial previously described. One of the points which give zest to these festivals is the practice of asking for the thing of all others most difficult to obtain. It is a point of honor with the giver to procure it at any price or risk. In some cases couriers are sent hundreds of miles, and the festival is prolonged until their return, in order that the honor of the host may be untarnished. I asked for a live seal, knowing very well that the seal had left the coast at least three weeks before, and that no amount of trouble would obtain one. Pópoff asked for

foxskins and beaver; Ostrofskoi, for a tame reindeer parka, and wolfskin for collars.

The next day we repaired to the casine in the evening. The custom is for those who bring presents to approach by the underground passage. We sat on the floor around the aperture, and Myúnuk appeared and distributed tobacco to those present, a beaver-skin to Pópoff, and a pair of walrus tusks to me. The giver stands in the aperture and dances and sings there for a few moments, the old men, meanwhile, keeping time on the drums. Alluiánok came up and presented Pópoff with three fine red foxes. The giver always depreciates his present, and says there are no more to be had, after which he stoops down and pulls out something more, repeating the remarks until his supply is exhausted. Arknapýak brought me a fine pair of winter boots ornamented with wolverine skin, a dish of deer fat, two marten skins, a bundle of boot-soles and some berries. André offered fat, berries, a fine kamláyka, wolfskin for collars, half a sealskin for boot-soles, meat, reindeer tongues, sinew, and a fine pair of tame reindeer breeches. Each, after giving all his presents, howled once or twice, danced in the aperture, and finally jumped out to one side. The old men kept up a persevering drumming and chorus. We distributed the tobacco and fat among them and returned to the fort. Arknapýak said that his men had gone to the edge of the ice after seal, and he could not yet fulfil all of his duty, but would do so before the festival was over. It was again the turn of the Innuit, and hoping to find me unprepared, he asked for a plane, which of all things is most difficult to obtain in this part of the world. I was fortunate enough to find one in the tool-box which I bought of Pópoff. It was duly presented at the next meeting, which was similar to the one already described, and in return I asked for a good tame reindeer suit for my ethnological collection. The closing evening of the festival arrived, and after the preliminary dances and singing were concluded, the head of a seal appeared in the opening of the floor, the body followed, and it began to move about, pulled by strings in the hands of bystanders stationed for the purpose. It was dead, but complete and frozen in a natural attitude. As it was jerked about the Innuit imitated the cry of the seal, much to everybody's amusement. Arknapýak then appeared and stated that owing to

the lateness of the season he was unable to procure a more lively seal for the purpose, and hoped that this one would prove satisfactory. He added that it would not bite. His explanation was received with applause, and he added many other acceptable articles to his present. The old men rose, and Alluiánok the senior chief then declared that the festival had been properly carried out and every one satisfied. He thanked us for joining with them in such a cordial manner, and proclaimed that the feast was at an end. It was the first time on Norton Sound that white men had joined with the Innuit in celebrating these games, although Stepánoff had several times done so, when on trading expeditions among the more southern Innuit.

While collecting on the beach west of the river on the 18th of October, I met a native who said that he had come up in my new bidarrá from the Redoubt. The stormy weather had delayed it. The next day it arrived at the fort, in charge of I'chuk Kóliak, a trustworthy Máhlemut, who on many occasions had been extremely useful to our parties. His only fault was a predilection for liquor. He was honest, straightforward, and very intelligent. He had received the name of Isaac from some of the traders, who had also taught him to write his name legibly, but the Innuit had corrupted Isaac into Ichuk.

Ingechuk and Andrea having arrived from Iktígalik, I endeavored to engage them to take the bidarrá up to that place while the Unalaklík River was still unfrozen. They agreed, but put off starting until the next day. When the morning had arrived we provided bread and úkali for them, when I discovered that the brave Ingaliks expected me to hire somebody to row them up the river! After expressing my opinion very freely of their laziness and general worthlessness, I hired three Máhlemuts to take their places. That afternoon I was seized with violent pain in my neck and back, accompanied by fever, probably caused by camping on the river. On examining my boxes I was astounded to find that the small supply of medicine had been left at the Redoubt. I felt that the case admitted of no delay. Although the 20th of October, the air was mild and pleasant. Not a particle of ice was to be seen on the river or along the seashore. I went up to the village, and through Isaac's mediation obtained two men. Putting a little tea, sugar, and two loaves of bread, with

half a dozen salt salmon-trout, into the three-holed bidárka, in half an hour I had started for the Redoubt, a journey as unexpected as it was sudden. Another day, if the weather continued fine, would bring us there. We camped at Fossil Creek near Topánika, but I passed a sleepless and painful night. The next morning we were off again early and plied our paddles vigorously, hoping to reach Pallonoi Point. The waves rose very high, however, showing heavy weather to the westward, and the wind began to freshen. The rollers became so large that we were obliged to put on our kamláykas and tie them round the holes. The bidarka was frequently buried in the water, and as she was very old I was obliged for safety to put in at Kegiktówruk. My situation may be imagined, burning with fever and impatience at the delay. There was no help for it, however. Four days I lay in the casine, suffering from anxiety quite as much as from the pain, which however grew no worse. We got out of provisions the second day, as I had not anticipated such delay. I cut the last loaf into three parts and divided equally with my men. There was nothing else but seal meat obtainable. I tried the heart and liver, which were not objectionable, but the flesh impregnated with the oil was positively revolting. The blubber, when perfectly fresh, has a taste exactly resembling the smell of the old-fashioned lamp oil. Certain arctic explorers have pronounced this, as well as the raw entrails of the seal, to be "delicious!" I can regard this statement only as the result of a depraved appetite goaded by hunger. The blubber of the beluga and whale, and even the flesh of the walrus, sea lion, and fur seal, is eatable. When fresh the taste is but moderately disagreeable and is easily conquered by hunger. But the flesh and oil of the leopard-seal are always extremely repulsive, and cannot to the civilized palate, by any stretch of the imagination, be considered otherwise. Whale-blubber is a luxury compared to it.

I could not force myself to do more than taste it, and the result was immediate nausea. Fortunately, in the evening I obtained a small supply of venison and a deer's tongue. The latter dried or frozen is a great delicacy, and has the flavor of chestnuts. This flavor is lost in great part by cooking. In any shape there is no other kind of tongue which will bear comparison with it.

Towards night of the 24th the waves fell somewhat. About

midnight I stepped out to look at the weather: snow-clouds were driving across the sky, the surf roared, and billows dashed upon the rocky islets. About five o'clock in the morning I rose and took another look. The wind had subsided, but no boats would leave that cove for six months. The weather was icy cold. As far as the eye could reach seaward was a sheet of ice! Aided by the snow, the intense cold in five hours had covered the entire coast of the Sound with ice. It was not clear, smooth, and solid, such as makes in calm weather, but a white, frothy, rough substance, looking like the white slag from an iron-furnace. Close in shore it was several feet thick, but soft and unsafe, with occasional pools of water. The Russians, who often have a substantive name for conditions of things which we describe by means of adjectives, call it *shugáh*, in distinction from clear, solid ice, which is *loht*.

I dismantled the bidárka, raised her on a stage out of reach of the dogs, made up three packs of about fifty pounds each, and about ten o'clock started with my men for the Redoubt on foot. The travelling was exceedingly hard; we had to step from one tussock to another, which often gave way, striking the toes against the frozen ground. I had only one light parka without a hood, and the wind was very cold. By constant exercise I managed to keep warm, and about nightfall caught sight of the hut on the knoll at the Major's Cove. I told the men we would camp here, and they received the information with exclamations of thankfulness. The house was a wretched one, much out of repair, and in consequence smoky. My bread was exhausted; we had fortunately one drawing of tea, but no sugar, and only a small fragment of frozen deer meat. One of my men opened his pack and commenced unrolling a small bundle. First a piece of paper, next a bit of sealskin, and so on, until about ten wrappers had been removed. To my surprise it was the bread I had given him several days before. I praised his economy, but he interrupted me, saying, "Take it; you want it more than I do," and insisted upon my accepting it. The other, who was almost a boy, seeing the bruised and battered condition of my feet, brought out some pieces of cotton drill, which he asked me to use as "nips" and to return to him at some future time. These instances of kind-heartedness are worthy of being remembered. They give a glimpse of characteristics we never found among the Indians, and which eminently

distinguish the Innuit. Several similar instances were related by members of Major Kennicott's party. Máhlemuts in their employ, during a scarcity of provisions, denied themselves in order that others might not suffer.

The next day we boiled our tea-leaves over again, and made the best of our way over the ice along shore. The mouth of the Canal was frozen, as I had hoped, and with care we crossed safely, and reached the Redoubt just as the service was over and the inhabitants were coming out of church. Stepánoff, who with astonishment had watched us crossing the new ice, received me hospitably. I obtained the necessary medicines, and, by heroic doses of calomel and quinine, succeeded in quelling the disorder.

Four days after, though quite weak and still far from well, I started on my return with a Russian Creole, named Goldsen, a sled with six dogs, and three natives. I had obtained some sugar from Stepánoff, to make up my loss, and a good parka, with other necessary articles. The weather was about twelve below zero, and rather windy. We kept on the ice beyond the Major's Cove, but as it was untrustworthy we were obliged to take to the bank. Here the going was very bad, as previously mentioned. There was no snow, and we stumbled over the frozen hillocks until our feet ached again. We arrived safely at Kegiktówruk in the evening. Here we took on the tent and other things which I had been obliged to leave behind.

The next day the travelling was even worse. In many places we had to cut our way through low but heavy willow brush, which grows along small watercourses. We camped in a ravine near the two islands. In the evening the wind fairly howled, and it began to snow. The air was full of fine snow, which the strong wind drove into the eyes. Travelling under such conditions is almost impossible and very dangerous. The Russians call this *poórga*. It is in such storms that travellers lose their way, and are frozen to death. Clear cold, however great, can always be borne, with proper clothing and exercise, but the poorga, penetrating to the bone, first blinds, then chills, and finally exhausts the hapless traveller, who no sooner falls than he is covered by the snowdrift.

The next morning was more pleasant. We passed Golsóva River about eleven. In the middle of the afternoon we saw a

herd of deer feeding among the willow brush. The dogs started off on a full gallop, sleds and all, and it was with the greatest difficulty that we checked them. I started in one direction, and Goldsen in another. A doe with her fawn passed near me. I fired, and she sprang into the air and came down full on her horns. A few struggles, and she was dead. The others, alarmed by the shot, were off at full speed. On examination I found that one of the buckshot with which the gun was loaded had struck her on the leg. Falling on her horns, she had come down with such force as to break open the skull and pierce the brain. This, and not the shot, had killed her. On skinning her we found the udder full of milk, which we saved in a tin cup. It was thick and rich, like cream. The winter coat of the reindeer is gray, with long white hair on the throat. It is a very awkward-looking animal when in motion, reminding one of a cow. The eye is large and black. We cached the meat and skin, taking only the heart and liver. We hung up a handkerchief on a snow-shoe, and poured powder in a wide circle around it to keep off the foxes. Pushing on, we crossed Tolstoi Point, and camped in the house at Topánika. To reach it we were obliged to unload the sled, and carry every article, as well as the dogs, through the water around two points of rock. The ice was rotten, and there was a strip of open water ten yards wide between it and the shore. That night we had milk in our tea, the only time during my stay in Russian America. The house at Topánika, though well built, is very smoky, so much so that in good weather it is better to camp out of doors.

The next day we started for Unalaklík about eight o'clock. We had broken all the bone off the runners, and the sled moved slowly. I pushed on ahead, and reached Unalaklík about two o'clock ; the dogs arrived about two hours afterward.

The annual rumor of a proposed invasion by the Shágeluk Ingaliks had reached Unalaklík during my absence, and after two days' excitement had been forgotten.

November 3d, Isaac's brother arrived from Kotzebue Sound with two kegs of rum, bought from the traders. The whole village was in an uproar very soon, and the Russians barred the doors and loaded their guns, shaking in their shoes with fear. Poor Isaac came up to the fort, without a weapon of any kind,

and the Russians seized him, tied him with ropes, and beat him dreadfully with dog-whips. I remonstrated, but they paid no attention to it, and when weary of abusing him they turned him out of the fort, half naked, and blind with the treatment he had received. As soon as it became known in the village the women united in bewailing the misfortune, and the wind brought their cries distinctly to our ears. Isaac's wife came up to the window of the bidárshik's room and cried, "We will tell the Americans when they come back, and they will not forget us," but she was only answered with curses. More brutality joined to greater cowardice I hope never to witness.

The storm blew over in time, though the hatred which all the natives bore the Russians was much increased. Isaac was very popular among the Innuit, and had never injured the Russians in any way. I took some medicine and went down to the village next day, and dressed his wounds and bruises, but the Russians were afraid to leave the fort for a week.

On the 8th of November an old woman died very suddenly in the village. The warm weather in October had occasioned much sickness everywhere among the natives. Pleurisy and bronchitis were very prevalent; many were sick, and all much alarmed. By the liberal use of mustard I assisted many of them, and my attempts to cure them met with the utmost gratitude from the poor people. The weather was very cold, and a piercing east wind prevailed, which did not help matters.

Near the fort is a small village of Káviaks; their chief, named Kamókin, had been of much assistance to Captain Pim and other explorers in search of Franklin. He was always harping on this subject, and brought it forward on every occasion. A more persevering old beggar I never saw, nor were any of the others so unreliable or so mean. A fierce bulldog given him by the English was a perfect nuisance in the village. One of his workmen was sick with pneumonia, but not dangerously; he was in a fair way to recover when the old woman died. Fearful that this man would die in the house, which must then be deserted, Kamókin, with the greatest barbarity, and deaf to our remonstrances, put him out of doors in a cotton tent, without food, blanket, or fire. Of course, in two days, with the temperature thirty below zero and a sharp wind, the poor fellow died. His body was

dragged a short distance, wrapped in a piece of sealskin, covered with one or two logs, and all his little property, including his gun, scattered about on the ground. Left in this way, the dogs soon attacked it, and it was only by threatening Kamókin that we would take the body and throw it into his house through the smoke-hole, that we finally induced him to give it decent burial.

The cold weather continued, and we expected Kurílla with the dogs every day. Meanwhile I had a number of women set at work making new harness, as the old was worn out, and we should need a double supply. These harnesses are made with two bands over the back, sewed on each side to a broad band which passes around the chest and is prolonged into two traces. Beneath, a belly-band with a button and loop holds it on. A single small sealskin will make a dozen good harnesses. The thicker skins make the best, and they are often ornamented with red flannel and bright buttons.

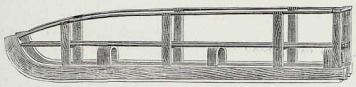
CHAPTER V.

Arrival of Kurilla and the dogs. — Departure from Unalaklik. — Various kinds of sledges. — Arrival at Iktigalik. — Series of detentions. — Indian avarice. — At Ulukuk and across the portage. — Comparative merits of different sledges. — Wolasatux. — Arrival at Nulato. — Sham hysterics. — Fish-traps. — Kurilla's return. — Journey to the Kaiyuh River. — Housekeeping. — Christmas and New-Year's. — Snaring grouse. — Yukon fish. — Continued sickness. — Arrival of the mail. — Start for the Redoubt. — How the Russians travel *vs.* how the Americans travel. — Arrival at the Redoubt. — Return to Iktigalik. — Break-down and repairs. — Dog-driving, and camp life in the Yukon territory. — Snowshoes. — Arrival at Nulato. — Expeditions among the Nulato Hills. — Hostile Koyukuns. — Reasons for their hostility. — Character of the western Tinneh. — Endurance. — Prevalent diseases. — Snow-goggles. — Totems. — Dances and songs. — Arms. — Habits of life. — Additional notes on the Kutchin tribes. — Making shot. — Attack on Tekunka and the result. — Arrival of swallows and geese. — Break-up of the ice. — Narrow escape. — Non-arrival of Indians. — Pavloff's departure.

EARLY in the forenoon of November 12th I was called out by a cry that dogs were coming. On reaching the river-bank I saw the tall form of the indefatigable Kurílla behind a rapidly advancing sled. He had hardly reached the fort when Pávloff, Paspílkoff, Peetka, and Iván the tyone came in sight with two other sleds. All was as usual at Nuláto, and there was a fair prospect of abundance of fish in the coming winter. We greeted them heartily, and were soon seated around the steaming samovár. They were eight days from Nuláto, and had found the ice on the Yukon in good condition, though there were still open places in it. The Russians were bound for the Redoubt, and Iván had come to Unalaklík to buy oil.

The 14th was stormy, and on the 15th I arranged to start for Ulúkuk. I was short of dogs, as Stepánoff had taken all the dogs belonging to the Telegraph Company, except those which Kurílla had brought from Nuláto. I was able to secure nine from the Unalaklík village, and hired three Máhlemuts to assist us as far as Ulúkuk and perhaps to Nuláto. I obtained two Innuit sleds, which would be available only as far as Ulúkuk. These sleds are

admirably suited for travelling over the ice, but are too heavy to use on a portage. They are made of spruce wood, with the runners shod with bone cut from the upper edge of the jawbone of the whale, and pegged on with birch pegs. They are brought from Bering Strait, and good ones are worth ten sables a pair. The sled is furnished with a flat bottom made of slats, on which the



Innuit sled of Norton Sound.

load is laid, and with a low horizontal rail. We were accustomed to lash a pole on each side, projecting behind the sled at an angle of fifty degrees with the runner These poles, strengthened with a cross-bar, assisted materially in pushing and guiding the sled and in lifting it up and down steep banks.

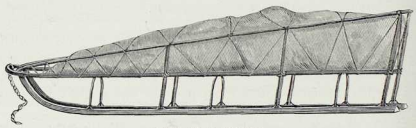
We had brought down from Fort Yukon to Nuláto, the previous summer, two Hudson Bay sledges and a set of harness. They are

Hudson Bay sled, loaded.

made of three birch boards about twelve feet long. These are cut thin at one end, about three feet of which is bent over, lashed and covered with rawhide to keep it in place. Inside of this curve the voyageur carries his kettle. The boards are secured to each other by crosspieces well lashed on. The load is placed inside of a large bag as long as the sled, and made of dressed mooseskin. It is then covered over and firmly lashed by means of a rawhide line and netting attached to each side of the sled. A piece of mahout, known as the tail-line, passes through a loop in the head of the sled and is tied to the lashings over the load, binding it all firmly together. The preceding sketch shows the appearance of the loaded

sled. The harness is furnished with a padded collar, like a horse-collar, but rounded, which goes over the neck of the dog, and the traces are long. The dogs are harnessed tandem, and three good ones make a team. The traces are buckled on each side of the dog behind, so that the strain all comes on the load and no power is wasted. I found it advantageous to lash two poles to the load behind, as already described, as it is very hard work controlling the motions of the sled by means of the tail-line alone.

The Indian sled of the country is much lighter. It is made of birch, with thin, broad runners, which bend with the inequalities of the road. The accompanying picture will give a better idea



Ingalik sled of the Yukon.

of it than a description. There are no nails or pins, the whole being lashed together by means of rawhide thongs. The load is usually covered with cotton cloth, and firmly lashed to the sides and rail of the sled. The dogs are harnessed two and two, with a leader, to a single line in front of the sled. The traces are tied together, and attached by a short cord to the sled-line. The harness was described in the last chapter.

We had had many discussions during the past season, in regard to the respective merits of the different kinds of sleds, and I was very glad of the opportunity of thus putting them to a practical test. The Hudson Bay sled is the only one used by their voyageurs; while the Russians use a sled similar to the Indian one, but broader and more strongly made.

We started for Ulúkuk about noon of the 15th. Our loads were unusually heavy and the teams small. On each of the Hudson Bay sleds I placed about four hundred pounds, and gave them three good dogs apiece. The Indian sled took about the same load with four dogs, and the Innuit one had about seven hundred with five dogs. The latter, being shod with bone, will carry a

very heavy load over smooth ice with ease. I took one of the Hudson Bay sleds, as I always made it a rule to take as heavy a sled as any man in the brigade. With this arrangement no man could complain of the excessive weight of his load, and laziness was left without an excuse. A light sled should always lead, and break the road. This was Kurílla's post; I brought up the rear, to prevent the natives from needlessly lagging behind. When sure of my men and with a good road, I always took the lead. It is a good plan for the leader to carry the blankets, chynik, and axes; for if a storm should come up, and the others should drop behind, they cannot camp until the day's work is finished, and they have caught up their lost ground.

We found the going moderately good, and camped a short distance below Iktígalik about six o'clock. The days were beginning to be short. The sun rose about ten o'clock, and by three in the afternoon had again reached the horizon. His highest elevation was far below the zenith.

We reached Iktígalik early the next day. Here we camped, bought dog-feed, and rearranged the loads, substituting an Indian sled for the Innuit one, which was of no further use, as we were about to make portages. Matfáy had promised me a new sled and the use of his dogs, for which I had paid him in advance. Now, the old ruffian refused to let his dogs go at all, and gave us a weak and almost worthless old sled. Amílka and others had built some new winter houses near Nuk'kóh, and had deserted Ulúkuk entirely, only one house there being still inhabited. All the Ingaliks were going to the Káiyuh River a little later in the season. Here Tékunka had announced that he would hold a festival. He was now on his way to Unalaklík to purchase oil. We were delayed the next day, having to patch up the old sled, but got off about ten o'clock. We had not proceeded far before three of the knees on one side broke. After making the best repairs in our power we pushed on, and about noon reached the new village.

Here we found a large number of Indians. There was a new sled there, and the owner asked for it a can (1 lb.) of powder, ten balls, and ten percussion-caps. The usual cost of a sled is twenty balls; yet I would have purchased it, even at the outrageous price he named; but after paying him he stooped down and be-

gan to strip off the lashings, saying that the remni belonged to another man. At this my temper, which had been at the boiling-point ever since I left Matfáy, gave way, and I expressed my decided opinion of him as thoroughly as my vocabulary permitted me. Leaving the sled and reclaiming the price, I pushed on, determined not to submit to such an imposition. About a mile beyond the village the old sled gave out entirely. This was the last drop. I said nothing, but took out my pipe and sat down to calm my nerves. The others did the same, and finally Kurílla spoke up and said that we must go back and buy the sled previously spoken of. He suggested that he had a small tin which held only half a pound of powder, and if that were presented to the man he might not detect the difference: in this way we might get even with him. We had plenty of mahout to lash the sled again. I told him he might try, and he went off and soon returned with the sled. We had meanwhile boiled the chynik, and now took our tea, after which we reloaded. One of our dogs had taken the opportunity to gnaw off his harness and disappear in the woods. Meanwhile it had become almost dark, and the men were grumbling, and wanted to go back and spend the night at the village. They invented stories about there being no ice in the Ulúkuk River, and went grudgingly to their work when I told them that stopping was out of the question, and we should sleep only on our arrival at Ulúkuk. This day's adventures are fair specimens of the annoyances sometimes experienced in travelling, and which only patience and energy can overcome. The dogs are given to running away when most wanted, and light steel collars, and chains such as horses are hitched with, would be a very valuable addition to any traveller's equipment.

We arrived in good order, but some time after dark, and camped in one of the winter houses. There we found a few Indians, and obtained abundance of trout, fresh from the river, with which we fed ourselves and the dogs, reserving the lighter úkali for the road. A small Indian cur occasioned great confusion during the night, howling and fighting, and started at last for the woods, with several of our dogs in pursuit. I had reckoned that old Amílka would be willing to lend us his fine team, but he refused; — such is life among the Indians!

The next day was occupied in repairing damages, reloading, and recovering our runaway dogs. The weather was disagreeably windy, with snow.

On the 19th we started very early. A few miles from Ulúkuk we were astonished to see dogs coming, and in a few moments the previously mentioned cur appeared, with Amílka's three dogs in hot pursuit. These were immediately impounded and pressed into the service, forming an exceedingly acceptable addition to our insufficient teams. Even the cur was made to contribute, by tying her to the foremost sled as leader.

In crossing one of the gullies by which the tundra is intersected, the new sled was broken beyond repair. The Indians were in despair; but, by cutting off about three feet of the other runner, I made a short sled, in which two dogs could haul our blankets and other light but bulky articles. The remainder of the load and team was distributed among the other sleds. Owing to this delay we were obliged to camp near the Vesólia Sópka. These repeated stoppages were the more annoying as our dog-feed was short.

The next day we made better time, and camped near Beaver Lake. Many deer tracks were visible, and there were evidently herds in the vicinity.

The following morning we passed Beaver Lake and One-Tree Camp. The wind and snow were blowing just as they were the year before, when I was travelling with Mike. I little thought at that time that my next journey on that road would be taken alone. Facing the keen wind, I got my nose and cheeks somewhat frostbitten, but soon restored them by rubbing with snow. It has been said that freezing is unaccompanied by pain, but my experience does not confirm it. The feeling is as if a thousand red-hot needles were being driven into the flesh. Of course, after it is frozen beneath the skin, there is no further pain. Immediate application of snow will relieve it, and the usual effects are slight. The skin peels off and leaves a brown stain resembling sunburn, and quite as ephemeral. Fire and warmth should be avoided, as they produce an intense burning pain attended with inflammation. The best plan in cold weather is to face the wind boldly; after a while the skin will become inured to it. Arriving at Periválli, we camped, making our supper of úkali and tea.

The next morning we started with the twilight. The valley through which we had been passing is of an hour-glass shape. The narrowest part is near a round, abrupt hill, called by the Russians the Ass's Head. It widens toward Iván's barrábora and Kaltág. We camped not far from the latter place. For the last three days we had been on snowshoes, and the road was far from good.

In the following morning early we reached the Yukon, and crossed to the village on the left bank. Here I bought some dog-feed and a couple of rabbits. There were many fresh marten and fox skins on the caches, and most of the men were away trapping. At this season the fur is the best; toward spring it becomes faded by the sunlight. The next day we continued on our way, reaching Wolasátux' barrábora in the afternoon. Dog-feed was very scarce, and I was obliged to give them only half a fish apiece, instead of a whole one, which is the usual ration. I found myself very tired, having worked with a Hudson Bay sled all day, and with a very heavy load. I came to a conclusion about the sleds, which I have not yet seen any reason to change.

The virtues of the Hudson Bay style are, that it will carry very heavy loads without breaking; that it will make fair time on level, hard snow; that the method of harnessing is good; and with first-class dogs it will do good service. Its faults are, that it will not carry as large a load of light baggage, dog-feed, &c., as the Russian style; that it is much harder to guide; that it is extremely hard work to take it up hill; that on a side-hill it keeps sliding down, unless a level road is beaten for it; finally, that it is almost immovable in soft snow, a large pile of snow always forming under the head of the sled.

For the Russian style it may be said, that, while more liable to fracture, it is much lighter; it will carry an equally heavy load, with the same dógs, as the other style, and the load is above the surface, and not so liable to injury from water or snow; it rides much more easily on a hillside and in soft snow, and the driver can help the dogs much more effectually. The Hudson Bay style is the best for carrying such loads as oil, fresh meat, flour, and hardware; and the other for all lighter loads. The Hudson Bay harness is decidedly the best, but not suitable for a large team, which would infallibly tangle at every declivity. The Innuit sled

is superior to both on the ice, and far inferior everywhere else. The Hudson Bay dogs are swifter and better trained, but not so enduring or tough as the dogs of the coast.

Wolasátux, poor man, was in great tribulation. His eldest son, a bright-eyed, intelligent boy of twelve, was evidently dying. The child was wasted to a skeleton; his cheeks burned with fever; his stomach alone protruded. The old man and his wife were both laid up with pneumonia, and his breast was covered with scars, where he had applied the actual cautery. I left as much bread as I could spare, and some pieces of backfat for the sick boy, who brought out from its hiding-place the skin of a lemming, which he had prepared for me the previous summer. I made the old man a liberal present, for he was a very generous and kind-hearted old fellow.

About noon the following day we reached Nuláto. Only three Russians were there. The house in which I proposed to winter was unfit for occupancy, being without windows. It had been repaired according to my orders, and I occupied a corner in the bidárshik's house until my own should be ready. Several of my dogs had been taken to feed during the past summer by Indians, who had failed to return them in the fall. I sent a man to Koyúkuk, where a great festival was being held, to procure the missing animals. Fish was very scarce, the traps catching very little, as the water continued high in the river. The next day two dogs arrived, but a third had been killed in a rage by the Indian who had it in charge, as he had hoped to keep it permanently. The dogs and sleds were prepared for another journey to Ulúkuk, to bring up the remaining goods. On the 28th of November the brigade started, in charge of Kurílla, Johnny accompanying him, with two Indians and the Máhlemuts. The Russians got after my alcohol for collecting, and I was obliged to poison it. I set to work making windows, and laying my plans for putting down a fish-trap on my own account. The idea of being dependent on the Russians for fish was repugnant to me, and I knew very well that they were often without fish for their own use.

Several of the Indians at the fort had been attacked by a kind of fit, and one of these occurred in my presence. The Russians consulted me as to some means of cure. The patient fell in a sort of convulsion, struggling violently, appearing unconscious,

tearing the clothing, and breaking everything within reach. There were no symptoms of any disease, and the fits were epidemic, seizing one after another at short intervals. The cases resembled the descriptions of those people who were supposed in ancient times to be bewitched, and also some of those appearances which have accompanied cases of semi-religious mania in Europe in modern times. Suspecting the cause of the symptoms, I recommended the application of a birch twig, well laid on: the result exceeded my anticipations. The patients arose in a rage, and the epidemic was effectually checked. The reason for such behavior was inexplicable, and is one of the mysteries peculiar to the Indian mind. It is probable that in the course of time these fits, at first wilful, became in a measure involuntary.

Having finished the windows, I began to put the house in order, and it soon assumed a habitable appearance. My fever, which I had hoped was thoroughly conquered, returned, and I felt anything but well.

On the 4th of December, Pávloff and his companions returned from the Redoubt. They brought discouraging reports from Kurílla, whom they represented as without dog-feed. They strongly opposed my putting down an independent fish-trap, saying that it would cost me a great deal, that I should catch no fish, and that they could furnish me with all I required; but I determined to persevere in my own plan. These fish-traps are the sole dependence of the Russians and Yukon Indians in winter, for a regular supply of food. They are made in the following manner. Green spruce trees, straight-grained and without knots, are selected. It is often a matter of great difficulty to find them. When obtained they are repeatedly split by means of wedges, until the wood is reduced to strips a quarter of an inch in diameter and twelve feet long. The tough green wood does not break. These strips are for the basket and funnel. Thicker ones are used for making the fences or mats. The former are carefully trimmed until cylindrical. The latter are tied together with osiers until a sheet of network is formed, with the strips crossing each other at right angles, and the meshes about two inches long and one high. These sheets are eight feet high and ten long. The basket is twelve feet long, cylindrical, tapering nearly to a point at one end, and open at the other. The aperture in the

point is about eight inches in diameter, and is closed by a small cover. The cylinder is about two feet in diameter. A large funnel of similar network is made. The mouth of it is eight feet square, and it tapers to a very small aperture, just large enough to admit a fish. The point is inserted into the open end of the cylinder, and the whole is tied together. The network of both is fastened with strong twine of hemp, or the inner bark of the willow. Holes are cut into the ice, uprights driven into the mud at the bottom of the river, and the mats are tied strongly to them. In this way a T-shaped fence is made, extending at right angles to the current out into the stream, to a point where it is about eight feet deep. The funnels, with baskets attached, are fastened to the ears of the cross-stroke of the T, one basket pointing up stream and the other down. They are so arranged that they can be lifted to the surface and out of the water. The ice above them is broken away by means of four-sided chisels made for the purpose. As they are raised every other day it does not form to any great thickness. The baskets are kept in place by sharp poles attached to the point and to the sides of the funnel, and pushed down into the mud. Fish going up or down stream follow the shore until they come to the fence, which guides them to the mouth of the funnel, when they enter the basket, from which they cannot escape. The water passes freely through the network, and keeps them alive for any length of time. As the water falls, the fence is extended, and baskets moved out or new ones put down. It is a work of no little labor to cut through the ice and put down the trap, or *zapór*, as the Russians call it. This trap was original with the Yukon Indians, but is found only below Koyúkuk. The upper Indians and the Hudson Bay people know nothing of it. Yagórsha informed me that the Yakúts had a similar custom. Without it, in winter, starvation would reign on the Lower Yukon. Similar traps are used in summer and raised by means of boats. The slender network, exceedingly frail when dry, is very tough when wet. The fish are shaken out by opening the cover at the point of the basket. I had great difficulty in getting suitable wood, and had to send six or eight miles from Nuláto for it. I cut the willows on the island myself, to be ready for work when Kurílla returned.

Métrikoff, the bidárshik of Nuláto before Pávloff, died suddenly,

leaving two bright, intelligent children. The Russians had retained them on sufferance until the Governor could be heard from in regard to them. Maksútoff's reply was, that the Company would do nothing for them, and they had better be given to the Indians! Their mother was dead, and the recommendation of the hard-hearted Russian was carried into effect. Ingechuk, who was a relation of the mother, came and took them to Ulúkuk. It was hard to see two such boys deprived of all prospect of education and condemned to a worthless life with the Indians, but it was a fair specimen of the character of the Russians in Northwest America.

The weather had set in very cold, and averaged thirty below zero at noon. The wood for the trap, which had been obtained with so much trouble, proved unsatisfactory, and there was no prospect of obtaining more until Kurílla returned. Meanwhile, though sick and miserable, I had not neglected the collections, and had already several hundred birdskins of the species which are winter residents.

Late in the afternoon of December 15th, Kurílla made his appearance with the brigade. They had done everything I desired, had brought all the goods except a bag of oil and some úkali, and the train contained four Máhlemut dogs, beside thirteen of mine. The Innuit had come forward and offered dogs as soon as they heard I was in need of them. I could not have trusted any Russian in the territory to do the work as well and faithfully as Kurílla had done it.

The Russians were out of fish. I had úkali, but none to spare. It was evident that nineteen dogs could not be fed at Nuláto for any length of time, and I determined to go to the Káiyuh River, where Tékunka was giving a festival, and distribute all but one team among the Indians, to be fed and used until I needed them again.

Notwithstanding they had nothing to eat, — as the day was a Prasnik, or holiday, when they were not obliged to work, — the Russians preferred sitting in the house and grumbling, to the trouble of going to the fish-trap.

On the 17th of December the Nowikákat tyone and seven men arrived with a small hand-sled loaded with furs, which they sold to Pávloff. When they were at a little distance, though their num-

ber could be counted, the Russians were seized with one of their cowardly fits, barred the gates, loaded the howitzer, and prepared for an attack from eight men and a boy! On their stating their errand, the commotion subsided and the gates were opened.

I made the tyone a present of some tobacco and ammunition, in consideration of his services during the previous spring. With Indian assurance, he immediately demanded a seine, gun, blanket, and a large supply of ammunition, which of course were produced forthwith.

The next day I harnessed all the dogs into one sled and started for Wolasatux', riding several miles for the first time during my stay in Russian America. We found all sick on our arrival, and very short of provisions. The following morning we proceeded up a small river and across the country, until we arrived at Tékunka's barrábora on the Káiyuh River. Here we found the festival in full blast and the place crowded with Indians, dancing and singing all night, so that we got very little rest.

The country is rolling, sparsely wooded, and full of small lakes and rivers, which contain many fish, especially in summer.

The next morning, as the Indians were still engaged in their festivities and would not attend to anything else, I put on my snowshoes and travelled about fifteen miles eastward, to the ridge of the Káiyuh Mountains. These are low hills, trending in a northeast and southwest direction, and at that season covered with snow. Beyond them the country was rolling, with occasional hills, and sparingly wooded. The rivers, if any, were hidden by the snow. I returned, and reached the house in time to make a good camp outside, as I felt very tired and unwilling to be deprived of sleep for another night. I made my supper on raw, frozen whitefish, scraped up like frozen pudding. This dish is not unpalatable, as the freezing has all the effect of cooking. Several of the Indians made me presents of mink and marten skins.

The next day was devoted to trading. I secured a full sled-load of frozen fish and úkali, keeping six dogs, and hiring Indians to take and feed the rest. I also purchased a quantity of frozen berries, and some mats to cover the floor of the house at Nuláto.

Tékunka promised faithfully to make one of my party down

the river in the spring, and I gave him a gun as part payment to clinch the bargain.

The next day all the Indians dispersed to their homes. We left Tékunka, passing up the river to a place known as Jearny's barrábora. Jearny (meaning fat) was the name of a very stout, greasy Ingalik, who had a house and fish-trap, where I hoped to obtain some more fish. The afternoon was moonlight, the sun

Jearny's barrabora.

setting very early, and after stopping to buy fish we thought best to push on. The fence of the fish-trap at this place extended clear across the river, and was made of bundles of willow brush tied together and placed side by side. There was only one Indian house and two caches. The building over the entrance to the house was large, square, strongly built of heavy logs, and pierced for musketry.

We camped five miles beyond. I had determined to return by another route, which would bring us on the Yukon nearly opposite Nuláto. Here I met with a serious misfortune, losing a fine meerschaum, which had been my constant companion and solace. I was now reduced to a single brierwood, in very poor condition. The next morning, starting with the first light, we followed a very poor, roundabout trail toward the Yukon. I

went on ahead of the dogs, and soon outstripped them. About dark I reached Nuláto, pretty thoroughly tired out, having made nearly forty miles on snowshoes. The train arrived about two hours after.

On leaving Nuláto I had placed all our slender store of crockery on a high shelf, that it might be out of any ordinary danger. What was my regret, on going into the house, to find that the shelf had given way, and the whole was in fragments on the floor! No more could be obtained for love or money, and we were reduced to eating off of tin. Luckily, I had purchased of Ketchum a Hudson Bay cup, saucer, and plate, made of iron lined with porcelain. These were uninjured, and afterward did good service. Another plate was repaired by boring small holes with an awl, and sewing the pieces together with strong waxed thread.

My efforts were soon directed to the work of supplying our household with various necessary utensils. Lamps, small cups, and other articles were manufactured out of old tin cans. Mosquito-netting furnished the material for a sieve, and with Paspílkoff's assistance I made a candle-mould. Seal-oil lamps are very unsatisfactory, requiring constant picking, and making a great deal of smoke. Cotton twine furnished wicks, and I was soon able to make very passable candles from my extra supplies of reindeer fat.

The flour which I obtained from the Russians was a mixture of rye and wheat meal, usually denominated groats. The husks were so coarse and abundant that sifting became necessary. The Russians raised their bread by means of leaven, but as this made sour bread I adopted another plan, which is here described for the benefit of future travellers. A gallon of warm water was mixed with a handful of coarse salt, flour enough to make a batter, and was placed in a wooden vessel on the warm peechka over night. Early in the morning flour enough was stirred in to make it of the proper consistency. At breakfast-time the fire was made, and after breakfast, when the coals were removed from the oven, the bread was kneaded, made into loaves, and put in. An hour usually served to bake it, making a batch of perfectly light, sweet bread, without yeast or leaven. White flour may be treated in the same way, but takes longer to rise. I usually made up about forty pounds of flour at a time, and the bread would last us about

a week. I soon found, by calculation, that we must be very careful with our flour, and was obliged to weigh out the daily allowance, — a pound each, not a very large piece of such damp brown bread. I allowed each three pounds of sugar per month, and a pound of tea for all hands. In this way I managed to make our supply last, although we were often on short commons. Fish, rabbits, and grouse were unusually scarce, and often entirely deficient. No deer visit Nuláto during the winter.

I had saved a small piece of frozen deer meat for Christmas, which found us without other supplies in the storehouse. Christmas morning I bought two white grouse, and sent Johnny out to shoot another, which he fortunately succeeded in doing. With these, some berry pies, and some sweetened short-cake, I made

Yukon grouse-snare.

out a pretty fair dinner, and invited Pávloff and Yagor to eat it with me, each bringing his own cup, plate, and spoon, as my stock did not set the table. It was a lonely Christmas compared with the last, or with any I had ever spent before. It was impossible to help thinking of the dear ones at home, of the Christmas-trees and festivities they were enjoying, and equally impossible to doubt that they were thinking of us as we were of them, though many thousand miles away.

New-Year's day brought cold weather, forty-eight below zero. My hunters were unsuccessful, and our dinner was reduced to fish soup, cranberry pie, bread, and tea. My family consisted of Johnny, two Indian boys, and Kurílla. I sent the boys out setting snares for grouse and rabbits. These were occasionally successful, and eked out our slender bill of fare. The snares are

made of twisted deer sinew in a running loop. This is attached to a pole, balanced, as in the preceding sketch, between two branches, and caught over a horizontal pole by means of a small pin tied to the snare. Brush is piled on each side of the tracks which the grouse run in, so that they have to pass through the opening where the snare is set. A touch loosens the pin, and the heavy end of the pole falls, hanging the partridge or rabbit in the air. Some seasons hundreds are caught in this way. These grouse feed entirely on the willow buds, and the crop will sometimes contain a pint. The flesh is hard, dry, and tasteless; a long experience in eating it has left an unfavorable impression. Our fish-trap was in process of manufacture, but illness prevented me from assisting. I seldom rose from my bed, except to weigh out the daily allowance of bread, and I felt my strength failing fast. In spite of this, I could hardly force myself to eat, and was tormented with constant headache.

Cold days alternated with warm weather, and even occasional rain. Pávloff said he had not known such a season for sixteen years. Such mild weather in January was unprecedented.

January 16th the Indians and some Russians, whom I had hired to help, commenced putting down my fish-trap. Kurílla came home with an ugly wound in the thigh, from falling from the sled upon an ice-chisel. I dressed his wound, but this disablement was a serious misfortune. All the Káiyuh Indians, starved out by the unwonted scarcity of fish, had gone to Ulúkuk, where there is always abundance, to stay until March. Weeks passed by, and not an Indian came near the fort.

The Russians were totally without fish, returning from the examination of fifteen baskets with three poor whitefish. They were living on tea and bread. Their dogs were nearly starving. Iván started up the river on his annual trip to Nowikákat, and hoped to find dog-feed on the road.

Kurílla's wound healed rapidly, and to my great thankfulness he was able to ride on the sled and examine the fish-trap, which had caught six whitefish, — a good omen. The first week or two, before the resin is washed out of the wood, the trap rarely catches anything. On the 24th of January there were twelve fish in the trap. From that time forward we obtained from ten to thirty fish every two days, which drove the wolf from the door, and

enabled me to save my úkali by leeding the dogs partly on fresh fish. The Russian trap still continued almost empty, and if I had not persevered in my plan of putting down an independent trap, I should have been left without fresh provisions and lost my dogs by starvation.

The first fish which are caught in early winter on the Yukon, are the "*losh*" (*Lota maculata*) of the Hudson Bay men. These are known in Lake Erie as the "eel pout," and grow in the northern rivers to a very large size. I have seen them four feet long and weighing sixty pounds. The liver is very large and full of a rich sweet oil, which we found very useful in cooking. The livers themselves are good eating, but very rich. The flesh is hard and tasteless, and is usually given to the dogs. They present an anatomical peculiarity in having from one to four distinct gall bladders. The spawn, which occupies a large part of the abdominal cavity, makes an excellent soup. The next most common kind of fish is a red sucker, which grows also to a large size. The heads make a good soup, but the rest of the body is so full of bones as to be uneatable. The pike (*Esox estor*) is very common in the lakes and small rivers, but rare in the Yukon. A salmon-trout is rarely caught, and a belated salmon occasionally finds its way into the trap as late as January. There are six kinds of whitefish, some large and others small. The sea whitefish, or *Morskoi seegá* of the Russians, is considered the best. There is also found in spring a fish resembling the whitefish, but dark-colored, and with a very long dorsal fin, from which it gets the Indian name of "blanket-fish." In July the salmon begin to ascend the river. There are five kinds. Three of them are good eating, but the others are only fit for dogs. After August they are bruised and in bad condition, being cast in layers a foot deep on the banks of the small rivers. I have seen hundreds of thousands of dead salmon cast up in this way by the stream. Of course, in this condition they are only fit for dog-feed, though the Indians will eat them if other food be scarce. Most of these fish, except the salmon, are common to the rivers of the Hudson Bay territory.

On the 30th of January, Pávloff returned. He had not gone far, for want of dog-feed. His trade consisted of a black bearskin and one lynx; the previous year he had brought back some seven hundred sables.

My collection had thriven pretty well, in spite of sickness. I had a keg of small animals and fish, two boxes of birdskins, and other light specimens.

Still, I was fearful lest my sickness should increase so as to prevent my collecting in the spring. I saw that the Russians and Indians considered me as half dead already, and I resolved to overcome it by force of will, if other means failed. I looked in the glass one day, and saw such a cadaverous reflection there that I turned it to the wall. I had already made preparations for my journey to the sea-coast, and the birch was seasoning from which I intended to have a long sled made, expressly to bring the bidarrá over the portage without taking it apart.

On the 3d of February there was a commotion in the fort. Dog-trains were approaching in the distance. A rumor spread that Stepánoff was coming, and it was amusing to watch the unaccustomed energy with which the Russians hastened to clean out the yard, removing the accumulated dirt of months, and sweeping the path clean from the gateway down to the ice. It was not Stepánoff, however, but a Russian and two Creoles, with two of Stepánoff's fine teams from the Redoubt. On arriving, they proved to be Kámaroff, Lukeen, and Alóshka; they brought a bag of oil for Pávloff, a two-gallon keg of molasses, and a larger keg of salted geese, — a present from Stepánoff for me. I knew at once that they had not come so far merely to bring these things. I asked if any news had arrived from Sitka, and received only an evasive reply. After a little I called Lukeen, who was a jolly little Creole, into my house, and stimulated him until he told me, with many injunctions of secrecy, that the official news had arrived, via Nushergák and the Kuskoquím, of the sale of the territory to the United States, that the Russian American Company was wound up, and all the Russians would return to Sitka or the Amoor River by the vessels in the spring. This was good news, and I lost no time in hoisting the stars and stripes on our flagstaff in front of the fort. The news was soon made public, and all received it with joy. Old men who had been many years in the country, detained by trifling debts to the Company, which they had no means of paying, were extravagant in the expression of their delight in the hope, so long deferred, of seeing Russia once more. The native women, who

could not accompany their husbands if the latter chose to leave the country, were in tears at the prospect of parting; while others, whose husbands had treated them with brutality, did not conceal their pleasure at the hope of getting rid of them.

Kámaroff decided to try his luck in trading at Koyúkuk, and beyond; on his return, Pávloff was to go with him to the Redoubt for orders. I decided to accompany them, thinking, if I did break down on the road, I should be within reach of assistance from them, and I had many misgivings as to my own strength.

Paspílkoff at once set about making my new sled, and we began to prepare sukarée for the road. By dint of extreme argument I succeeded in getting Peetka to accompany me to the Redoubt. I proposed to take Kurílla, and leave Johnny and the rest to take care of the house.

Kámaroff and Lukeen returned with a few furs on the 13th, and everything was prepared for an early start the next day. Our loads consisted principally of the collections. I took a Hudson Bay sled, and the long sled for the boat, with eight dogs. On the 14th we set out. I found myself too weak to walk, and was obliged to ride nearly all day on the sled. We made a very short day's work, as the Russians stopped to get dog-feed from the fish-traps, and camped at Wolasátux' barrábora, where they rummaged all the caches for úkali, the Indians being at Ulúkuk. The next day we camped at Kaltág. The necessity for work and the determination to do it were conquering my weakness. I felt better than for months previously.

The next day we reached the hill at Beaver Lake. This was an excellent day's work, and I so remarked to Kámaroff. "Yes, Gospodin Doctor," he replied, with an amusing air of superiority, "this is the way the Russians travel." I made no answer, but did not forget the remark.

The next day we took tea at noon near Iván's barrábora. The Russian sleds were light, and they had full teams of fine dogs. With our heavy sleds we were soon left behind. I forced myself to walk on snowshoes behind the sled, and relieved the dogs as much as possible. We passed Poplar Creek, and came to the Vesólia Sópka about dusk. The moon was shining, although there were dark clouds coming up, and we pushed on as fast as our tired dogs would go. Stopping a moment to rest, I improved the opportu-

nity to sketch the scene, of which the frontispiece gives a good idea. The crust was covered with about three inches of soft dry snow, and the Hudson Bay sled pulled very hard. Constant exercise of the lungs and whip were necessary to keep the dogs up to their work. On we trudged, following the track, lifting the sleds up and down gullies, pushing through occasional drifts, and shouting encouragement and admonition to the dogs, calling each by his name.

We did not turn off from the tundra at Ulúkuk, but kept on, until I noticed that there were no new tracks, and called to Kurílla, inquiring where the Russians were. He replied that he did not know; perhaps they had camped at Ulúkuk; but as that road was such a bad one he had kept on the Indian trail across the tundra direct to Iktígalik. I approved of his determination, but saw that we must reach the latter place before we could camp, as the trees along the edge of the tundra were small and sparse, the wind was rising, snow beginning to fall, and poorga impended. At last we reached the river, and collected all our energies, as the blast, carrying snow and almost blinding us, was increasing in severity. In half an hour we passed a fish-trap, and soon after, the welcome sight of the tall caches against the sky met our eyes. We carried the sleds up the bank with a will and a shout, which brought the Indians like marmots from their burrows. An Indian who had been with us during the early part of the day came out and inquired where the Russians were. Kurílla replied that we did not know, probably at Ulúkuk. The air rang with their shouts of derision, at the idea that a sick man, with heavy loads and feeble teams, should have outstripped the fine dogs and empty trains of the Russians. The poor dogs were unharnessed, and immediately curled themselves up to sleep, refusing to eat, from fatigue. It was with a pardonable feeling of pride that I took my place in the house by the fire, and discussed the day's work over a cheerful cup of tea. By the winding road which we were obliged to take, we had made not less than fifty miles, unquestionably the longest day's travel with loaded sleds which had been made in that part of the territory within the memory of the oldest inhabitant.

The next morning, after a long night's rest, we arose and fed the dogs. The teams were loaded and harnessed up, and I spent

a half-hour purchasing deer meat and úkali for my dogs on my return. We then started down the river, and after a mile or two stopped to obtain some water. Just as we were about to push on, the Russians, who had been travelling since daybreak, came over the bank. Kámaroff advanced, cap in hand, and inquired where I spent the night. I informed him, and he remarked that we had made an excellent day's work yesterday. It was now my turn, and I replied, "Yes, Kámaroff, that is the way the Americans travel!"

About three o'clock in the afternoon we reached Unalaklík. Here we found Ostrofskoi alone, Pópoff having been recalled to the Redoubt. After some trouble, I hired a Máhlemut sled to take our goods on to St. Michael's. All the Innuit were away hunting deer, only two or three old people remaining in the village.

After a cold, rough journey, we reached the Redoubt about noon of the 23d. The wind was very strong, the ice broken and piled up in barricades twenty feet high. The temperature averaged twenty-eight below zero. We were just in time for a hot bath, and Stepánoff received me with great hospitality. A private letter from the Russian ex-governor had informed him of the circumstances of the sale and transfer of the country, and the arrival of General Rousseau at Sitka. The winter expeditions from the Redoubt had been very successful, and more furs had been obtained than for many previous years.

I obtained two bags of flour, some powder, and tea, from Stepánoff. At home it would sound queerly to talk of going three hundred and fifty miles for a bag of flour, but here it was well worth the trouble.

Though still very weak, I felt perfectly well, and could ascribe my recovery only to the exercise of will required by the journey.

On the 27th of February I started with Pávloff for Nuláto. We were able to pass around Tolstoi Point on the ice, an unusual occurrence, which facilitated our journey. We arrived at Unalaklík on the 29th. I found that Ostrofskoi had made away with a good many of the úkali which I had relied on to feed my dogs on the return. It was impossible to obtain restitution, as úkali were not to be had for the asking. These fellows are inveterate thieves.

On the 2d of March I reached Iktígalik. I had hired several

extra dogs from the Russians, and found two of my own here, which Andrea had stolen. The place was crowded with the Káiyuh Ingaliks, and I gave him a rating for his dishonesty, in their presence, which made him sneak away like a whipped cur.

We determined to strike on to the tundra directly beyond Iktígalik, and I would recommend this plan to all future travellers. It is far preferable to the old route by way of Ulúkuk. By keeping along the bases of the Ulúkuk hills, a nearly even road may be obtained as far as the Vesólia Sópka. At the first bank beyond Iktígalik the runner of the new sled carrying the bidarrá broke short off. My mortification was great, and the Russians passed on, thinking us disabled for several days at least. To make a birch runner, the wood must be bent while green, and then well seasoned. To do that here was out of the question, and we lighted our pipes and sat down to consider what could be done. After consultation, Kurílla started off with the axe over his shoulder, and I made a good fire, and put on the chynik, determined to be comfortable, whatever might turn up. Kurílla returned with a slender spruce tree, which he rapidly hewed into the shape of a runner. I sent an Indian back to the village to borrow an awl and buy some small sealskin line. As soon as the runner was hewn out, we bent it in the fire, and in two hours we had the sled completely repaired. The new runner was thick, heavy, and clumsy, but answered the purpose very well. Deerskins, to prevent the sealskin from chafing, were laid on the sled, which had no rail. The boat was then replaced, and strongly lashed. We took our tea, and proceeded on our way. In the afternoon we passed the Russians, who had camped near a small stream. They were much surprised and disgusted at seeing us so soon. We camped just beyond the Vesólia Sópka. I had the heaviest load on one of the Hudson Bay sleds, Kurílla had the bidarrá, and an Indian called Blackbird had the other sled.

My team comprised three dogs. The leader was a fine black dog named Ikkee, who had a magnificent bushy tail, which was always erect and curly. The next one was black and white, and called Sawáshka, a hard worker and of amiable disposition. Next the sled was old Kamúk, my favorite, and the ugliest dog in the brigade. His tail, poorly furnished with hair, was usually

between his legs ; his ears were short, and scored with the marks of many battles. His face was stolid, and exhibited emotion only when feeding-time came, or when some other dog ventured too near or lagged behind. His body was large, and his legs were like pillars ; his color was white, with dirty spots. Altogether he looked a good deal like a lean pig. But how he would pull !

A description can give but a faint idea of dog-driving. It is an art in itself. The nature of dogs is cross-grained, and they frequently do the wrong thing with apparently the best intentions. Each has a peculiar look and character. Some are irreclaimably lazy, others enjoy hard work unless pushed too far ; some are greedy and snappish, others good-humored and decorous. All are very practical, showing affection only for the man who feeds them, and for him only as long as he feeds them. Hence the voyageur should always feed his own team himself. They dislike the whip, not only when in use, but in the abstract. They will always destroy one if they can get at it. The whip is made with a short handle, a very long lash, braided of leather or sealskin, and usually loaded with sheet lead or bullets in the core.

As we walk behind the sled, which ordinarily travels about four miles an hour, we have an excellent opportunity of studying dogs. One habit appears to be ingrained in their nature. It exhibits itself at street-corners in cities, and at every bush, stump, or lump of ice which they pass on the road. When travelling rapidly, some dog will stop twenty times an hour to examine any bush or twig which attracts his attention. If a leader, it checks the whole team ; if not, he usually entangles himself in the harness, and jumps frantically to release himself as he hears the well-known crack of the whip about his ears. If a log comes in the way, and the driver is not ready with his help in urging the sled over it, down they all drop on their haunches, wagging their tails and looking about with a pleased expression, or uttering a sentimental howl. With a crack of the whip, and a shout to Kamúk to stir himself, their reveries are broken, and we go on. Going down hill, the whip and lungs are again called into requisition, to keep the dogs out of the way of the descending sled. It has been said that no man can drive dogs without swear-

ing. I think it is in a measure true. At all events, he must have a ready store of energetic expletives to keep them on the *qui vive*. In Russian America we always used the indigenous epithets, which, as we did not understand them, were hardly sinful. If there is a tree near the trail, the dogs invariably try to pass it on different sides, until checked by their harness; they constantly exhibit such idiosyncrasies, and it was lucky for Job that he was not set to dog-driving: if he had been, I fear his posthumous reputation would have suffered.

At noon we stop for a cup of tea. Here the true voyageur exhibits himself in building the fire. A greenhorn or an Indian will make a conical fire, at the side of which you must place your chynik, and wait until it chooses to boil. A white man's fire is built in layers. The sticks in each layer are parallel with each other, and at right angles with those in the layer beneath. A few chips are placed upon this pile, which presents a broad, flat top, on which you set your chynik. A few shavings are whittled from a dry stick, and you light your fire on the *top* of the pile. The free circulation soon puts it all in a blaze, your kettle boils in ten minutes, you drop in your tea and let it boil up *once*, and you are ready for "chy peet." If the fire be lighted at the bottom, it takes twice as long to kindle, and if you boil your tea more than an instant, it is ruined. Many travellers drink a caustic decoction of tannin, which they call tea; such unfortunates are to be pitied.

Tea over, you empty out your chynik, and set it in the snow a moment to cool, that you may not burn your sled cover. Having replaced it, and seen that the dogs are untangled, you shout to Kamúk, "Be off, you old sinner!" Down goes his tail, and away you go. A greenhorn will have burnt his skin boots meanwhile, trying to warm his shins, and have put the axe where it will knock a hole in the chynik or drop out through the slatting of the sled-bottom, if you have n't looked out for him. The wind blows the snow in his eyes; his toes bump against the bar of his snowshoes; now and then he trips himself up with them: truly, the poor fellow has a hard time. If he has the right grit in him, he will soon learn, and laugh at these things as you and I do. Up hill and down dale, until it begins to be dusky in the south. Greenhorn thinks it is the west, because the sun sets there. In June we will show it to him setting due north, and rising there within half an

hour after it went down. The chief of the brigade has been on the lookout for a place where there is plenty of dry wood, and having selected his ground, gives the signal for halting. Kurilla, who delights in showing his proficiency in the use of the American axe, makes a straight wake for yonder dead spruce. Greenhorn takes an axe, and chooses a small tree to begin with. Somehow or other, the chips don't fly as they do over yonder; but, by dint of chopping all round like a beaver, it finally falls, burying him under the branches in the deep snow, where he must stick until somebody picks him up.

Meanwhile the direction of the wind is noted, and the camp placed accordingly;—not so that it will blow on the backs of those who sit in front of the fire,—because this always makes an eddy where the smoke will remain, choking everybody,—but so that the wind will blow on their sides, lengthways of the camp, and carry the smoke away. In March we must excavate the snow to a depth of eight or ten feet before we can find solid ground to build our fire on. If built above the ground it will gradually sink beneath the snow, leaving us in the cold. One Indian goes in search of water, another cuts spruce boughs, and you instruct greenhorn in the art of placing the twigs, stem down and tips up, so as to make a soft and springy bed. A green log is placed at the foot of the bed, to keep the blankets out of the fire. Some one is cutting poles for a temporary stage. On this the sleds are placed, with their loads intact, to keep them out of the way of the omnivorous dogs. The harnesses are also hung out of reach for the same reason. Then each dog receives his supper of one dried salmon, and you carry your blankets to the camp. Kurilla comes staggering under the weight of a huge back-log, and follows it up with half a dozen more, and also a supply for morning use. The camp being made, and everything else done, we finally light the fire. Greenhorn asks why you don't do that first, and you explain that the effect would be to keep everybody in the vicinity warming themselves, while the camp was unfinished, and hence the other necessary work would be slighted.

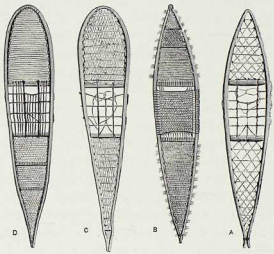
The ever grateful cup of tea being ready, and such other provisions cooked as you may have, you enjoy the evening meal and discuss the events of the day. Supper being over, you light your

pipe. What demon would have the heart to deprive the weary voyageur of his tobacco, — or what money would buy the pleasure which he derives from it? Oceans of whiskey would poorly replace his cup of tea, and untold gold would fail to purchase his pipe.

That delicious fifteen minutes being over, one last glance must be taken at the sleds and dogs. As you return, the inmates of the camp are invisible, beneath the surface. The fire and smoke and glow, which issue from the excavation in the snow and illuminate the dark evergreens behind the camp, remind one of the mouth of Inferno. The deerskins are spread; if you are luxurious you have a small pillow, if not, you take the biscuit-bag as a substitute. Water being scarce, a large cake of snow is impaled on a stake before the fire. Beneath it is the chynik, which soon fills with water as the cake melts. Your nips and the straw from your boots are hung in the smoke, to be thoroughly dried for tomorrow's use. Unless this precaution is adopted, you will have cold feet the next day. You cover yourself with a blanket on which skins of the arctic hare or rabbit have been sewn. This forms a light but very warm protection. I have slept comfortably with nothing else and with the air at sixty below zero. You pull your head entirely under the blanket, leaving a very small hole for air, and if the dogs, who like a warm corner, do not come and lie down on top, you may enjoy undisturbed the sleep of the just.

Leaving our camp in the morning, we pushed on among the trees toward Beaver Lake. Every step was taken on snowshoes. The snow was blown in our teeth, and the wind howled in such a way that we knew poorga was raging on the tundra. Near the edge of the timber at Beaver Lake we found an old camp. This we cleaned out and enlarged, making a first-rate camp of it. It was useless to go farther, as there were no trees and it was impossible to travel over the open country. The great spruce trees rocked and moaned with the fury of the blast, and the snow flew in sheets far above our heads. The next morning it was even worse. As we were well supplied with provisions and dog-feed, I concluded to remain where we were. In the afternoon the Russians came up. I invited them to occupy part of our camp, and told them they could not go over a mile farther, and then would not be half as comfortable. But no; their energy was not so easily daunted, and on they went.

I have spoken of travelling on snowshoes. To travel without them in winter is impossible, but sometimes on an old, well-beaten road, or with a hard crust on the snow, and while travelling over ice, they are not needed. The different kinds of snowshoes are, in a measure, characteristic of the locality where they are used.



Different kinds of snowshoes.

The Innuit snowshoe (A) is small and nearly flat. It is seldom over thirty inches long. The netting is open and strong, being made of fine remni. That which supports the foot is made of strong mahout, which passes through holes in the frame. It is strong, simple, and well adapted for walking on the hard snow of the coast. Both shoes are alike.

The Ingalik snowshoe (C) is much larger. Mine were five feet eight inches long, and strongly curved up in front. They are always rights and lefts, a slight difference being made in the curves of the frame of the two shoes. They are much wider in front, and the netting, which is of deer sinew twisted into twine, is much closer than in the Innuit shoes. The netting under the foot is the same. In all the snowshoes the strings are alike. Two short loops over the toe, and a long one around the foot above the heel, fasten it to the foot. In walking, the toe sinks into an opening in the netting provided for the purpose. Beginners generally strike their toes against the bar, but after some experience they learn how to adjust the loops and prevent this.

The Kutchin snowshoe (D) is made a little smaller than the Ingalik pattern, but much in the same style. The netting is much closer and finer, and is made of fine line, cut from prepared deerskins, called babíche. The whole shoe is prettier and more artistic. It is frequently painted and ornamented with beads.

The Hudson Bay snowshoe (B) is very small, thirty inches being the regulation size. This is in order that it may sink deeper in the snow and beat a better road for the sleds. It is sharply curved upwards in front, and is furnished with a knob to break the crust of the snow. The frame is flat, not rounded as in the other kinds. The foot netting is put on around the frame, and not through holes in it. All the netting is very fine and close, and made of babíche. They are generally painted in gay colors, and ornamented with tufts of colored worsted. The latter in moist snow must be a great nuisance, as the snow must stick to them and greatly increase the weight. In hunting, the Hudson Bay men use the larger Kutchin shoe. The latter is probably the best of all for general use.

The next morning the wind had gone down, and we started very early. We passed the Russian camp, about a mile beyond ours, and soon overhauled them on a side hill, where they were stuck in a large drift. I proposed to go ahead and break the road for them, at the same time taking some of their load, though my sleds were already the heaviest. My offer was accepted, and we led the way for the remainder of the trip. We camped near the Ass's Head that night, and about ten miles above Kaltág on the Yukon the following day.

The road on the river was exceedingly bad. The long March day and the warm sun made the snow moist and sticky. Each snowshoe would raise ten pounds adhering to it, and it was extremely hard travelling. We took tea three times during the day. Tired out with running before the dogs, Pávloff's Indian lay down on the snow and refused to run any further. None of the Russians were in a condition to take his place. We were only some three miles from Nuláto, and I gave my sled to the runner, and took his place. It was really a relief to exercise another set of muscles, after walking behind the sled and pushing all day. We found all in bed at Nuláto, as we were not expected for several days, and the Russians were especially surprised to see me, sup-

posing me to have been too sick to return immediately. Pávloff's wife had the samovar ready, and we all took a cup of tea together, which did much to relieve the fatigue of the day.

The Russian fish-trap was catching nothing. Mine had been very fortunate. There was a pile of several hundred frozen fish in the storehouse, quite sufficient to feed my dogs. The next day Blackbird was handsomely rewarded for his work, and sent back with the extra dogs to Unalaklík.

Repairs being needed on the fish-trap, I discovered that the Russians had appropriated all my extra wood during my absence. After some trouble I obtained restitution.

Having a small piece of glass, I inserted it in the window. After getting the light all winter only through parchment, it was a great relief to be able to peep out occasionally, and to admit a few rays of pure sunlight.

The plans which had been settled upon by the Russians were about as follows: A raft was to be built in the spring, and on his return from the annual trip to Nuklukahyét, Pávloff was to embark with all the Russian employés and goods belonging to the Russian American Company, and make the best of his way to the mouth of the river, where boats from the Redoubt would meet him and convey them to St. Michael's.

In the latter part of the month of March I made several expeditions, without dogs, to the hilly region back of Nuláto. In this manner much geographical and geological information was obtained.

About the 1st of April, Bidárshik, one of the Koyúkuns who had accompanied us to Fort Yukon, arrived from the mountains, where he had been deer-hunting. He brought a sled-load of meat, of which I secured the greater part, — a most acceptable addition to our monotonous fare of fish-soup. He brought the information that Larriówn was endeavoring to excite the Koyúkuns to active hostilities against the Nuláto post. Larriówn was one of a family of five brothers, all influential men among the Koyúkuns. One, whose name I could not obtain, had recently died. He had been concerned in the first Nuláto massacre, and was accused of having killed Barnard. Since that time he had committed many outrages. A Yukon Indian, named Nikolai, who had been extremely useful to Major Kennicott's party in their explorations about Koyúkuk, had

an exceedingly pretty wife, and, with his brother, was possessed of much property. In the fall of 1866, Larriówn's brother induced Nikolai and his brother to accompany him to the mountains after deer. There the former killed both of them, and hid the bodies, securing their guns and ammunition. All the autumn and far into winter, the other Indians sought the brothers in vain. At last the murderer, tired of hearing about them, led the searchers to the place where they lay, and boldly avowed his crime. He then went to the house where they had lived, and plundered it. Nikolai's mother reproached him with the unprovoked murder, and he threw her into the fire, forced Nikolai's wife to accompany him, and fled to the mountains. Of the whole family, only the little son of Nikolai and his sister, who were away, escaped. There was no one to revenge them, and the murderer escaped unpunished. In the fall of 1867 he died of pleurisy. Much sickness of the kind prevailed during the winter, and Larriówn, whose dictum as a great shamán was not to be denied, accused the Russians of having caused the sickness and death by their sorceries. This may seem incredible, but such reasoning is characteristic of the Indian mind. The remaining brothers sent beads to the various Indians as an inducement to attack the Russians; but so far they had hesitated, from the scarcity of provisions. Bidárshik, under promise of secrecy, divulged the plot to me, and begged me to leave Nuláto. I took him into the magazine, showed him my stores of ammunition and my arms, and told him that I was prepared for anything; that the Russians had given me the use of a house in the fort, and if they were attacked I should assist them against their enemies,—giving him permission to inform the Koyúkuns of the determination. Rumors were rife, during the entire spring, of a proposed attack, but none was attempted.

Details have already been given of the practice of shamánism among the Indians, and the various tribes have been described. A few more particulars in regard to them and their mode of life may not be uninteresting.

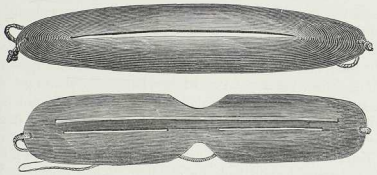
The Indian character, with some modifications, is the same almost everywhere. The Ingaliks are peacefully inclined, and as industrious as any Indians. They are more honest than the majority of uneducated whites, and much more so than those tribes who

have been degraded by the use of liquor. They are courageous, but not bloodthirsty, and are easily controlled by a firm hand. Avarice appears strongly in their characters; the affections are but slightly developed, and are exhibited only toward their children. The latter are obedient and respectful to their parents, but exhibit no love for them. The old people live on odds and ends of food which the young ones do not eat; this seems rather to be a custom than any deliberate neglect. The opinions of the old men are always consulted, and usually followed. Foster-children are not uncommon. The fruit of their labor belongs to the person who reared them, and they are in a manner slaves, but still possess property of their own, and marry when they like. The authority of the foster-parent is retained as long as he lives. Children are anxiously desired, even when women have no husbands. The Ingalik women are less inclined to sensuality than many others, but are by no means strict in their morals. Incontinence on the part of a wife is seldom punished with anything more than a beating. Excessive laziness or ill-temper sometimes induces the men to discard them entirely. The women are rarely chastised, and usually well treated. Both sexes are dirty about their persons, and handsome women are exceedingly rare. The old ones are often hideous. The Ingaliks are tall, but more slender than the Innuit, and their legs are often ill-shaped. This comes from constant sitting in a small canoe in summer, and walking on snowshoes in winter. They are seldom very muscular; those who live on fish are invariably the most dirty, weak, cowardly, degraded, and least intelligent. Their number appears to be decreasing. Few women have more than two children; twins are almost unheard of. Many women are barren. The number of deaths annually increases, from their habit of inhaling the smoke of the Circassian tobacco into the lungs, which greatly adds to the prevalence of lung diseases.

While the Indians are exposed to privations of every kind from childhood, they are, if anything, less hardy than the whites. A white man of ordinary strength and endurance can invariably tire out any Indian, as soon as he has become accustomed to the mode of life. I believe that the white can surpass the Indian in everything, with but little difficulty, even in those things to which the latter has devoted his attention from infancy. All my own

experience tends to confirm this opinion, and it is certain that Indian sagacity has been greatly overrated, especially in the fables of such romancers as Cooper.

Diseases are quite as prevalent among them as among civilized people. As yet, among the Ingaliks, zymotic diseases are unknown. Pleurisy, pneumonia, bronchitis, dyspepsia (not rare), asthma, rheumatism, colic, hydrocephalus, calculus, urethritis, and hemorrhoids were noticed, and various mild diseases of the skin, boils, and small tumors are not uncommon. Ophthalmia is produced by the reflection of sunlight from the mist arising from the melting snow in the spring. To obviate this, they, as well as the Innuit, make use of goggles after the annexed pattern. These



Snow-goggles of the Yukon Indians.

are made of soft wood, cut to fit the face, and tied by a string behind the head. They are pierced with one or two slits which admit of vision. The inside is blackened with charcoal, and some have a small ledge over the slit, as a shade, also blackened. I found these goggles superior to those of green glass with which we were provided.

Curiously enough, a tænia, developed from hydroids found in the reindeer, is occasionally found among these Indians. I have seen humpbacks, club-feet, and other malformations among Koyúkuns, and once a deaf-and-dumb man. Strabismus is common, and I have seen several cases of cataract.

Their remedies, besides the rites practised by the shamáns, are few and simple. Bleeding, scarification, actual cautery, ligatures, steam baths, and fasting, are practised, but they have no knowledge of the virtues of any roots or herbs. The women seem ex-

empted from the curse of Eve. Delivery takes place in a few minutes, the mother kneeling; no pain is experienced, and she is about again and at her work in half an hour. The infant is rubbed with grease, washed and put to the breast. They are rarely weaned under three years.

The Indians are devoid of fortitude, crying at a scratch or cut which we should consider trifling: this may be partly ascribed to ignorance. They are short-lived, few men reaching forty-five. The women live longer, many reaching sixty. Their exact ages can seldom be determined, as they keep no record and soon forget. They can count one hundred, but no further.

The work is divided among the sexes much as among the Innuit. There is no such enslavement of the women as exists among the Kutchin and other eastern and southern tribes. The men do nearly all the hard work. They have no pride of family such as is so prominent among the Koloshes, and few know who were their grandfathers. A very few of the Ingaliks have more than one wife; none, as far as I know, have more than two. The Koyúkuns are more lax in this respect. Cousins do not marry among the Ingaliks, but there are no rules observed by the Koyúkuns in regard to marriage. There is a superstition among the Koyúkuns that a youth must not marry until he has killed a deer, otherwise he will have no children. They believe in love-philters, made of an owl's liver, which, to be successful, must be administered without exciting suspicion. The totemic system, properly so called, is unknown among them, but they have the practice, as described among the Innuit, of selecting a patron spirit. Some substitute for an amulet the small brass crosses distributed by the Russian missionaries; sometimes both hang around the neck on the same string.

The Kutchin have always possessed the system of totems, and I quote the following remarks from an account of them by William L. Hardisty, Esq., of the Hudson Bay Company. All the Kutchin are divided into three castes or totems, called respectively *Tchit-che-ah*, *Teng-ratsey*, and *Nat-sah-i*, according to Strachan Jones, Esq., late commander at Fort Yukon. Mr. Hardisty says: —

"With reference to the origin of caste it is difficult to arrive at a correct solution. I believe that they do not know, themselves, for they give

various accounts of the origin of the three great divisions of mankind. Some say it was so from the beginning ; others, that it originated when all fowls, animals, and fish were people, — the fish were the *Chitsah*, the birds *Tain-gees-ah-tsah*, and the animals *Nat-singh ;* some, that it refers to the country occupied by the three great nations who are supposed to have composed the whole family of man ; while others, that it refers to color, for the words are applicable. *Chitsah* refers to anything of a pale color, — fair people ; *Nat-singh*, from *ah-zingh*, black, dark, that is, dark people ; *Tain-gees-ah-tsah*, neither fair nor dark, — between the two, — from *tain-gees*, the half, middle, and *ah-tsah*, brightish, from *tsa*, the sun, bright, glittering, shining, &c. The country of the Na-tsik-kut-chin is called Nah-t'singh to this day, and it is the country which the Nat-singh were supposed to have occupied. The Na-tsik-kut-chin inhabit the high ridge of land between the Yukon and the Arctic Sea. They live entirely on the flesh of the reindeer, and are very dark-skinned compared with the Chit-sangh, who live a good deal on fish. Some of the Chit-sangh are very fair, — indeed, in some instances approaching to white. The Tain-gees-ah-tsa, taken as a whole, are neither so fair as the Chit-sangh nor so dark as the Nah-t'singh. A Chit-sangh cannot, by their rules, marry a Chit-sangh, although the rule is set at naught occasionally ; but when it does take place the persons are ridiculed and laughed at. The man is said to have married his sister, even though she may be from another tribe, and there be not the slightest connection by blood between them. It is the same with the other two divisions. The children receive caste from their mother : if a male Chit-sangh marry a Nah-t'singh woman the children are Nah-t'singh, and if a male Nah-t'singh marry a Chit-sangh woman the children are Chit-sangh ; so that the divisions are always changing. As the fathers die out the country inhabited by the Chit-sangh becomes occupied by the Nah-t'singh, and *vice versa*. They are thus continually changing countries. Latterly, however, these rules are not so strictly observed or enforced as formerly, and no doubt will soon disappear altogether. One good thing proceeded from the above arrangement, — it prevented war between two tribes who were naturally hostile. The ties or obligations of color or caste were stronger than those of blood or nationality. In war it was not tribe against tribe, but division against division ; and as the children were never of the same caste as the father, the children would, of course, be against the father, and the father against the children, — part of one tribe against part of another, and part against itself ; so that, as may be supposed, there would have been general confusion. This, however, was not likely to occur very often, as the worst of parents would have naturally preferred peace to war with his own children."

It is not improbable that the custom or system of totems originated in a desire to prevent war, and to knit the tribes more closely together. It is a well-known fact that most of the inter-tribal Indian wars have occurred between those who did, and those who did not, adopt the system. In all other known tribes the names of the totems are those of animals, and I doubt whether the similarity of the Kutchin names to words indicating color, referred to by Mr. Hardisty, is anything more than an accidental coincidence, or perhaps an error. The system is found in perfection among the Thlinkets or Koloshes.

The method of disposing of the dead has been described. The dances or festivals of the Indians are less varied and interesting than those of the Innuit. They are held at their yearly meetings at Nuklukahyét, or other neutral trading-grounds. Others are given by men who desire a reputation for liberality; others by the relatives of a dead person a year after the death; still others by the inhabitants of a village who desire to extend their hospitality to neighboring villages. These dances have been previously alluded to. Their choruses are less euphonious and less varied than those of the Innuit. Their dances have less of a symbolic character. Feasting and giving presents form the chief attractions at their festivals. The universal chorus is "He! he! ho! ho!" indefinitely prolonged. When the feast for the dead is given the presents are hung on a pole. Around this the dancing is done. The Indians wrap themselves in blankets, and the motions are simple jumping up and down, gradually moving sideways, as in the old game of "threading the needle." There are no graceful motions or posturings of the arms and body, as in the Innuit dances.

The Indians, particularly the women, are fond of singing, apart from their festivals. Their ears are very quick, and they soon catch up an air from hearing it sung once or twice. Our parties contained several good singers, who enlivened the evenings with patriotic and comic songs. The Indians soon caught up the airs; and "Tramp, tramp, the boys are marching," "Sixteen cents a dozen," and "Marching through Georgia" may now be heard from the mouth of almost any Yukon Indian. The women are fond of making up songs of their own, which they hum over their work. Some of these are full of sentiment and not unworthy of

preservation. The chorus always forms a prominent part. The following is a free translation, preserving the original rhythm, of one which I heard a Koyúkun woman singing as she sewed. It is a fair specimen of many which were translated to me, some of which I preserved. It is the song of a mother hushing her child to sleep, and the air was slow and soft.

"The wind blows over the Yukon.
My husband hunts the deer on the Koyukun mountains.
Ahmi, Ahmi, sleep, little one.

"There is no wood for the fire.
The stone axe is broken, my husband carries the other.
Where is the sun-warmth? * Hid in the dam of the beaver, waiting the spring-time?
Ahmi, Ahmi, sleep, little one, wake not!

"Look not for ukali, old woman.
Long since the cache was emptied, and the crow does not light on the ridge-pole!
Long since my husband departed. Why does he wait in the mountains?
Ahmi, Ahmi, sleep, little one, softly.

"Where is my own?
Does he lie starving on the hillside? Why does he linger?
Comes he not soon, I will seek him among the mountains.
Ahmi, Ahmi, sleep, little one, sleep.

"The crow has come, laughing.
His beak is red, his eyes glisten, the false one!
'Thanks for a good meal to Kuskokala the shaman.
On the sharp mountain quietly lies your husband.'
Ahmi, Ahmi, sleep, little one, wake not!

"'Twenty deer's tongues tied to the pack on his shoulders;
Not a tongue in his mouth to call to his wife with.
Wolves, foxes, and ravens are tearing and fighting for morsels.
Tough and hard are the sinews; not so the child in your bosom.'
Ahmi, Ahmi, sleep, little one, wake not!

"Over the mountain slowly staggers the hunter.
Two bucks' thighs on his shoulders, with bladders of fat between them.
Twenty deers' tongues in his belt. Go, gather wood, old woman!
Off flew the crow, — liar, cheat, and deceiver!
Wake, little sleeper, wake, and call to your father!

* I. e. the warm principle of the sunlight, which they regard as a personal spirit.

"He brings you backfat, marrow, and venison fresh from the mountain.
Tired and worn, he has carved a toy of the deer's horn,
While he was sitting and waiting long for the deer on the hillside.
Wake, and see the crow, hiding himself from the arrow!
Wake, little one, wake, for here is your father!"

These songs are heard in every lodge. Some attain wide popularity, others are unknown except to the singer, who measures the stroke of her paddle or the motion of her needle by the simple rhythm of the air.

The bow has long since given place to the gun among the Koyúkuns, Kutchin, and northern Ingaliks. Long, single-barrelled flint-locks have been obtained from the Hudson Bay Company at Fort Yukon since 1847, and at about the same time traders from the Sandwich Islands began to visit Grantley Harbor and Kotzebue Sound. The latter trade a small Belgian fowling-piece, double-barrelled and of small bore. These guns, with some ammunition, bring twenty marten-skins, and the Hudson Bay guns are sold for forty.

Their habits, though not as regular as those of the Innuit, still pursue a nearly uniform course, each successive year being much like the previous one, and only modified by the greater or less abundance of game and fish.

Life among the Indians is a constant struggle with nature, wrestling with hunger, cold, and fatigue; the victory is ever uncertain, and always hard-earned. The opening and closing of navigation are the two great events of the year. The months of April, May, and June are the hardest of the season. The snow is melting, ophthalmia attacks the deer-hunters, and the winter's store of food is nearly or quite gone. In May the geese and ducks arrive. The fish-traps are carried away by the rising water in the rivers, and few have sufficient ammunition to supply themselves with wild fowl for many weeks. The men take their canoes and ascend the small rivers, as soon as the ice breaks up and the freshets drive the beaver out of their winter houses. For a week or two they support themselves in this way, and then those who have been successful in trapping start for Nuklukahyét to trade. There they find the moose and deer driven by the mosquitoes into the river, where they may be killed. Bears leave their winter quarters, and their meat occasionally adds to the spring supply

of food. The women, and such of the men as remain at home, are busy making nets and seines from the inner bark of the willow and alder. The wood for the summer fish-traps is also prepared, and the baskets and other parts of the trap are tied together, ready for use. On the Lower Yukon the eggs of wild fowl are obtained in sufficient numbers to furnish a partial means of subsistence. This is also the season for making birch canoes. Early in June the king salmon (*Kaththl'* of the Ingaliks, or *chowíchee* of the Russians) begin to ascend the river. After the middle of July only stragglers of this species are caught. The chowíchee are followed by two or three other kinds, and the salmon fishery is well over about the end of August. During this period most of the Indians are on the river, fishing, splitting, and drying the fish for winter use. Some are smoked, but the greater part are simply dried in the sun. They have no salt, and never use it, even when it might be procured from the Russians. In consequence many of the úkali have a tainted flavor. Whitefish are caught and dried at the same time as the salmon, but are smaller, and not so extensively fished for. They are most plenty and in their best condition in September. In the latter part of October the ice puts a stop to fishing, until it is strong enough to set the winter traps. In August many Indians repair to the hills, where the reindeer are in prime condition, fat, and less timid than at other seasons. The fawns are also large enough to make their skins of use. Moose are very rare on the Yukon below Koyúkuk. In August the young geese are fledged, but cannot yet fly, as their wing-feathers are not fully grown. The old ones have also moulted, and many of both kinds are caught in nets. In October and November the white grouse have returned to the willow thickets on the river, where they are snared by hundreds. In December the winter fish-traps are put down, and some deer-hunting is done on the mountains. Trapping begins in October; before that, the furs are worthless. In December and January, trading commences with the Innuit for oil and sealskin. In February and March the fish-traps and snares for grouse and rabbits are their principal reliance. In the latter part of March the starving season sets in again. By some tribes, April is called the "hunger month." In May, rabbits are very plentiful for a week or two, when the wild fowl arrive in millions, and the yearly round is completed.

The Koyúkun and Ingalik names for women generally end in "il'no" as *Tállo-ilno*, "dashing water," &c. The names of men frequently end in "ala" as *Kúsko-kála*, "he who strikes," &c., but are not so regular in their terminations as the female names. With the Kutchin the father takes his name from his child, not the child from the father as with us. Thus, *Kwée-ech-et* may have a son and call him *Sáh-nu*. The father then takes the name *Sah-nú-tee*, and his former name is forgotten. Sometimes the mother will drop her name, and be called *Sah-nú-be-han*, or Sah-nu's mother.* The same practice obtains among the Indian tribes to the south, as the Koloshes; but the western Tinneh are without it.

In war, when a Kutchin Indian kills his adversary, he cuts all his joints. They are governed by the same chiefs in peace and war. The authority of a chief is very limited; the Indians are very unruly, and indisposed to submit to authority. The chiefs are chosen on account of their wisdom, wealth, or courage, and not on account of birth. They have no insignia of office, and only such privileges as they can take; none that the others can withhold from them. This undeniable fact has been universally ignored in the dealings of the United States Government with the Indians.

The chiefs and old men are all who are entitled to speak in council; but most young men will not hesitate to rise and give their elders the benefit of their wisdom. Among the Han Kutchin a metal ring is sometimes used in the nose instead of the dentalium ornament of the western Tinneh. Among the eastern Tinneh the women are literally beasts of burden; but they have the privilege of disposing of their daughters at any age; the fathers and brothers having no voice in the matter, according to their customs. They have the singular custom of not cutting the nails of girls until they are four years old. The reason they give is, that, if they did so earlier, the girl when grown up would be lazy, and unable to embroider in porcupine quills, an art which they carry to great perfection. The children are seldom weaned until three years old. They arrive at the age of puberty at about twelve or fourteen. Some of the women reach a great age; one

* *Vide* account of Kutchin tribes by Strachan Jones, Esq., in Smithsonian Report, 1866.

at Fort Simpson was estimated to be ninety-seven years old. The eastern Tinneh and Kutchin tribes far surpass the western Tinneh in their proficiency with the needle, and in their love for ornament. The latter care little for trinkets, seldom paint, and will barter their furs only for tobacco and useful articles. This should be borne in mind by traders.

Preparations for the spring shooting soon became necessary. I had no shot, and was obliged to make all I needed. The Russians are accustomed to hammer lead out into slender bars, to cut these in small cubes, and roll them. This process being exceedingly laborious, I hit upon another plan. I took a piece of walrus tusk and planed it off until it was about half an inch thick, flat on each side, and about two inches wide by six long. Taking a large nail, I filed the point and rigged a "fiddle-bow drill." With this I bored a hole about three eighths of an inch in diameter, a little smaller at one end than at the other. I then filed off a little more of the point and bored another hole a little smaller, and repeated the process until the last hole was about the diameter of a duck-shot. I ran my lead into small bars, and, greasing them well, wire-drew them through the holes, beginning with the largest. The result was lead wire of the diameter required. This was cut up into pieces, each piece as long as the diameter of the wire. These were then rolled with a little ashes in an iron pan under a flat stone. This produced shot nearly as round as dropped shot, though not polished. In this way I manufactured seventy pounds of shot of different sizes, which answered every purpose. It was a work of great labor, but less so than by the Russian method. A man can make in this manner about three pounds in a day. The Russians at Nuláto were each furnished every spring with five pounds of lead and half a pound of powder. With this they must supply themselves with game, or go hungry. The same practice is usual at Fort Yukon, except that the men are furnished with manufactured shot.

As spring approached, we made ready for our journey to the Yukon-mouth. The collections of natural history grew apace. Many hundred birdskins, and other specimens, were brought together, some of which had not previously been collected. On the 21st of April, Tékunka paid us a visit. He was accompanied

by all the Káiyuh Ingaliks who were returning from Ulúkuk. While sitting peaceably in the casarmer he was insulted and struck by Shabounin, a convict from Archangel in Russia, who had been sent to Nuláto to build the raft on which the Russians were to descend in the spring. I heard Kurílla calling to Pávloff, in the yard, that Shabounin was killing Tékunka. I rushed into the casarmer at once. Tékunka was standing on one side, his face bleeding, and hurling defiance in good Russian at his assailant. The Russians were huddled in one corner, unarmed, and cowed by the crowd of Ingaliks, each with his hand on his gun, which half filled the room. Sure of his power, though himself unarmed, Tékunka did not spare his tongue. He told them that he held their lives in his hand. "A word," said he, "and my men wash this floor with your blood. You call us 'dogs of Indians!' We know what you are, — murderers, thieves, and outlaws, driven from Russia for your crimes! Yet you come to our country and abuse us without reason, take away our daughters, and pay us with a leaf of tobacco for furs which you cannot trap yourselves! Why should I not avenge this unprovoked insult? Why do I not order my men to exterminate you like vermin? Because I had rather stand here and tell you in your own casarmer that I hate, despise, and defy you!"

Pávloff now entered, and was called upon to redress the injury, which he did sullenly and reluctantly. Shabounin was rebuked before the Indians for his conduct, and a present of tobacco and ammunition was made to Tékunka, who received it with unconcealed disdain. The Indians slowly left the room, and I followed them. They took their baggage and sleds, and left the fort. It is very seldom that such an exhibition of spirit is seen among these Indians, but Tékunka was unusually intelligent, and had worked in the fort among the Russians when young. It must also be said that such an outrage on the part of any Russian had never before occurred at Nuláto, and probably very seldom anywhere.

On the 11th of April the first swallows appeared, and on the 27th Kurílla earned the pound of tobacco by killing the first goose of the season.

The Russian raft was well under way, and was a clumsy concern, shaped like a flat-iron, and provided with high bul-

warks, a mast, rudder, or rather sweep, and a sail. They informed me that it was after the pattern of the rafts on which timber is floated down the rivers of Russia which flow into the Northern Sea.

Meanwhile the skin had been taken off our little bidarrá, well oiled, repaired, and replaced. The mast, oars, and sail were manufactured, as well as an enormous paddle, which Kurílla, in his capacity as coxswain, proposed to use himself. The Russian bidarrá was made ready for their trading-voyage to Nuklukahyét. Johnny would accompany them, and go on to Fort Yukon with the Indians. He was a useful little fellow, but gratitude or affection formed no part of his nature, and I did not expect to miss him much.

On the 24th of May the Nuláto River broke up, and the water and ice came down with a rush. About four o'clock in the afternoon the ice on the Yukon moved a little, and then stuck fast. An ice-barrier fifteen feet high formed near the bluff north of Nuláto. This remained several days without change. On the 28th I went up to the Klat-kakhátne River, and crossed in an old birch canoe which I found there, after hewing out a rough paddle, and leaving my axe in a dry log, four feet above the water. On the other side the beach between the ice and the high perpendicular bluff was only about six feet wide. I collected here a number of interesting fossils which had been uncovered by the melting snow. Suddenly I heard a crash, and the water began to rise very rapidly. The barrier had broken, and I had to run to escape being crushed between the bluff and the enormous blocks of ice which the rising river ground against it. I was just able to keep pace with the water, and found my canoe on the little point quite submerged. On the other side the log, with the axe in it, was floating away with the ice. I emptied the canoe, and paddled after the axe, and got safely ashore on the Nuláto side. Here I stopped awhile and enjoyed the sight. Blocks of ice six feet thick were driven against the bank, cutting off large trees, and carrying ice and turf many yards inland. In some places the ice was piled thirty feet high. I only regretted that my artist companion of the previous year, Mr. Whymper, was not there to preserve the scene with his ready pencil. The break-up of 1867 was nothing to it. At the fort the ice came

close to the bank. A little more, and the buildings would have been in danger. Pávloff said that he had seen a similar freshet only once before in fifteen years.

The barrier being removed, the water soon began to fall, and left the great blocks and piles of ice stranded all along the beach. There was hardly room to land a boat anywhere near the fort.

We now set about packing up in earnest. The store was half full of goods, which I could not carry away. The boxes of collections, with our baggage, filled the bidarrá. She was a little beauty, well shaped, light, and elegant.

The season was very late. On the 1st of June, Pávloff and his men left for Nuklukahyét. The river was full of ice, and Tékunka and his men had not appeared; so I was still delayed. Johnny departed with the Russians, not even bidding me good by, although he was loaded with articles which I had given him. He had letters for Mr. McDougal, the Fort Yukon commander, which I took pleasure in addressing to "Fort Yukon, Alaska Territory, *United States of America*," as the Scotchmen had insisted against all reason that the post was situated on the British side of the line. As my Indians did not make their appearance, I secured Kurílla's brother, — "Monday" by name, as he was engaged on that day, — and determined that, if Tékunka failed to keep his promise, I would start the next day, and trust to luck to obtain another man somewhere on the river below.

CHAPTER VI.

Departure from Nulato. — Lateness of the season. — Yeto. — Kwikhtana barrabora. — Lofka's. — Habits of the beaver. — Swan-shooting. — Indian carvings. — First Indians. — Klantilinten. — A letter. — Meeting with the Mahlemuts. — Anvik. — The Stareek. — Pottery. — Sand-hill cranes. — Canoes. — Leather village on the Shageluk. — Great abundance of food. — Demand for liquor by the Mahlemuts. — Dances. — Attack and narrow escape. — Leave the village. — Manki. — Ekogmuts. — Loon-cap village. — Carvings, old houses and graves. — Great breadth of the Lower Yukon. — Arrive at the Mission. — Pass the Great Bend. Fishing-village. — Myriads of wild fowl. — Energetic collection of specimens. — Rasbinik village. — Starry Kwikhpak village. — Obtain a guide. — Andreaffsky. — Tragedy in 1853. — Mistake of guide. — Arrive at the Uphoon. — Kutlik. — Emperor geese. — Arrival of Teleezhik. — Go on to Pastolik. — Beluga-hunting. — Innuit carvings. — Drawings on bone. — Rise of the water. — Elephant bones. — Start for the Redoubt. — News of the ships. — Arrival at the Redoubt, and meeting with old friends. — —Traders. — Embarkation for California. — Abuses prevalent in the new territory. — Value of a territorial government. —Necessary legislation. — Disparagement of the territory. — Arrival in San Francisco.

EVERYTHING was ready for our departure. The bidarrá was almost transparent from the oil which was smeared upon the outside, and inside it was as dry as a bone. Tékunka had apparently deceived me. There were no signs of him or his men. Long experience had inured me to such disappointments, but there were few Indians at Nuláto, and it was difficult to fill the place of those whom I had expected. By giving to Monday's mother all the úkali and oil which were left over, I induced him to go with me, as the old woman, with these provisions, would not suffer from hunger before his return.

On the morning of the 2d of June everything was put aboard. The supplies which I left behind were put into the storehouse, and the door fastened with a padlock and chain and then securely nailed up. The Koyúkuns were already threatening to burn the post as soon as the Russians left it, but, in case they did not, the goods I left behind might prove of some use to somebody.

The beach in front of the fort was covered with large blocks of

ice, and the quantity of ice in the river was much greater than usual for the time of year. We pushed off with some difficulty, on account of the low water, and finally reaching the channel, took a last look at the old fort of Nuláto. The day was cloudy and cold, with a head-wind. Not a mosquito had yet shown himself, a fact which proved, more than anything else, the uncommon lateness of the season. Our little company consisted of myself, Kurílla, Monday, and a little foxy Koyúkun dog called Bushy, which was my especial pet. The stars and stripes and the scallop of the Scientific Corps floated from the mast, which was also decorated with a broad-tailed arrow ornamented with a blue muslin fly. I took the stroke oar and Monday the bow, as Kurílla's skill was needed to avoid the numerous floating cakes of ice in the rapid current. I found that my sickness had unfitted me for severe labor, and after a few hours I changed places with Kurílla.

The river presented a very different appearance from that of the previous year, when we started up the Yukon. Now large blocks of ice were piled up on the shores, where they had been driven by the first high water; no weather had yet occurred warm enough to melt them. We took our daily tea near the Shamán Bluff, close by the coal seam, and, while enjoying our meal, Kurílla was quick enough with his gun to bring down a mallard which flew overhead. As we pulled down the river I was so fortunate as to secure a pair of the beautiful Harlequin duck (*H. torquatus*) which flew from the mouth of a small stream. This elegant duck is very shy and solitary in its habits, preferring the small streams which wind among the trees, away from the main river. We saw no Indians on the banks, as the fishing-season had not commenced. Late in the evening we arrived at Kaltág, and camped on the left bank. The ground was still muddy from being overflowed, and the willow leaves were still folded. At the Kaltág village we found Matfáy and his family from Ulúkuk. They proposed to make a trading-voyage down the river a little later in the season. Big Sidórka was also there. He had promised to accompany the Russians to Nuklukahyét, but the threats of the Koyúkuns and the ice in the river had caused him to change his mind. He was now very anxious to go down the Yukon with me, as he had never been below Lófka's barrábora. We boiled our

ducks, and found them all very lean and tough from the scarcity of food. The horsetails (*Equisetæ*), on which they feed, had hardly begun to show themselves above the mud.

Wednesday, June 3d. — As there was little prospect of obtaining a more suitable man farther down the river, I decided to let Sidórka go with us. His Indian name was Yéto, and by that we called him. The brown sandstones on the right bank cease at Kaltág, and below is a long stretch of gravel banks, and then gray sandstones and shales with very poor vegetable remains. At the village near the bluffs below Kaltág there were a few Indians. Here I bought half a dozen martens for a few loads of powder and ball. The wind kept obstinately ahead, and impeded our progress a good deal. We took tea near the mouth of the Káiyuh River. The left bank of the Yukon appears to be generally low, with hills in the distance. The right bank is always the higher, and the river seems to run on the right side of a broad valley, of which the bluffs on the right bank and the distant hills on the left form the boundaries. The vegetation resembles that farther up the river, but here the willows and poplars attain a larger growth. We pitched the tent on the banks of a small creek, where the level dry ground formed an excellent camping-place. There were the remains of many old Indian camps here, and we saw a large number of sand-hill cranes, besides adding to our collection a specimen of the beautiful purple sandpiper.

Thursday, 4th. — I rose very early, and taking my gun, went to a pool near by, where I got a shot at a swan, but failed to bring it down. By patient waiting I finally succeeded in getting a brace of green-winged teal, which are the best eating of any of the water-fowl found on the Yukon. The mosquitoes were abundant here, as the location was warm and sunny, and I soon awoke the Indians by raising a corner of their tent and giving the predaceous insects access to the interior. The sun shone brightly, and the day was most beautiful. We soon pushed off and continued on our way. We passed through a number of sloughs, and stopped at several of the islands to shoot. On many of them small lagoons exist, and on these the water-fowl congregate early in the morning to feed. We obtained quite a number of brant and several ducks. A downy owl (*Brachyotus Cassini*) flew out

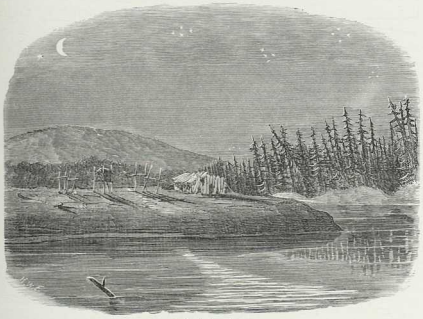
from a thicket and, probably impelled by curiosity, followed the boat at a short distance for nearly a mile. The superstitions of the Indians were excited, and they finally shot the bird, which fell in the water and continued to follow us, carried by the current, even in death.

The alder buds were just opening, and the tender leaves began to appear. About ten o'clock, passing through a small pratoka, we saw on a gently rising mound a white Greek cross. This spot, according to Kurílla, was the place where the boat for Nuláto with goods from the Redoubt was once caught by the ice and frozen in. The crew built a house and wintered here. They called it Kwikhtána barrábora or Cold House, from the extreme cold which they suffered. One of them, who died, was buried on

Site of Kwikhtana barrabora.

this mound, where the cross marks his resting-place. Game was scarce, and we were obliged to be economical with our stores. For dinner we boiled three geese and a duck in the big kettle. I usually made away with the duck and a plate of soup, beside tea and sukarée, while the Indians never failed to clean out the kettle, leaving only the bones, which were the dog's perquisite. In the afternoon we crossed the river to a slough which Kurílla said was a short cut; but after going a little way the wind was so

strong and dead ahead that I determined to turn back and go by the main river, where we were sheltered by the high bank. We saw many fresh tracks of the black bear along the muddy shore. Crossing again, we continued along the right bank, which in some places is composed of trachytic rocks of different colors. These do not rise to any great height, and are soft and crumbling. Yellow, red, green, blue, and all transitions from black, through gray, to white were observed. Toward evening we approached the Yakútz-kalátenik River, at the mouth of which is an Indian house in a very dilapidated condition. This is known as Lófka's barrábora. It had a melancholy appearance in the twilight,



Lofka's barrabora.

being deserted and falling into ruins. We decided to camp here. As we pulled toward the beach, a large otter started from among the willows and ran along the shore. We had brought along a small canoe made of three boards, and Kurílla hastily jumped into this and made for the beach. He landed, but the otter was too quick for him ; it plunged into the water near the river and disappeared. We put up the tent, boiled the chynik, and retired to rest. The rain, which soon came on, did not disturb us, as every-

thing had been put ashore and covered with the bidarrá before we had turned in.

Friday, 5th. — The rain had ceased about four o'clock in the morning, and it had cleared off finely. A stroll along the banks of the small river revealed many fresh beaver-tracks. The beaver, when forced to leave his house by the spring freshets, which fill it with water, seeks his living along the banks of the small rivers, until the waters subside. He is a gregarious and playful animal, fond of gymnastics for their own sake. When he finds a steep, smooth mud-bank, he usually amuses himself by crawling up and then sliding off into the water, repeating the process many times, apparently enjoying the fun as much as boys do coasting. He is nocturnal in his habits, and very timid. Taking the small canoe, Kurílla paddled patiently up and down, making as little noise as possible, and scanning the water near the banks for the beaver's nose. This is the only part visible, the rest being below the surface. A crack, followed by a shout, told that my old Scotch rifle had done its work, and Kurílla soon appeared in triumph, bearing a small beaver. The flesh of this animal is to most persons disagreeable. A slight odor and flavor which accompany it frequently produce nausea with those unaccustomed to it. I never ate the meat, but the paws and tail I found very good. The former are covered with a black skin, with only a little hair near the junction with the arm or leg; when thoroughly boiled they resemble pigs' feet. The tail is composed of muscular fibre containing a large amount of a peculiarly sweet fat in the interstices. The skin which covers the tail has the appearance of scales, but there are no real scales. The skin readily peels off if scorched in the fire, and the tail, when well boiled, is a delicious morsel. The muscles and inner skin are reduced by boiling to a kind of jelly, and the whole is so rich that one cannot eat much of it. The castoreum, which is used in medicine, is contained in two glands which open near the tail. Their use is not clearly understood, but is probably similar to that of the musk glands in the muskrat and muskdeer. A favorite amusement among the Kutchin Indians consists in taking the humerus in the hands and endeavoring to break it; as it is very short and strong, this requires considerable strength. After skinning the beaver, and stretching the skin on a hoop of green willow, we

pushed off. The wind was, as usual, dead ahead and very strong. Although aided by the current, we had hard work to make headway against it. Blowing against the stream, it raised quite a sea on the broad river, and as our gunwale was only four inches above the water, we found it necessary to keep close in shore. We stopped to rest several times, and arriving near a broad, shallow lagoon, we went ashore, and creeping behind the willows, tried to get a shot at some of the water-fowl which were feeding there. My favorite, of seven guns, was a Scotch rifle, which had been bored out so that it carried shot as well as ball. It was remarkably long in range, and very true. The ball which I used with it was a long conical one, weighing an ounce and a quarter. One of these was quite enough to bring down anything which it hit. Loading with buckshot, I waited for Kurílla, who had gone to the other end of the lagoon, where several swans were gracefully seated in the water. The report of his fowling-piece, which brought down a couple of brant, roused the swans from their reveries; and striking the water with their broad wings, they rose slowly and sailed through the air in single file toward my hiding-place. They are not rapid flyers, and I could count every sweep of their strong white wings. As they followed one another, uttering their harsh cry at intervals, their heads and necks in a straight line, they looked anything but graceful, and would hardly be recognized as the same birds so lately seated on the water. Just before getting in range, they most provokingly changed their course and struck out across the Yukon; so I had my trouble for my pains.

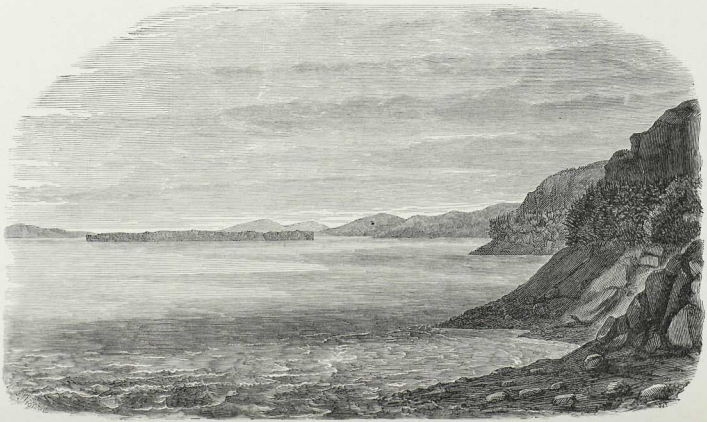
Before returning to the boat I secured a mallard and a white-fronted goose, to which the Indians added several pintails, and seven brant, so that our larder was well supplied. Toward evening we began to look for a camping-place, but everywhere the shore was covered with great blocks of ice, some distance above the water, and we were finally obliged to haul the boat up on a large ice-sheet which was grounded on a sand-bar. Here we camped, and a most uncomfortable camp it was. We had to travel a long distance to obtain driftwood sufficient to make a fire. Sand makes the hardest bed known; fine gravel is much more comfortable. The mosquitoes too, though not abundant, were by no means idle. Everything along the river showed that

it was an unusually late season. Few small birds were seen, and no butterflies as yet. The birch, poplar, and willow had only begun to unfold their leaves, while on the north slope of the hills snow still rested.

Saturday, 6th. — We started early, and pulled against the same strong wind. We landed at a village which was quite deserted, the inhabitants being away after beaver. The facility in carving, shown by the Ingaliks of the Lower Yukon, was well displayed here. Paddles, dishes, and other articles lay scattered about where the owners had left them. The winter houses were half full of water, and the Indians had evidently been living for some time in three large summer houses. Among other things lying about, I noticed a large scoop or shovel shaped like a table-spoon, but seven feet long. It was carved out of one piece of wood, and ornamented with designs in red chalk and charcoal. It was of very graceful shape, and had evidently been used for throwing out the ice from the aperture through which the fish-traps are raised in winter. I noticed a small bowl prettily carved, with two ears or handles. A long stick, to which a block of wood is attached at one end, is used, with the bowl referred to, for grinding up tobacco into snuff. My Indians were anxious to appropriate some of these articles, but I would not allow them to do so in the absence of the owners. The paddles, many of which were seen, were curiously painted with green, red, and black, and were smaller and more pointed than those in use farther up the river. The paddles decrease in size as we go down the river; those at the Yukon-mouth are very small and narrow indeed. We passed a very small waterfall during the day, the first I had seen on the river.

On a small island we saw the first Indians. There were only three or four, and they were much alarmed when they first saw us. We landed, and found that they were making fish-traps. They had nothing to sell except some eggs, and a few úkali, which I bought for the dog. After making them a present of a few leaves of tobacco, we pushed off and continued down the river.

The boat was ill stowed, and a good deal of mud had gathered in her bottom from our feet, so I determined to camp early, turn her over, and wash her thoroughly, after taking out the goods.



KLAN-TI-LIN-TEN.

Nothing rots a bidarrá like mud or dirt inside of it. We camped near a small brook, and Kurílla started off after game, while we attended to the boat. We finished cleaning her and gave her a good oiling before getting supper ready. The three Indians polished the beaver's bones, while I regaled myself on a fat teal roasted on a stick before the fire.

Sunday, 7th. — The day opened fair, but with the same wind, which was soon attended by smart showers of rain. We pulled along shore, and about ten o'clock came to the point where the Russians had located a sort of rapid. It proved to be nothing more than a piece of swift water, running along the base of a range of low conglomerate bluffs, for two or three miles. The river here was quite broad; to the right were successive hills, rising one after another, and fading into purple distance. The left bank was, as usual, low, and a large island divided the river a few miles beyond. Kurílla said that the Indian name of the place was *Klan-ti-lín-ten*, meaning "rocks and strong water."

The Russians had reported a coal seam here, but the rocks are conglomerate, preceded by trachyte of various colors, and followed by beds of clay, quartzite, and yellow gravel.

I landed to take the annexed sketch, and to examine the rocks. While so doing, an arctic hare scampered by on the edge of the bluff. Kurílla was too quick for her, however, and a shot from my rifle brought her down. I was sorry afterward, when we skinned the animal, to see that the teats were full of milk; for it showed that she had, somewhere, a family of little bunnies, who would suffer and probably die for want of a mother.

We took tea at a small rivulet about noon, and concluded to remain there until the wind fell somewhat. We scoured the small lakes near the river for game, and came back to camp well loaded. About sunset the wind became less violent, and we pushed a little farther down stream, camping about nine o'clock.

Monday, 8th. — As we slowly descended the river, we saw a few Indians on the bank. They appeared to be shy, and indisposed to meet us, but finally one of them put off in his canoe, and extended a bit of paper in the end of a long cleft stick. I took it, and he immediately paddled away as fast as he could. It was a bit of yellow tissue paper, carefully folded. I opened it, and after removing several wrappings I came to a bit of white paper, ap-

parently the blank edge of a newspaper. On this was a rude drawing of a boat, by its side a bottle, and under the drawing, in a straggling hand, was written, "Isaac Koliak."

The meaning was evident. My intelligent Máhlemut friend had crossed the portage from the seaboard to Anvík, not far below on the Yukon, and was going down the Yukon on a trading-voyage. He knew I was coming down the river, and sent this note by one of the river Indians to inform me of his proximity. We passed the northern entrance of the great Shágeluk slough, and continued down the main stream toward Anvík. There were numerous large, well-wooded islands, and the mouth of the slough might easily be overlooked. A little later we saw a camp on the right bank, and, pulling toward it, soon recognized Isaac and his party. They received us with the most lively demonstrations of welcome, and declared their intention of going down the river with us. The party comprised about thirty Máhlemuts, male and female, and their children and dogs. Isaac told me that he had crossed from Kegiktówruk late in the spring, with three large bidarrás on sleds drawn by dogs, and had descended the Anvík River after the ice had broken up. His intention was to descend the Yukon, trading as he went, and to meet the American traders who were expected at St. Michael's in the early summer. The articles which they had brought for trade were principally skin clothing of their own manufacture, needles, tobacco, guns, and ammunition. They proposed to buy furs, and wooden dishes or kantágs, of Indian manufacture. The Innuit are accustomed to make these voyages for the purpose of getting rid of their old guns and

Kantags and wooden ladle.

surplus ammunition, at prices much higher than they pay for new ones to the traders at Grantley Harbor and Kotzebue Sound. The wooden ware is an article of trade with the Innuit of Bering Strait, where wood suitable for the purpose does not grow. I

ANVIK STAREEK.

"One more leaf of tobacco."

took Isaac on board as a passenger, while his party got their boats ready to follow us to Anvík.

We reached the mouth of the Anvík River about noon, and pulled up the stream for a short distance, to the point where the village is situated. Here both sides of the Yukon are rather high. Not far below they become low and flat. The Yukon widens, and here a series of sand-bars exists, which is the first obstruction to navigation as we ascend the river from the sea. These bars change somewhat every year, but a native pilot can find a five-foot channel during the lowest stage of the water in the fall. Anvík is a large village, of some ten or twelve houses, each of which may contain twenty inhabitants. The natives are Ingaliks, but from constant intercourse and close proximity to the Innuit tribes of the coast, they have adopted many of the Innuit customs. Among these, that of wearing labrets is most conspicuous. The language spoken is the true Ingalik, with no intermixture of Innuit words, except such as are used to designate objects which they obtain from the latter in trade, and for which there are no Indian names. A jargon containing a large number of words of both languages is used in trading. This is also used in intercourse with the Russians, who understand something of the Innuit dialects. This fact is a sufficient cause of miscomprehension in regard to the different dialects, and should be borne in mind by philologists. A similar jargon is in use wherever the Indians trade with the coast tribes.

We boiled the chynik, while I examined the village and took notes of points of interest. The chief man of the village had been hired by Isaac to descend the Shágeluk and meet him at the southern entrance; but an old fellow who appeared to have a good deal of influence came forward with two fish, which he proposed to sell for tobacco. The price of a salmon is a leaf of tobacco, on this part of the Yukon. He wanted two leaves apiece, complaining that it was early in the season and fish were scarce, while the leaves were very small! His parka was almost deprived of hair by long use, his breeches were shiny with grease and dirt, which also incrusted his hands and face, while the hair on his aged head, though cut short, stood erect as if in protest against the invasion of so much raw material. He looked so comical, as he stood haggling for a leaf of tobacco, with his

head on one side and his small eyes glistening with excitement, that I gave him the price he asked, and made it square by taking his portrait. Dirt was the prominent characteristic of the village. The year before, we had touched here, and the space in front of the houses was red with thousands of salmon, split and hung up to dry. It was yet too early for the fish this season, and there were many new baskets and nettings lying about, — the material for projected fish-traps. Many of the inhabitants were absent, after beaver. One man brought me ten fine marten, but asked so high a price that I refused to buy them. The Stareĉk (old man) brought me two marten and some mink, which I bought, but the Máhlemuts had purchased most of the furs. Well armed, bold, and numerous, the latter completely overawed the degraded, fish-eating Indians, and forced them to sell whatever they had, at the purchaser's price.

I noticed that the graves or coffins here, instead of being covered with logs, as farther up the river, were filled in with earth beaten down hard and plastered over with clay. They were larger, rather more elevated, and painted more after the Innuit fashion than those farther up on the Yukon.

I saw quite a number of clay pots and cups of native manufacture here. They were mostly large, holding three or four gallons, but some were smaller, and one was evidently modelled after

Indian pottery.

a Russian mug. The common Innuit lamp is also made of clay, and all their pottery is rudely ornamented with lines, dots, and crosses. They are about three quarters of an inch thick, of a dark bluish clay, and were perfectly black from smoke and grease. I would have purchased some of them, but they were so large and so exceedingly dirty that I did not care to put them in the boat. This kind of pottery was formerly universal, but has been superseded by the kettles of the traders. The pots are made by hand,

and therefore not perfectly round or symmetrical. They are dried in the sun, then baked, and will stand the fire very well. The Innuit name for the pots is *Atkusik*, for the saucers or lamps *Núnuk*, and for the cups *Im-owun*.

We left Anvík soon after drinking our tea, with Isaac on board. The wind was so high that we could not cross the river, and rain coming on, we soon camped on a small island. The other boats crossed to the other side, and we lost sight of them. Starting from camp, I saw and killed a large sand-hill crane. These birds are plenty on the Lower Yukon. I have seen thousands of them, but never of any color except brown, gray, and fawn color. White ones are unknown, and I doubt the correctness of the theory which considers the white crane of the Mississippi valley and the sand-hill crane to be one species.

Tuesday, 9th. — The rain ceasing, we passed down the river and entered a long slough or cut-off. Near noon we stopped and took tea. Soon after, we came to an Ingalik camp where they were making birch canoes. The birches of the Lower Ingaliks are very different from those of the Upper Yukon Indians. The

Ingalik birch canoe.

rough waters of the broad river need a stronger canoe than those used by the Kutchin tribes. Everything is carefully carved and smoothed. The frame is stout and strong, and ornamented with red paint. The bark is shaped over a mound of the exact size of the proposed canoe, and sewed with spruce roots. The cut represents the canoe before the gum is placed over the sewing. The paddles are lance-shaped, small and slender, and ornamented with the most fantastic figures, in red, black, and green. I expressed a desire to see the green pigment, and one of the Indians produced some. It was a sort of fungus (*Peziza*) or mould, which penetrates decayed birch wood and colors it a deep blue-green. I bought a small model of a canoe, from which the above figure is drawn. There were seven large canoes nearly finished, and several in process of manufacture. The Ingaliks take fleets of

these new canoes down to the delta in the fall, and trade them to the river Innuit for oil, ivory, boot-soles, and other articles. Isaac expressed a great desire to take one of the little model canoes to his baby, and I bought one for him, to his great delight. We also purchased some fish and berries, and went on our way. We passed a large winter village between two hills, known to the Russians as the Murderer's Village. Crossing the Yukon about three o'clock, we came to the southern entrance of the Shágeluk slough. Ascending a little way, we reached the Leather Village of the Russians. This is a large Ingalik summer village, the inhabitants in winter living at the last-mentioned settlement. Here we saw the cotton tents of the Máhlemut camp near the Indian houses. Isaac's wife stood on the bank, holding the baby, which crowed and exhibited all its infantile joy at seeing its father, who still further delighted this promising member of the family by producing the toy canoe.

We left the boat in the water, and took only our tent, cooking utensils, and blankets ashore, as the number of natives was so great that I thought it the safest way, especially as these Indians have a reputation for stealing. Leaving one man on the watch, I strolled into the village. The amount of food collected here was almost inconceivable. Large stages were groaning beneath the weight of fish, caught and dried the previous season. Long lines were strung with fresh white-fish, drying in the sun. Rows of caches full of dry fish, meat, fat, and skins of oil, showed that hunger need not exist in this favored locality.

The fresh meat of three or four moose, just killed, was lying in one pile; another contained the haunches and shoulders of ten deer. Every few minutes a canoe half full of fresh white-fish would arrive from the fish-traps, and in no part of the Indian country have I ever seen food so plentiful and so easily obtained. I was informed that the natives had quite a trade with those from other places, who came to buy úkali in the winter and spring. The summer houses were large and well built. The walls even of the caches were thick, and in many cases pierced with loop-holes for guns. There were but few dogs about, and I noticed a large white-breasted thrush tied by the leg, and apparently quite tame. I tried to buy the bird, which I had not seen elsewhere, but the owner could not be found. The Indians told me that

Teleézhik, the old Russian interpreter, had been there the previous day, and was now trading for furs farther up the Shágeluk. I returned to my tent, and bought a lot of fresh meat and some fat. Isaac came up and said that his brother had come with him, and had a little liquor which he had bought of the traders, but not enough to make a "good drunk." "Now," said he, "we want you to sell us your whiskey, and we will pay you well for it, with furs or anything you want." During my absence the rascals had discovered a can of alcoholic specimens in the boat, and supposed it was whiskey. I told him that I wanted it myself, that it was not good to drink, &c., but he went away very sulky. The Máhlemuts, male and female, now dressed themselves in the new fur clothing which they had brought to sell. Old Abraham, Isaac's father, commenced drumming, and the rest soon began one of their characteristic dances. Those who did not dance raised the old "Ung-hi-yah" chorus and kept time, clapping their hands. It was a sight to remember. Ten or fifteen clean, handsome, stalwart Innuit, going through the graceful gesticulations of their national dance, dressed in new and handsomely trimmed parkies of every variety of skin, — with the tall poplars and spruce for a background, a fire on one side, and above the genial twilight of the arctic night. Their wild chorus added to the charm of the scene. Around them in a wide oval were huddled the well-fed but filthy Indians. Their skin clothing was hairless from long use, and while almost dropping off them from decay, glistened with vermin. Degradation, filth, stupidity, fear, and wonder marked their features. The meanest of the Innuit far surpassed the best of them in strength and manliness. Their miserable condition was due in great measure to their sedentary habits, constant fish diet, and natural indolence. Very few had guns at all, and those which they did have were old, worn out, and nearly worthless. The Ingaliks who live farther up the Shágeluk are said to be more intelligent and active, probably because they subsist on the deer and moose which they are obliged to hunt. After the Máhlemuts had concluded their dance they distributed tobacco in small pieces to the bystanders. I repaired to my tent, took supper, and putting the alcohol-can, for safety, into the tent, lay down to rest. I had not got asleep, when I heard something crash against the tent-pins, breaking down two of them. At the

same time, Kurílla shouted to me from outside that the Máhlemuts were after the alcohol. I shouted back to look sharp, as they would not get it while I had a loaded gun. I pulled on my boots, seized my revolver, which lay by my head, and threw back the flap of the tent. There stood a Máhlemut with his hand on the trigger, and the muzzle of his gun about two feet from my breast. At the same moment, Kurílla's long arm jerked the gun from his hands, and flung it far away among the bushes.

I stepped out of the tent, and the Mahlemuts slunk away without a word. They were intoxicated, having drunk the liquor of which Isaac had spoken. The Indians had hidden themselves, while my men, guns in hand, stood near the tent. If the Máhlemuts had been sober, they would not have behaved so. It was a narrow escape, which I hardly realized at the time. The intruders retired to their tents, seeing us armed and ready for anything. The Indians now mustered courage enough to come out, and the chief came to me and begged me, with many bows and deprecatory gestures, to remove my camp, as he was afraid there would be trouble yet. "You know these Innuit are so very bad, so horribly bad, such beasts, worse than dogs," said he, almost with tears in his eyes. No doubt he was thinking of the miserable gun which they had just given him for twenty fine marten skins, which he dared not refuse them. I consulted with Kurílla, and then told the chief that we would move our camp to the island in the middle of the river, and if any one wished to trade meat or fur they would find us there. The tent and other traps were thrown into the boat, and we pulled across a very swift current to the island. Just as we hauled up the boat, Kurílla shot a swan who was sailing slowly overhead, and taking the little canoe, he started down stream after it. Some Indians came over with beaver skins and tails, which I purchased; and I hired one of them to act as sentinel during the night, with a good fire to keep off the mosquitoes. When Kurílla returned we gave our watchman the swan to pick, to keep him awake, and turning in, were soon lost in slumber.

Wednesday, 10th. — We pushed out into the rapid current very early in the day, while we saw nothing more of our Innuit friends, who were probably sleeping off their headaches. We pulled hard, hoping to reach the Mission before night. We passed a village

of two houses, called Mankí, interesting principally as being the most inland Innuit village on the Yukon. The difference of stock was apparent only from the countenances of the natives and the dialect which they spoke. The latter exhibited no signs of any mixture of Indian words. It was quite incomprehensible to my men, who had been able to converse freely at the last village. I could understand only a few words, which resembled the Máhlemut, though the grammatical construction was the same as that of the other Innuit dialects. These natives belong to the *Ekógmut* (sometimes called *Kwikhpágmut*) tribe, and are known

First Premorska village.

to the Russians as *Pre-mórski*, or "dwellers near the sea." They extend to the seaboard, on both sides of the river. Their habits in general are similar to those of the coast Innuit already described, but are a little modified by their situation on a river, which presents some conditions which do not obtain on the seashore. They are at peace with the adjacent Indians, probably as much because both are miserable cowards, as from any other reason.

As we sailed down the river, an old fellow in a small bidarrá came out from a river which entered the Yukon from the west,

and brought some cranberries for sale. A great difference is noticeable between the villages on the Upper and those on the Lower Yukon. Below, we find large, solid, permanent houses, gayly painted paddles, and great abundance of skin boats, the prows of which are frequently fashioned to resemble the head of some beast or bird; above, the dwellings are at best miserable huts, tents, or temporary shelters made of brush. Dirt, and a deficiency of the ornamental, mark the upper villages, while the only boats are the frail and carelessly made birch canoes. A little farther on we met a three-holed bidárka with a Creole from the Mission in it. He was going to the small river we had just passed, to try and hire the bidarrá from the natives, for a trip to the Redoubt. He gave us some goose-eggs, and went on his way.

We kept on until eight o'clock in the evening, and finding that we could not reach the Mission within several hours, camped at a native settlement, called by the Russians Loon-cap Village. We pitched our tent near a small brook, and soon had the kettle on the fire. This village presented many points of interest. The number of inhabitants was only eight or ten, the remainder having died. This decrease in population is noteworthy along the Lower Yukon. Everywhere there are fewer natives than formerly. The decrease is partly due to lung diseases, which arise from their habit of drawing the smoke of the Circassian tobacco into the lungs. In this particular village, within a generation, there had been several hundred inhabitants. There were eight large summer houses, in each of which a hundred people might have been comfortably accommodated. These houses were built of immense planks, hewn out of single logs with stone adzes. Many of these planks were four inches thick, and three feet wide by twelve feet long. The houses were in a miserable state of decay. Water stood in some of them, and only one or two were habitable. The rafters were carved into rude imitations of animals, and still retained traces of the red earth with which they had been painted. The graves were the most conspicuous and remarkable part of the village. They exceeded any I have ever seen on the Yukon, in intricacy of ornament, variety of design, and in their number compared with the size of the village. They were on the hillside, a little way above the houses. I noticed that they were not covered with logs or slabs of wood like

the Ingalik graves, nor with earth and clay like those at Anvík, but were filled with earth over the body, and then carefully covered with pieces of birch bark, held down by heavy stones. The supports of the box were immediately underneath it, and large baluster-like standards ornamented the corners. Many of the boxes were carefully fitted, smoothed, and painted with various designs. Some had fur animals depicted on them, showing that the dead person was a successful trapper. Others had the bear, deer, and other animals, denoting the graves to be those of hunters. Fish, birds, pictures of seal and beluga hunting, were painted with the usual red pigment on others. Many were studded with pegs of ivory or bone; some were surrounded by a carefully carved and painted railing. Drums, kantágs, paddles, bows of tremendous size bound with sinew, arrows of bone carved into intricate lace-work, quite different from anything I have seen elsewhere, strings of beads, belts, pieces of brass scratched with patterns, kettles, and other articles of use and ornament were attached to many of the coffins. On posts in front of some of them were separate pieces of wood-carving, such as masks resembling the human face, and trimmed with wolfskin, carved human heads, beavers transfixed with arrows, fish, beluga, and boats with men in them, all variously painted.

The ethnologist would find a wide field in the vicinity of this village alone. The few inhabitants had a melancholy cast of countenance, as if conscious that they were living among the remains of the ingenuity of their ancestors, which they could not hope to emulate. They were successful in hunting; that very day a bear and three deer were killed, with nothing but arrows, a few rods from the houses. The men wore dresses of birdskins, which are common on the Lower Yukon. Some of them had caps made of the skin of a loon or hawk, with the breast above, the head still attached and hanging down behind, and the wings on either side. The vegetation was luxuriant. I forced my way to the vicinity of the graves through a growth of grass and weeds four feet high. Care was necessary to avoid falling into excavations, the sole remains of ancient winter houses long since rotted away.

I bought some fresh venison, and after a hearty supper we turned in.

Thursday, 11th. — After collecting a few plants, among which were the blossoms of black and red currants, we pushed off on our way to the Mission. The trees had already become less abundant, especially on the right bank. The latter was pretty high in many places, and trachytic rocks were observed. In some places the river is exceedingly wide, and once or twice, when we were in the current close to the right bank, the left bank was quite invisible. A broad, smooth sheet of water stretched to the west, undisturbed by any ripples, and not broken by islands or dry sand-bars. The scene strongly impressed upon the observer the majesty of the great river upon which we were travelling. About ten o'clock the basaltic rocks indicated the proximity of the Mission, and hoisting the American flag and that of the Scientific Corps, we rounded a point, and the buildings came into view. The water near the shore was shallow, and we had some difficulty in hauling in our heavily loaded boat. We fired a gun, and were saluted in return by the Russians.

We found that the missionary of the Greek Church in the District of St. Michael's (commonly known to the Russians as the Pope) was on the point of starting for the Redoubt. He had dismantled the church of everything valuable, and had nailed up the door. At his request I took an inventory of the houses and articles of furniture he left behind, as he hoped to sell them to the Americans when they arrived. He then applied for medical advice, and gave a lengthy description of his personal miseries, which were all clearly referrible to an undue indulgence in alcoholic stimulants. This, I believe, in the Greek Church is not considered to detract from the holiness of its ecclesiastics. All of those I have met with in Alaska and Kamchatka were inveterate topers. He told me that he had been seven years a missionary on the Yukon, and that he thanked God that he now had an opportunity of returning to Russia, where a glass of rum might be had for twenty-five kopeks (five cents). I cautioned him against *delirium tremens*, and bade him good by. His Creole servant, who accompanied him to St. Michael's, had a very pretty wife, and I doubted if something more than a fatherly benediction did not lurk in the kiss Father Larriówn gave her just before he embarked.

The other Russians at the Mission were Milavánoff the bidárshik, and Goldsen, who had been acting as secretary. Milavánoff was a good trader, but an invalid from liver complaint, which is common among the Russians in this country. He gave me a good supply of bread, as my own was nearly exhausted, and I made him a present of my Derringer, to which he had taken a fancy. I was sorry to find that I could not get an interpreter here, as the Innuit dialect of the delta was incomprehensible to all of our party. The buildings at the Mission, except a new house of Milavánoff's and one belonging to the Pope, are very rotten and miserable. The place is a very unhealthy one. It is situated between two hills which shelter it completely from the wind. Several pools of stagnant water are close by. The Indian village is very filthy, and their refuse from fish and other matters is everywhere scattered about. I counted six dead dogs among the bushes, and close to the houses there is a large number of graves, both Russian and native. Some of the latter were curious, and were furnished with the baluster-like supports before mentioned.

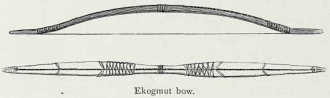
Ekogmut grave.

We emptied our boat, turned her over, gave her a good oiling, and left her to dry. This is imperatively necessary when travelling in skin boats, and should be done at least once in ten days, if possible. We all took a good steam bath, which was a great luxury. Once, farther up the Yukon, I had tried the experiment of bathing in the river, but the water was so cold that only a single plunge was endurable. In this part of the river the water is so muddy that it adds nothing to one's cleanliness to bathe in it.

Friday, 12th. — After securing a number of specimens, grinding our axes, and performing a variety of similar small jobs, we again proceeded on our way. Just below the Mission we saw a native attacking a beaver with one of their bone tridents. Kurílla started to his assistance, in the canoe, with his gun; after a little while they returned, and I bought the animal, as it lay, for three bunches of Circassian tobacco. We kept on all night, as

the air is cooler than in the day, and there is no darkness, though the sun goes a little below the horizon. No stars were visible all night.

Saturday, 13th. — About midnight we rounded the Great Bend. Here we met the head-wind blowing in our teeth with redoubled force. For all the use they had been, so far, we might as well have left the mast and sail at Nuláto. At the Bend we found a camp of natives who were waiting for the wind to subside. They had nothing for sale except a few mink and some eggs. I bought some swan's eggs for scientific purposes, and also a bow of the kind in use in the Yukon delta. These bows are made of spruce, which has little elasticity when dry, and is very liable to break. To remedy this defect the bow is bound with cords twisted from deer sinew, as shown in the annexed figure. This gives it great

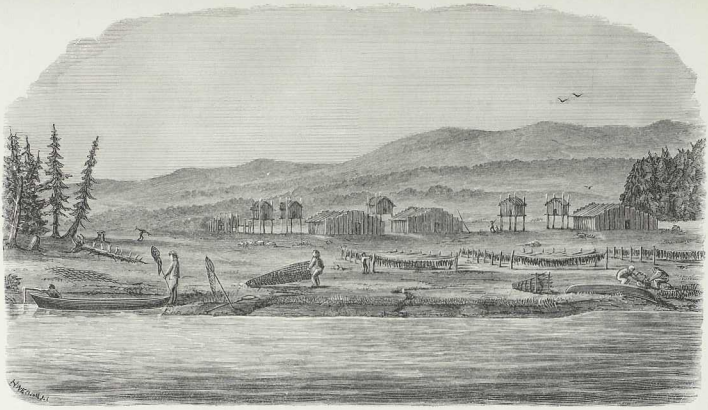


Ekogmut bow.

strength, and overcomes the brittleness of the wood. We took tea in a slough, and about noon stopped at a village where the inhabitants were engaged in fishing. It is only by personal inspection of such a village that any one can obtain an adequate idea of the immense quantity of fish which is annually caught and dried on the Lower Yukon. Several acres of ground in front of the summer houses were literally covered with standards and stages bearing line after line of fish, split and hung up to dry. The odor is borne to a great distance by the wind. The dogs, children, and other inhabitants of the village, during the fishing-season, recall the old lines,—

> "Jeshurun he waxèd fat,
> And down his cheeks they hung!"

while the long rows of caches are crammed with provisions for the winter. This condition of things holds good as far as Anvík. Beyond that point the fish are scarcer, and, as previously related, Nuláto is far from furnishing food of any kind in plenty. In the foreground the different parts of fish-traps were lying, in readi-



VILLAGE ON THE LOWER YUKON, DURING THE FISHING SEASON.

ness to repair any damage, or put down a new trap, if the water fell so as to render it necessary. Here some men were emptying the fish out of a basket, and there others were returning with a canoe-load of salmon from some distant zapór.

We bought a few whitefish, and some mink. I saw two red fox cubs with collars, tied to stakes in some of the houses. These were apparently intended to amuse the children. We then departed, and finally camped on a sand-bar which was literally alive with wild fowl. We were now getting into the region where they abound, during the spring and summer, in myriads. The report of a gun will often raise such immense flocks of geese as literally to darken the air; sometimes a flock will be four or five miles long, and two or three rods wide, flying as close together as they can with safety. Swans whitened the surface of several lagoons, and from them down to the tiniest snipe, not weighing more than an ounce, every kind of wild fowl abounded in profusion. Their eggs were scattered over the sand-bars, and a hatful could be obtained on any beach. On attempting to empty the swan's-eggs which I had purchased the day before, by means of a blow-pipe, they resisted all my efforts. On breaking them, what was my surprise at finding that they had been hard boiled by the natives, to keep them from spoiling!

The real work of the season had been well commenced at Nuláto, but partially suspended since we left, as we had procured but few birds new to the collection, since leaving that point. Now I had my hands full, and leaving the task of navigating to Kurílla, I was constantly occupied skinning the birds which we obtained at every turn. I passed many a night without getting an hour's sleep, in order that rare birds might be preserved; and the work of preparing birdskins is anything but a pleasant one. The results to be obtained for natural history were so great, that it was impossible to grudge a moment of time so spent, or to neglect any opportunity of adding to the note-book or the collection.

Sunday, 14th. — Passed the Rasbínik village, where I bought a marten-skin and a haunch of reindeer meat. The natives here always cut a small piece off every skin after selling it, for luck as they say. Toward night we reached the village of Starry (old) Kwikhpák. Here I found a man named Yaska, who had been interpreter at Andréaffsky. I explained to him that I wished to

visit the Kúsilvak Slough, and obtain eggs and skins of the beautiful emperor goose (*Chloephaga canagica*), which breeds in abundance there, and there only. He could not go himself, but obtained a boy who knew the way, and explained to him what I wanted. The village was full of fresh skins of the reindeer fawn. I counted a thousand and seventy-two bunches hanging up to dry. Each bunch contained four skins, or enough to make a parka. This would give a total of nearly four thousand three hundred of these little creatures, which had been killed during the past two months. The village contained a great deal of dry meat and fish, but the inhabitants were squalid and dirty. I saw

Andreaffsky.

a tame owl sitting on one of the rafters, and a few marten-skins were hanging on a cache. I bought an otter-skin of the finest quality, for four bunches of Circassian tobacco. Not wishing to camp in such a dirty place, we proceeded a little way down the river with our guide, and camped.

Monday, 15th. — While collecting in the morning, I found cowslips in blossom on the marshes, and obtained the eggs of the beautiful white-winged gull. The long-continued and never-tiring head-wind was stronger than usual this morning. To avoid it, we entered a long slough, where we took tea, and I collected many yellow butterflies (*Pieris venosa* Scud.), the only species

which I noticed on the Yukon near the sea. About one o'clock we emerged from the slough, and at this point killed several geese. The waves were very high, and after an hour's hard pulling we passed the mouth of the Milavánoff River, and finally reached Andréaffsky Fort. It was quite deserted. The solitary fort, with the windows all nailed up, the bare hills, and cloudy sky, made the place seem more lonely and dreary than ever. We hauled up the boat, and boiled the chynik, and rested until the wind should abate a little.

Andréaffsky was built in the form of a square, the buildings making two of the sides, and a stockade the other two. It contained barracks, a store, magazine, cook-house and bath-house. It was erected about the year 1853. In 1855 it was the scene of a mournful tragedy. There was formerly an Ekógmut village near the fort. Several of the natives were workmen at the fort. No trouble had ever occurred. Several of the garrison had gone up to Nuláto with the annual provision-boat, and only the bidárshik and one Russian, besides the native workmen, were left in the fort. One Friday in August, the natives attacked the Russians as they came naked out of the bath, and killed them with clubs and knives. A Creole boy escaped to the hills, and finally crossed the portage to the vicinity of St. Michael's. When he reached that point the Uprovalísha was away, and his secretary, Iván Kogénikoff, was acting in his stead.

The Russians had long murmured at the conduct of the Company, in leaving unavenged the Nuláto massacre. The opportunity of settling accounts with the natives was too tempting to resist. Kogénikoff and Gregory Ivánhoff, with two Creoles, immediately started for the fort. On reaching it they found everything in confusion. The dead bodies lay at the door of the bath-house. The natives, not knowing how to use flour, had merely carried off the sacks. They had also ripped open the beds, and carried away the ticking, while the mass of flour and feathers was left on the floor. After satisfying themselves that there was no living thing in the fort, the Russians started for the village, which was about a mile off. As they approached, Kogénikoff saw a man standing in the door of one of the houses and pointing a gun at the approaching party. It afterward turned out that the gun had no lock; but not knowing this,

the Russians fired, and killed the man. The natives, who were few in number, came rushing out, and were shot down without mercy. The Creoles, who, when aroused, have all the ferocity of the aboriginal savage, attacked the shamán and beat out his brains with clubs. None were spared. The blood shed at the fort was not yet dry, and the infuriated Russians resolved that the authors of that cowardly outrage should be exterminated without mercy. When they stayed their hands the work was done. Fathers, mothers, and children had passed their "evil quarter of an hour." The result was wonderful. From that day to this not a native on the Lower Yukon has lifted his hand against the whites. The bloody lesson was not thrown away. The strong hand, which alone commands the respect of savages, was worth a thousand missionaries. To this day the natives travelling on the river near the fort pass by on the other side. Large quantities of tobacco and other property, stolen from the fort, were found in the village. Around the necks of most of the dead, crosses were found hanging, indicating that the thieves and murderers were baptized converts of the Yukon Mission.

The only articles remaining in the fort at the time of our visit were three six-pounders, and some old iron. Toward evening, though the river was still very rough, we embarked, and by keeping close to the bank managed to travel several miles farther. The white dome of the Kúsilvak mountain loomed up grandly to the southwest. Just south of it is a shallow slough which leads into the south slough of the delta. This is navigable only for bidárkas. The trees were now reduced to low willows, and the level character of the country to the north and west showed that we had passed all the mountains. A few low hills still fringed the right bank, but the general level of the country was only a few feet above the sea. We finally camped on the bank of a small stream, which our guide said was called Egg River. The evening was cold and raw, the sky cloudy and sombre, and the vegetation far less advanced than that a hundred miles inland. Fragments of ice, the remains of huge blocks left by the freshet, still lay on the shore.

Tuesday, 16th. — The whole morning we pulled against a strong steady head-wind. We passed into a narrow slough, and by a turn to the northward were able for the first time to use our

sail. Convinced that we were passing the mouth of the Kúsilvak, we crossed to the other side of the river. Two hours were consumed in doing this, although we made at least three knots and a half an hour. The aspect of the country, flat, marshy, and muddy, was truly desolate. We saw immense numbers of wild fowl in the distance, but no other animals. We camped on the left bank, and I noticed that the mice in winter, crawling along the surface of the snow, had gnawed the bark from the willows full six feet above the ground. This would indicate that the snow falls at least to that depth. A few warblers were building their nests in the thickets, and I noticed the tracks of mink along the muddy beach.

Wednesday, 17th. — Our guide to my astonishment insisted on crossing the river again. As none of us understood the Premórska dialect, we were unable to find out what his intentions were. About noon we stopped at a small island and collected about fifty eggs of the water-hen (*Mergus serrator*). They were laid under logs, without any lining to the nest, and covered carefully with dry leaves and down. The parent birds flew, screaming, round the island, out of gunshot. About half an hour after, our guide brought us to the mouth of the Uphoón! I recognized the place immediately, and by referring to my vocabularies managed to make out that he had supposed this was our destination, and that he knew nothing about the Kúsilvak. This was a great disappointment to me, as I had hoped to obtain large numbers of the eggs and skins of the Emperor goose. However, there was nothing to be done but to make the best of it. I paid him, and he started homeward, while we kept on our way through the Uphoón. The small beaches were plentifully strewn with eggs. The most common were those of Hutchin's goose, the white-winged gull, and the pin-tail duck. I had instructed Kurílla in the manufacture of omelets, and they now formed part of every meal. The egg-shells were carefully emptied with a blowpipe and devoted to science, while the contents went into the frying-pan. We camped on a high bank, which bore the remains of many native camp-fires, and just before turning in I was fortunate enough to shoot a fine specimen of the beautiful red-necked loon. The Uphoón is an excellent collecting ground, but the emperor goose is seldom seen there.

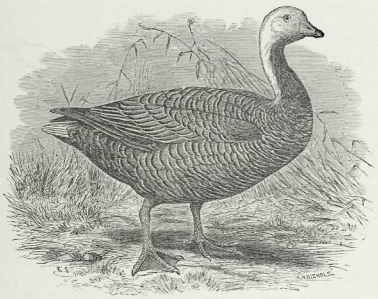
Thursday, 18*th*. — We started late, after unlimited omelet, and rowed slowly through the various windings of the slough. Now and then we stopped to collect eggs or specimens, and the boat was fairly covered with our feathered prizes. We passed one deserted native house, and about dark arrived safely at Kutlík. This settlement consists of one house, built by a Russian called Anányan, containing a living-room, kitchen, and bath-room, under one roof; a single Innuit barrábora stands near it, and a great cache, the largest in the country, has been erected behind the house. The house was entirely empty, and had such a smoky smell that I decided to sleep in the tent, and only to do my bird-

Kutlik.

skinning inside, where there was room to spread out the skins to dry. I proposed to spend several days here, and to send the Indians out shooting, while I kept at work preparing the specimens. Anányan, with his family, was away in the Kúsilvak, where he was salting chowíchee (*Salmo orientalis* Pall.) for Stepánoff.

The next day I busied myself repacking the specimens which had been collected on the road. I sent out all the Indians with liberal supplies of powder and shot, and promised ten balls as a present to whoever should bring in one of the much-desired geese. I blew about five dozen eggs during the day which is an undertaking to be appreciated only by those who have tried it. To-

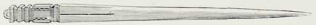
ward evening it rained, and I moved everything from the tent into the house, except my blankets. The men came back loaded with game, and the indefatigable Kurílla, with an unwonted smile on his sober face, unfolded a piece of cotton and brought out a magnificent old gander of the right sort. The golden tips to the snowy feathers of the head, the beautiful "ashes-of-roses" color of the body, marked with half-moons of black, gave it the undisputed right to its proud title of the Emperor, or, in Russian, *Cæsár-ka.*



The Emperor goose.

The following day and the one after that were spent much in the same way. I was busy preserving and packing the skins, while the Indians were constantly out gunning. Sidórka added another goose to my collection, and I obtained near the house several pairs, and also the eggs of a curlew (*Limosa uropygialis*) not previously found on the American continent. On Monday, Kurílla heated the bath-room, and we all took a steam bath. In the evening about half past eleven that old veteran Teleézhik arrived from the Shágeluk with a boat-load of furs. He would only stop to drink tea, however, and with his two companions pushed on to Pastólik. He had obtained about a thousand martens.

Tuesday, 23d. — After packing up all the collections, I concluded to follow Teleézhik to Pastólik. We arrived there safely, and had hardly landed our cargo before a strong head-wind sprang up, so that we had been just in time. Pastólik is a Únaleet village of some thirty huts, mostly built of turf and driftwood. Just now it was without inhabitants. It is situated on the shore of a wide inlet, into which the Pastólik River empties. The mouth of this inlet is nearly closed by a bar which is almost dry at low tide. Inside of the bar there are deep places, and here a beluga fishery is carried on in the month of August. The beluga is a small white whale, allied to the sperm whale and porpoise. They come into the shallow water to breed, and are prevented from getting out of the inlet by the bar. When the tide falls, the natives in their kyaks attack them with lances, and large numbers are killed. The flesh is eaten, and the blubber and oil preserved for trade and winter use. The length of these animals seldom exceeds fifteen feet, and a large one will weigh about two thousand pounds. I counted eighty skulls lying about the huts, the remains of the fishery of the previous year. The teeth of the beluga are of the consistency of ivory, and are extensively used by the Innuit in making small carvings. Birds, seal, deer, and other animals are imitated with some skill by the natives, and many articles of use and ornament are made by them from ivory. The previous year, on our arrival from Nuláto, I purchased a large number of these articles. An awl or bodkin is here repre-



Ivory bodkin.

sented. The larger articles of ivory are made from walrus tusks, which are obtained by trade with the natives of the northern coast. In July and September a seal fishery, similar to that at Kegiktówruk, is carried on here, and many are secured in nets. These nets are exceedingly strong, and are made from rémni,

Seine needle.

with a peculiar needle, which is here represented. The Innuit

women are extremely expert at this kind of work. I am informed that with similar nets, during the moulting season, they secure large numbers of wild fowl and also many arctic hares in the fall. During the moulting season they obtain many skins of the different species of divers, by driving them into shallow water where they cannot dive, and spearing them with bone tridents. Of these skins they make parkies and other articles of clothing, some of which are very tasteful.

The Innuit have also a custom of making, on flat pieces of bone, rude drawings of animals, hunting parties, and similar things.

INNUIT DRAWINGS ON BONE.

Spearing geese.

Wolves after deer.

Innuit dance.

Deer hunting.

These drawings are analogous to those discovered in France in the caves of Dordogne, and the preceding sketch of the drawings on either side of two bone knives illustrates their general character. I have seen an ivory bow, used in connection with a drill, and made of an entire walrus tusk, which had depicted on each of the four sides every pursuit followed by the Innuit from birth to interment. These facts have a peculiar interest as showing some similarity between the customs of the present Orarian tribes

and those of the ancient European cave-dwellers. Similar drawings are common everywhere among the Innuit, while I have never seen among the Tinneh tribes of the northwest any similar specimens of art. Some of the Innuit tribes to the southward exhibit much more ingenuity in such matters than those of Norton Sound and the vicinity.

Back of Pastólik are extensive marshes bounded by the low range of the Pastólik Hills, while at their foot the Pastoliák River flows, emptying into Pástol Bay. These marshes are the favorite haunts of myriads of wild fowl.

Wednesday, 24th. — This morning an unexpected misfortune occurred. The strong west wind raised the water so high that it not only invaded our tent near the shore, but surrounded the boxes of birdskins before we became aware of it, and I was obliged to empty them, unpack every individual specimen, and dry it in the sun. This was fortunately accomplished and the specimens repacked, when clouds came up and it began to rain. From the marshes my Indians obtained many fine birds and eggs, including several specimens of the exquisite Sabine's gull (*Xema Sabinii*), and a pair of Emperor geese. This is nearly the most northern point reached by the latter species.

A solitary native arrived in a kyak at night, and reported others on the way. I picked up near the village a large portion of the skull of the extinct elephant (*Elephas primigenius*). These bones are not so common as the teeth and tusks, being found on the surface only, and usually much decayed; while the bones of the musk-ox and fossil buffalo found in the same situations are much better preserved, and sometimes retain some of the animal matter in the bone. The natives have no tradition of any other large animal than the reindeer and moose, and regard the elephant and musk-ox bones as the remains of dead "devils." The tusks are not so well preserved as those found in Siberia, which are usually buried in the earth. The former are blackened, split, and weathered, and contain little ivory in a state fit for use, though the Innuit of the Arctic coast occasionally find them in such preservation that they make kantágs or dishes of the ivory, according to Simpson.

On Friday, Goldsen arrived in a three-holed bidárka with his son and an Innuit lad. He reported that Milaváno ff was at Kútlik.

Saturday, 27th. — The wind being nearly fair, all hands loaded up, and we started for the Redoubt. I had hoped to get a larger boat at Pastólik, fearing to trust my little bidarrá to the waves of the open sea, but there were neither boats nor natives at hand. We sailed well, and soon outstripped Teleézhik, though the nimble bidárka led the fleet. We drank tea on the shore, about ten miles from Pastólik, and then pushed on toward Point Románoff. Goldsen arrived at this point some time ahead of us, as it had become quite calm.

On reaching the village, near the solitary hill which marks the point (which is the Cape Shallow Water of Cook), I was about to land, when Goldsen cried out to me, "Hurry up! Mr. Doctor, don't stop for a moment, there are two American vessels at the Redoubt!" My joy and excitement can hardly be described. Our ignorance of any details only added to it. The news was obtained through a native who had been to the Canal, and had only seen the vessels. I immediately proposed to Goldsen to put his native into the bidarrá, while one of my Indians would take the other paddle, and I would accompany him in the swifter bidárka to the Redoubt. This arrangement was soon completed, and I left Kurílla to bring the bidarrá to St. Michael's. We touched at Pikmiktálik, and entering the Canal took tea on the bank. While the chynik was boiling I took a bath in one of the lagoons, and otherwise prepared myself to meet civilized beings once more. After tea we pulled vigorously all night.

Sunday, 28th. — About three o'clock in the morning we reached the northern mouth of the Canal, and saw a small schooner lying in the bay. To the eastward a bidarrá was pulling for the Canal, but seemed rather to avoid us. Taking Goldsen's glass, I made out one white man in it, and the round sides of two barrels rose conspicuously above the gunwale. I felt sick as I sat down, knowing that the cargo must consist of rum, and seeing already the beginning of evils whose future growth none could estimate.

We pulled up to the landing near the boat-house. Everything seemed much as usual, and everybody was evidently asleep. My eye soon fell on a pile of boxes, which were not of Russian make, and just beyond was a lot of American tin cups. I hastened to the house on the point, which was evidently occupied. Entering, I nearly stumbled over a sleeper on the floor. He rose and came

out into the light, and I was soon shaking hands and exchanging hurried interrogatories with Mike Lebarge. The unmixed delight with which I welcomed his familiar face can hardly be appreciated. I found, to my own astonishment, that speaking English, after a year of nothing but Russian and Indian dialects, was anything but easy, and for several days I was obliged to resort to Russian when fluency was required. The news, much of it eighteen months old, was all news to me, and it was weeks before I gained anything like a comprehension of the events which had occurred in the civilized world since I last heard from it. My only disappointment was that they brought me not a single home letter. All of these had been sent to Sitka or elsewhere, in ignorance of my whereabouts. I had not heard from home for nearly two years.

Captain Smith had left with his vessel for Grantley Harbor. He would return to St. Michael's, and I made the necessary preparations for accompanying him to California. I must pass over the events of the next month at the Redoubt. Several trading companies, beside that which Mike represented, intended to send parties into the country. The vessel in the bay was principally loaded with liquor, which had in some mysterious way eluded the vigilance of the United States officials at Sitka ; she belonged to one of these companies. Some time after, the vessel arrived which had been sent to take back those Russians who desired to return to Russia. Very few went in her, as most of them were hired by the new trading companies. To Mr. George R. Adams, and Captain Riedell, of the brig Constantine, I was under many obligations. On the 21st of July the schooner Frances L. Steele arrived from Bering Strait with Captain Smith on board. On the 9th of August, having shipped the collections, I embarked for San Francisco *via* the Aleutian Islands. We touched at St. George's Island and some of the Aleutians on our way to California.

The incidents of the voyage need not be recounted here. It is sufficient to say that I obtained abundance of evidence that during 1868 great abuses were prevalent in the new territory. One trading company in particular, hoping, by its large capital and connection with the officers of the defunct Russian Company, to crush all smaller concerns, had not hesitated at force, fraud, and corruption, to attain these ends. It would be impossible to

believe in the probity of some of the officials (since removed) at Sitka, as it was impossible to avoid seeing the outrages which had been committed. One instance of the temper of these traders will suffice. A party, consisting of several German Jews, one Russian, and some other foreigners, had staked out the places where the fur seal come up on the island of St. George, and declared their intention of holding these tracts of beach under the homestead laws (!) by force, if necessary. Two unarmed Americans, who had served in the army and navy during the late war, and who had a permit to seal from the Sitka authorities, having trespassed on the land staked out, were set upon by a party of armed natives, led by a member of the company referred to, were tied hand and foot, and left all night in a mud hovel used for storing salt. The next day they were released on condition that the trespass should not be repeated.

In their present condition the Creoles are unfit to exercise the franchise, as American citizens. If a territorial government should be granted to the handful of Americans now resident in the territory, it would simply give the stronger companies the power to crush and ruin the weaker ones, and a full opportunity of smuggling and selling liquor would be afforded to the former. The present system of a military government, with honest officers, is unquestionably the best, until the proper reservations are made and regulations in regard to trading are enacted. The territory is not likely to be populous for many years, and should rather be regarded as a great storehouse of fish, timber, and fur; from which American citizens alone should be allowed to draw supplies, under proper restrictions and on payment of reasonable taxes. The country, under a monopoly, afforded one hundred thousand silver rubles a year, taxes, to the Russian crown, and, with the development of other resources than the traffic in furs, can certainly afford as much to the United States. I speak from no uncertainty, but from positive knowledge; I believe that a proper and not onerous system of taxation would afford two hundred and fifty thousand dollars in gold per annum.

It is but reasonable to suppose that a territory separated by sea and foreign territory from the United States — being in point of fact a *colony* — should need, and be the subject of, special legislation, differing in many particulars from that applied to territories

which are merely continuations of densely populated districts under State jurisdiction.

I have seen with surprise and regret that men whose forefathers wielded the axe in the forests of Maine, or gathered scanty crops on the granite hillsides of Massachusetts, have seen fit to throw contempt and derision on the acquisition of a great territory naturally far richer than that in which they themselves originated, principally on the ground that it is a "cold" country. This complaint is but half true to begin with, since on half of the coast of the new territory the thermometer has never been known to fall below zero. Icebergs are unknown in Alaska from Dixon's Entrance to Bering Strait, and no polar bear ever came within a thousand miles of Sitka. On the other hand, has the race of hardy pioneers died out among us? Do we, as a nation, sigh only for indolent siestas in the canebrakes of Cuba? In a country where all that we honor and respect has grown from the efforts of those whose energy, fostered by conflict with the elements, has made a garden of the rock, turned the forest into fruitful fields, and drawn the precious minerals from the flinty bosom of the earth, there can be but one answer to such a question.

We have bought for a nominal price the key to the North Pacific. It can no longer be said that three ironclads can blockade our entire western coast. Two hundred and fifty years hence there may be a new New England where there is now a trackless forest. The time may come when we shall call on our Pacific fishermen to man our fleets, on the lumbermen of Alaska and our hardy northern trappers to don the blue, and strike another blow for unity and freedom. The oak must weather the storms of many winters before it gains maturity. Alaska is not a California, where cities arise in a night, and may pass away in a day. Meanwhile we must be patient.

We entered the Golden Gate on the 29th of September. I cannot close this partial record of my experience in the north, without a word of acknowledgment to those Californian friends who made my welcome back so warm. The friendship of Californians, easily acquired, is as precious as their own gold, and as enduring as their Sierras. When I stepped on board the steamer, eastward bound, I felt almost as if I were leaving rather than approaching home.

PART II.

EXTRACTS FROM THE REPORT

ON AN

EXPLORATION MADE IN 1887 IN THE YUKON DISTRICT N.W.T.

AND

ADJACENT NORTHERN PORTION OF BRITISH COLUMBIA

BY

GEORGE M. DAWSON, D.S., F.G.S.

CHAPTER I.

The Yukon Expedition—Its purpose—Arrival at Wrangell—Dease Lake—Boat-building—The confluence of the Dease and Liard Rivers—Ascent of the Liard and Frances Rivers to Frances Lake—Examining and mapping the lake—Difficulties of portaging—The Upper Pelly—Descent of the Pelly—Mr. Ogilvie's preliminary report and map sheets—Chilkoot Pass—Distance travelled by the Expedition during the exploration—River systems of the northern part of British Columbia and the Yukon district—Characteristic features of the region—The estuary of the Yukon—When first explored—The name Yukon first applied in 1846—The source of the Yukon an interesting subject of inquiry—Its width, depth, and velocity—Principal routes of travel—The Taku River—Rivers of the Upper Yukon Basin—Total length of waters navigable—Routes of access employed in 1888.

THE Yukon Expedition was undertaken for the purpose of gaining information on a vast and previously almost unknown tract of country which forms the extreme north-westerly portion of the North-west Territory. This tract is bounded on the south by the northern line of the Province of British Columbia (lat. 60°), on the west by the eastern line of the United States territory of Alaska, on the east by the Rocky Mountain Ranges and 136th meridian, and on the north by the Arctic Ocean. The region thus generally indicated is referred to as the Yukon district, from the fact that the greater part of its area lies within the drainage-basin of the river of that name.

The Yukon district has a total area of approximately 192,000 square miles, 150,768 square miles being included in the watershed of the Yukon. The superficial extent of the district is nearly equal to that of France, greater than the United Kingdom by 71,100 square miles, ten times the area of the province of Nova Scotia, or nearly three times that of the New England States.

The writer was placed in general charge of the expedition, with Mr. R. G. McConnell, B.A., and Mr. J. McEvoy, B.Ap.Sc., also of the Geographical Survey, as assistants, while Mr. W.

Ogilvie, D.L.S., was intrusted with the conduct of instrumental measurement, and the astronomical work in connection with the determination of the position of the 141st meridian.

We left Ottawa on the 22nd of April, 1887, travelling by the Canadian Pacific Railway to Victoria, and reached Wrangell, at the mouth of the Stikine River, where our work was practically begun on the 18th of May. Here Mr. McConnell stayed behind, for the purpose of getting Indians and canoes to enable him to make a micrometer survey of the Stikine from the end of the line measured by Mr. J. Hunter in 1877, to Telegraph Creek, while I proceeded up the river by the first steamer of the season to Telegraph Creek, the head of navigation. From thence, goods are carried by pack animals to Dease Lake, the centre of the Cassiar mining district. On June 5th, we reached the head of Dease Lake, and found the greater part of the lake still covered with ice. It was not until the 9th that we were able to reach the point on the shore near Laketon at which two men, previously sent on in advance with an Indian packer, were sawing lumber for boats. Seven days were employed in this work and in constructing three boats. On the evening of the 16th, a strong wind having broken up the remaining barrier of ice, we reached Laketon with our boats, Mr. McConnell, with a crew of five Coast Indians intended for my work on the Upper Liard, having meanwhile joined us. On the 18th we started, and on the 23rd reached the "Lower Post" at the confluence of the Dease and Liard Rivers. Here Mr. McConnell, with one boat and two men, separated from us for the purpose of surveying and geologically examining the Lower Liard.

On leaving the confluence of the Dease and Liard, my own party included, besides myself, Mr. McEvoy, Messrs. L. Lewis and D. Johnson, engaged at Victoria, two Tshimsian and three Stikine (Thlinkit) Indians, all good boatmen. Two local Indians hired as guides, and to help in portaging, deserted a day or two after engaging; and from the "Lower Post" to near the confluence of the Pelly and Lewes, for an interval of more than six weeks, we met neither whites nor Indians.

The ascent of the Liard and Frances rivers to Frances Lake proved unexpectedly difficult and tedious, the rivers being swift

throughout and three bad cañons having to be passed through. Frances Lake was reached on the 8th of July, and after spending a few days in examining and mapping the lake, making the observations necessary to fix its position, and in the endeavour to find some Indian trail by which we might travel across to the Pelly, we began the work of portaging on the 17th.

As we had been unable to discover any route now in use by the Indians, and no trace remained of the trail employed by the Hudson Bay Company in former years; and as no local Indians could be found to act as guides or to assist in carrying our stuff, it was evident that the crossing of this portage (which had been estimated by Mr. Campbell at about 70 miles in length) would be a difficult matter, and that we might indeed find it impossible to carry over a sufficient supply of provisions for work on the Pelly. We therefore constructed a strong log *câche* on the shore of Frances Lake, and left there everything we could possibly dispense with, to be taken to Dease Lake by the Indians when they returned. Had we been unable to effect the portage, there was in our *câche* a sufficient supply of provisions to enable the whole party to return to the "Lower Post." We were, however, so fortunate as to reach the bank of the Upper Pelly on the 29th of July, with still nearly a month's provisions for four persons, our instruments and a small camping outfit, a canvas cover from which a canoe might be constructed, and the tools and nails for building a wooden boat, should that prove to be necessary. Our Indians were paid off here, and to their great delight allowed to turn back.

As a dangerous rapid was reported to exist on the upper part of the Pelly, it was decided to construct a canvas canoe in preference to building a boat, which it might prove impossible to portage past the rapid. Having completed the canoe, we descended the Pelly, and arrived at the confluence of the Lewes branch with the Upper Pelly on the 11th of August. At the mouth of the Lewes we had now reached the line of route which is used by the miners, and expected to find a prearranged memorandum from Mr. Ogilvie, from whom we had separated in May. As we did not find any such notice, and as Mr. Ogilvie had not been seen on the lower river by a party of miners whom we met here on their way up the Lewes, we were

forced to conclude that he had not yet reached this point. We were also told that Harper's trading post, where I had hoped to be able to get an additional supply of provisions should we fail to come up with Mr. Ogilvie, had been moved from the mouth of the Stewart to Forty-mile Creek. From the place where we now were we still had a journey of nearly 400 miles to the coast, with the swift waters of the Lewes to contend against for the greater part of the distance. If therefore it should have become necessary to go down stream 200 miles to Forty-mile Creek for provisions, so much would have been added to our up-stream journey that it would become doubtful whether we should be able to afford time for geological work on the Lewes, and yet reach the coast before the smaller lakes near the mountains were frozen over. I therefore decided to set about the building of another boat, suitable for the ascent of the Lewes, and on the second day after we had begun work, Mr. Ogilvie very opportunely appeared. After having completed our boat and obtained Mr. Ogilvie's preliminary report and map-sheets, together with the necessary provisions, we began the ascent of the Lewes, and from its head-waters we crossed the mountains by the Chilkoot Pass and reached the coast at the head of Lynn Canal on the 20th September.

In addition to the physical obstacles to be encountered on the long route above outlined, some anxiety was caused by reported Indian troubles on the Yukon. On reaching the mouth of the Lewes we ascertained that the story was entirely false, but it had none the less kept us in a state of watchfulness during a great part of the summer.

The entire distance travelled by us during the exploration amounts to 1322 miles. This, taken in connection with the coast-line between the Stikine and Lynn Canal, circumscribes an area of about 63,200 square miles, the interior being, even yet, but for the accounts of a few prospectors and reports of Indians, *terra incognita*. The same description, with little qualification, applies to the whole surrounding region outside the surveyed circuit, but much general information concerning the country has been obtained.

The region traversed by the routes just mentioned, including

the extreme northern part of British Columbia and the southern part of the Yukon district (as previously defined), is drained by three great river systems, its waters reaching the Pacific by the Stikine, the Mackenzie, (and eventually the Arctic Ocean,) by the Liard, and Behring Sea, by the Yukon. The south-eastern part of the region is divided between the two first-named rivers whose tributary streams interlock, the Stikine making its way completely through the Coast Ranges in a south-westerly direction, while the Liard, on a north-easterly bearing, cuts across the Rocky Mountains to the Mackenzie valley. The watershed separating these rivers near Dease Lake has a height of 2730 feet, and both streams may be generally characterized as very rapid.

To the north-westward, branches of the Stikine and Liard again interlock with the head-waters of several tributaries of the Yukon, which here unwater the entire great area enclosed on one side by the Coast Ranges, on the other by the Rocky Mountains. The actual watershed, between the Liard and Pelly, on our line of route, was found to have an elevation of 3150 feet, but it is, no doubt, much lower in the central portion of the region between the Rocky Mountains and Coast Ranges.

To the north of the Stikine, at least one other river, the Taku, also cuts completely across the Coast Ranges, but its basin is comparatively restricted and little is yet known of it.

It will be noticed, that while the several branches of the Yukon conform in a general way to the main orographic axes, the Stikine and Liard appear to be to a large degree independent of these, and to flow counter to the direction of three mountain ranges.

The region, being a portion of the Cordillera belt of the west coast, is naturally mountainous, but it comprises as well important areas of merely hilly or gently rolling country, besides many wide, flat-bottomed river-valleys. Higher in its south-eastern part—that drained by the Stikine and Liard—it subsides gradually, and apparently uniformly, to the north-westward; the mountains at the same time becoming more isolated, and being separated by broader tracts of low land. The general base-level, or height of the main valleys, within the Coast Ranges, thus declines from about 2500 feet, to nearly 1500 feet at the confluence of the Lewes

and Pelly rivers, and the average base-level of the entire region may be stated as being a little over 2000 feet.

The Coast Ranges, with an aggregate average width of about eighty miles, closely set with high, rounded or rugged mountains, constitute the most important orographic uplift in the entire region, and reproduce geographically and geologically the characteristic features of the more southern portion of British Columbia. Beyond the vicinity of Lynn Canal, this mountain axis runs behind the St. Elias Alps, ceasing to be the continental border, and may be said to be entirely unknown, as any indications of mountains which have appeared on this part of the map are purely conjectural. Notwithstanding the great width of the Coast Ranges, it is not known that any of their constituent mountains attain very notable altitudes, but it is probable that a great number of the peaks exceed a height of 8000 feet. These ranges are composed of numerous mountain ridges, not always uniform in direction, and, so far as has been observed, no single dominant range can be traced for any considerable distance.

The mountain axis next in importance to that of the Coast Ranges forms the water-parting between the Upper Liard and Yukon on one side, and the feeder of the main Mackenzie River on the other. This represents the north-western continuation of the Rocky Mountains proper. Its eastern ridges were touched on during the exploration in the vicinity of Frances Lake and the head-waters of the Pelly River, and are there designated on the map as the Tootsho Range. This forms, so far as has been ascertained, the culminating range of a number of more or less exactly parallel ridges, and certain summits attain heights of from 7000 to 9000 feet.

A third notable mountain axis, which I have designated on the map as the Cassiar Range, is cut through by the Dease River in its upper course, and further to the north-westward appears to form the line of water-parting between the tributaries of the Upper Liard and those of the branches of the Yukon. Peaks near the Dease, in this range, somewhat exceed 7000 feet, but the range in a general way becomes lower to the north-westward.

In the north-western and less elevated moiety of the region, the mountain ranges and ridges are in general lower and

become discontinuous and irregular, or while retaining a general parallelism, assume an overlapping or echelon-like arrangement.

In each of these mountain chains granitic rocks appear in greater or less force. In the intervening and subordinate mountain systems of the south-east, granitic axes are not found and do not exist as prominent features.

Scarcely anything is known of the character of the country drained by the Macmillan, Stewart and White rivers, but it is probable that the basins of the two first-named streams closely resemble that of the Upper Pelly. Miners who have ascended the Stewart for a hundred miles or more, report the existence of a continuous range of mountains of considerable height, which runs parallel to the river on the north, from a point about fifty miles from its mouth onward. The absence of tributaries of any size along the south-west side of the Lewes below the Tahk-heena, with the general appearance of the country in that direction, so far as it has been overlooked, shows that the basin of the upper portion of the White River must be comparatively low. Situated as it is within the St. Elias Alps, this country must possess most remarkable features, both geographically and from a climatic point of view, and well deserves exploration.

The estuary of the Yukon appears to have been first explored by the Russian, Glasunoff, in 1835 to 1838, and the river was then named by the Russians the Kwikhpak: this name, according to Mr. W. H. Dall, is in reality that of one of the channels by which it issues to the sea. The lower part of the river, however, continued to be known as the Kwikhpak for a number of years, and it is so called on the (Russian) map of Lieut. Zagoskin, made from reconnaissance surveys which, in 1842-43, he carried up so far as Nowikakat. The mouth of the river is shown on Arrowsmith's map of 1850, but is there nameless.

The name Yukon was first applied in 1846 by Mr. J. Bell, of the Hudson Bay Company, who reached the main river by descending the Porcupine, and called it by what he understood to be its Indian appellation. The head-waters of one of the main tributaries of the Yukon had previously been attained by Mr. R. Campbell (also an officer of the Hudson Bay Company) in 1840, and in 1850 he descended the river as far as the mouth

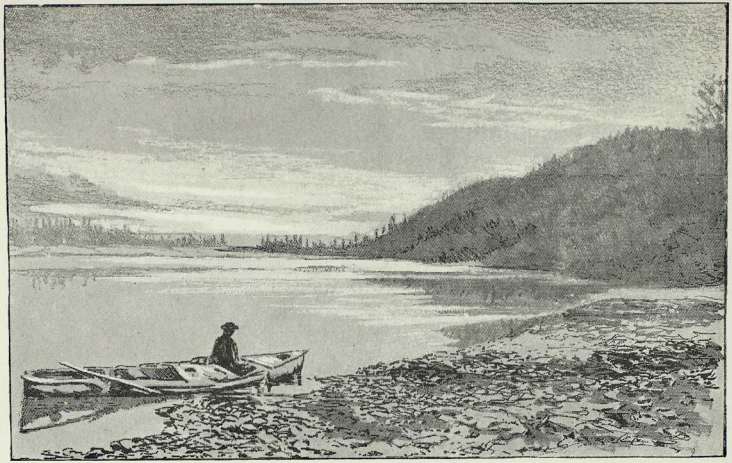
of the Porcupine, naming the whole river thus traversed the Pelly, and naming also the Lewes, White and Stewart rivers, as well as numerous smaller tributaries.

The name Yukon does not appear at all on Arrowsmith's map of 1854, that of the Pelly standing for the whole length of the river explored by Campbell, but since that date the term Yukon has gradually become applied to the main river. In the United States Coast Survey map dated 1869 the main river between the Porcupine and Lewes is definitely named the Yukon; but in the map accompanying Raymond's official report (1871) this name is again confined to the river below the Porcupine, and the statement is made in the report (p. 21) that from Lake Labarge to Fort Yukon the river is called the Lewes.

With respect to the substitution of the name Yukon for that of Pelly on the portion of the river between the Porcupine and Lewes, it is simply a question of well established priority *versus* use. It is possibly a matter of small importance which shall be employed in future, but no valid excuse can be offered for the attempt to substitute any new name for that either of the Lewes or Pelly above the site of old Fort Selkirk.

From the point of view of the physical geographer, and apart from the question of nomenclature, the position of the furthest source of the great Yukon River is, however, an interesting subject of inquiry; though it may yet be some years before we are in possession of sufficient information to settle the question definitely. It may be confidently assumed that this point is to be found by following up either the Pelly or the Lewes from their confluence at the site of old Fort Selkirk. The Lewes there carries the greater volume of water, but, draining as it does a considerable length of the humid Coast Ranges, which bear throughout the year great reserves of snow and numerous glaciers, it does not compare on terms of equality with the Upper Pelly, which unwaters a region relatively dry. Whether reckoned by size, or by distance from its mouth, the source of the Lewes must be placed at the head-waters of the Hotilinqu River [1] explored by Byrnes, of the Telegraph Survey, in approxi-

[1] The Tes-lin-too occupies the main orographic valley above its confluence with the Lewes, but is smaller than the Lewes and besides doubles back on its course, as is shown on the map.



ON THE UPPER PELLY RIVER, NINETEEN MILES ABOVE THE MACMILLAN.

mate latitude 59° 10′, longitude 132° 40′. In regard to the Pelly, it is not yet absolutely certain that the Pelly proper rises further from the common point at Fort Selkirk than its great branches, the Macmillan and the Ross rivers, but it is highly probable that it will be found to do so.

I must confess to having been somewhat disappointed in the size of the Pelly or Yukon where we saw it below the confluence of the Lewes. The river, when undivided by islands, is about 1700 feet only in width, with a maximum depth scarcely exceeding ten feet when at a stage which may be considered as its approximate mean. It appeared to me to be about equal in size and velocity to the Peace River at Dunvegan: Mr. Ogilvie, who is also familiar with the Peace, concurred in this estimate. Below this place the river, of course, receives a number of important tributaries, but at any fairly comparable point on the two rivers I believe that the Mackenzie must far exceed the Yukon in volume. Statements which have been made that the Yukon discharges a volume comparable with that of the Mississippi are altogether exaggerated.

The numerous large and important rivers by which the Yukon district and the adjacent northern portion of British Columbia are intersected, constitute the principal routes of travel, and during the summer months render inter-communication comparatively easy. The Stikine is navigable by stern-wheel steamers for a distance of 138 miles. This constitutes the travelled route to the Cassiar mining district. A trail was, at one time, opened from Fraser Lake overland to Dease Lake by which cattle were driven through, but of late no travel has occurred on it. The Dease River can scarcely be considered as navigable for steamers, though constituting a fairly good boat route. The Upper Liard and Frances rivers, above the mouth of the Dease, are also passable for large boats, with occasional portages, but not for steamers. The difficulties of the Lower Liard are, however, such as to render it an undesirable route, even for boats, and scarcely suitable as an avenue of trade between Cassiar and the Mackenzie. Numerous tributary streams in this district may also be ascended by boat or canoe for considerable distances, though with many interruptions from rapids and bad water.

Communication may easily be established by railway from the mouth of the Stikine to the centre of the Cassiar district and beyond, when such shall be called for; and it is probable also that this district might, without difficulty, be connected by rail with the more southern portions of British Columbia by one or more routes. Following the river-valleys, by a route practicable for a railway, from Rothsay Point at the mouth of the Stikine to the mouth of the Dease, the distance is found to be 330 miles. Thence to Fort Simpson on the Mackenzie is a further extension of 390 miles, making the total distance by this route, from the Pacific to the navigable waters of the Mackenzie, 720 miles only.

Little is yet known of the Taku River, but the Indians ascend it in canoes to a point about eighty miles from the head of Taku Inlet, and Indian trails lead south-eastward from this vicinity to the Tahl-tan, eastward to Tes-lin Lake and north-eastward to the lakes near the head of the Lewes. From what has been ascertained of these, it is probable that it would not be difficult to construct a trail suitable for pack-animals, if not a waggon road, from the vicinity of the head of navigation on the Stikine to the lakes which are connected with the navigable waters of the Lewes.

The rivers that drain the Upper Yukon basin have in general lower grades, and afford better navigable water than those above referred to, and are therefore likely to prove of greater importance in connection with the exploration and development of the country. The distance to which they may be respectively ascended by boat or canoe has been determined in only a few cases as yet.

It may, however, be stated that the Yukon is continuously navigable for small steamers from its mouth, on Behring Sea and following the Lewes branch, to Miles Cañon. Thence, after an interruption of about three miles, to the head of Bennett Lake and to an additional considerable, though not precisely determined distance, by the waters extending south-eastward from Tagish Lake. From the site of old Fort Selkirk, the Pelly might be navigated by small steamers of good power to within about fifty miles of the site of old Fort Pelly Banks, and the Macmilla branch is also navigable for a

considerable, though not ascertained distance. The same may be said of the Stewart River; but White River is, so far as known, very swift and shoal.

The total length of the waters which may be utilized for navigation by light stern-wheel steamers on the main river and its branches to the east of the 141st meridian of Alaskan boundary, measured in straight lengths of fifty miles, is therefore at least 1000 miles, and, if the sinuosities of the various streams are followed, would be very much greater. This does not include the Porcupine River, and with the exception of the single break above referred to on the Lewes, forms a connected system. If the upper portion of these rivers, above the first obstacles to such navigation, were included, the total here given would doubtless be greatly increased.

[1] At the present moment [1888] but three routes of access to the Yukon district are employed. (1) That of the portage by the Chilkoot Pass from the head of Lynn Canal to the navigable waters of the Lewes. (2) That from Peel River, near its confluence with the Mackenzie by portage to La Pierre's House on a branch of the Porcupine. (3) That from Behring Sea by the main river. The first is almost exclusively used by the miners, the second is employed only by the Hudson Bay Company, and the last is that of the Alaskan traders.

[1] The date of this report must be borne in mind.

CHAPTER II.

Stern-wheel steamers on the lower river—The Chilkoot Pass impassable for pack animals—White Pass—Indians and their travelled routes—Climatic condition of the Coast Ranges and the interior—Mean annual temperature—Summer and winter winds—Natural flora of the Yukon district—Its agricultural possibilities and timber—The fauna of the region traversed by the Expedition—Supply of fish in the lakes and rivers—Minerals and deposits of precious metals—Winter climate in the northern district—Difficulties of "quartz-mining"—Abundance of wood and water—Total amount of gold afforded by the Yukon district in 1887—Platinum found—Value of furs—Material resources of the district—Difference in climate between its northern extremity and the western and eastern sides—Geology of the southern part of British Columbia—Width of belt of granitoid rocks comprising the Coast Ranges and Chilkoot Pass—Paleozoic formation of the interior region—Comparison of the position of the granitic axis with deposits of placer gold—Clue to the search for auriferous ground—Lithological character of the mountainous region east of Frances Lake and River—Fossil molluscs and plants—Conglomerates and sand-stones of Lake Labarge—Fossil plants on the Upper Pelly River—Formation of rocks in the valley of the Upper Liard.

THERE are now three small stern-wheel steamers on the lower river, which ascend each year so far as the trading post at Forty-mile Creek, bringing the greater part of the goods used in trade with the Indians and for the supply of miners.

The character of the Chilkoot Pass is such that it would scarcely be possible to construct a useful trail across it for pack-animals, but the White Pass appears to offer a better opportunity for making a trail or road, which, if constructed, would render the entire region much more easy of access. Another route, also leading from the head of Lynn Canal to navigable water connected with the Lewes, is that by the Chilkat Pass, formerly much employed by the Indians, but it entails a much longer land carriage, one which is said to occupy the Indians for twelve days when carrying packs, as against two days of packing by the Chilkoot Pass.

The Indians who inhabit the region to the south and east of

the site of old Fort Selkirk are poor boatmen, and follow the various rivers, in the course of their periodic journeys, to a very limited extent. Most of their travelled routes appear, indeed, to run nearly at right-angles to the direction of drainage. The rivers are crossed in summer on rafts: the remains of these may frequently be observed. In travelling the Indians carry their small camping outfit on their backs.

The coast and coastward slopes of the Coast Ranges constitute a precipitate belt of excessive humidity, with somewhat equable temperatures, while the interior region to the eastward of these ranges is relatively dry, with a temperature of extremes. In the interior, however, the climate is largely influenced by the altitude of each particular district, and in consequence of the general lowering of the country beyond the 60th parallel (constituting the north line of British Columbia), it is certain that the climatic conditions there are much more favourable than in the Cassiar district.

The mean annual temperature of the coast region is considerably higher than that of the interior; yet, in consequence of the great depth of the snow-fall and the persistently clouded aspect of the skies, the Coast Ranges are found to support numerous and massive glaciers, while these are almost or altogether absent in the Cassiar Mountains, in the mountains about Frances Lake, and in the other ranges seen by us in the interior. The depth of snow in winter continues to be inconsiderable or moderate, at least so far down the Pelly (Yukon) as the mouth of Stewart River and Forty-mile Creek, while at Nulato, on the lower river, and in a similar latitude, but 500 miles further west, the depth of snow from April to November is said to average eight feet and often to reach twelve feet.

As in the more southern parts of British Columbia, the dryest country is found in a belt bordering the eastern or lee side of the Coast Ranges, and this phenomenon recurs, though in a less marked degree, in connection with each of the well-defined mountain ranges of the interior. Thus a region of greater humidity is found near Dease Lake, on the western Cassiar Mountains, with a dry belt on the east side of the range; while humid conditions, with recurrent showers in

summer, characterize the district in the vicinity of Frances and Finlayson lakes.

A noteworthy circumstance in connection with the Stikine valley, the passes leading from the head of Lynn Canal, and doubtless in all the low gaps in the Coast Ranges, is the change in direction as between the summer and winter winds. During the summer, strong winds blowing up these valleys inland are of very frequent occurrence, and they commonly freshen in the afternoon and die away toward night. In the winter months the conditions are precisely reversed, the strongest winds blowing seaward.

The temperature of Wrangell, just off the mouth of the Stikine, may probably be taken as fairly representative of that of the coast in these latitudes. For the interior region, here our special subject, we are unfortunately without a series of thermometer readings extending even over a single year, but some idea of its climate may be formed from that of Fort Yukon, which is, however, situated far to the north, almost exactly on the Arctic circle. The mean seasonal temperatures for these two stations may be compared as below :—

	Wrangell.	Fort Yukon.
Spring	40.4	14.6
Summer	57.1	56.7
Autumn	43.0	17.4
Winter	28.3	—23.8
Year	42.2	16.8

At Telegraph Creek, and in its vicinity on the Stikine, to the east of the Coast Ranges (lat. 58°), wheat, barley, and potatoes are successfully grown with the aid of irrigation. Their cultivation has so far been attempted on a limited scale only, on account of the want of a market, and wheat has been grown only experimentally, as it cannot, like barley, be employed for feeding pack-animals. None of these crops can be successfully grown or ripened on the coastward side of the mountains.

Taking into consideration the facts which I have been able to ascertain, and also those to be derived from an examination of the natural flora of the country, and the observed advance of vegetation, which (in the absence of actual experi-

ments) are capable of affording valuable data, I feel no hesitation in stating my belief that such hardy crops as barley, rye, turnips and flax can be successfully cultivated in the Yukon district so far north as the former position of Fort Selkirk, near the 63rd parallel, or in other words about 1000 miles north of Victoria. Taken in conjunction with the physical features of the region, this means, that chiefly within the drainage area of the Yukon, and for the most part to the north of the 60th parallel, there exists an area of about 60,000 square miles, of which a large proportion may be utilized for the cultivation of such crops, and where cattle and horses might be maintained in sufficient number for local purposes, without undue labour, as excellent summer grazing is generally to be found along the river-valleys and natural hay-meadows are frequent. I do not maintain that the region is suitable for immediate occupation by a large, self-supporting agricultural community, but I hold that agriculture may before many years be successfully prosecuted, in conjunction with the natural development of the other resources of this great country.

The district is generally wooded, and in all portions of it, in valleys and on low lands, there is abundance of white spruce, of fair to good quality, well suited for building purposes. The other species of trees are of inferior economic importance.

The fauna of the region traversed by us does not differ notably from that of other parts of the northern country which are already moderately well known. The smaller black-tailed deer (*Cariacus Columbianus*) occurs on the islands of the southern portion of Alaska and the adjacent mainland coast, but is nowhere found on the inland side of the Coast Ranges. The mountain goat is moderately abundant in the Coast Ranges, and is also found in the mountainous inland regions, probably throughout. The big-horn or mountain sheep occurs, together with the mountain goat, on the mountains about the head of the Lewes and other parts of the inland spurs of the Coast Ranges, but does not inhabit the seaward portions of these ranges. It is also found generally in the mountains of the interior, including the Rocky Mountains.

The moose is more or less abundant throughout the entire inland region, and together with the caribou, which is similarly ubiquitous, constitutes a great part of the food of the Indians. We found the moose particularly plentiful along the Upper Liard River, and it is stated that the country drained by the White River is noted among the Indians as a moose and beaver region. The caribou is everywhere common, but is scarcely seen in the valleys or lower country during the summer, when it ranges over the high, alpine moors and open slopes of the mountains.

The black and grizzly bears roam over the entire region and are often seen along the banks of the rivers in the latter part of the summer, when dead or dying salmon are to be obtained with ease. Wolves are not particularly abundant, but the cross, black and silver-fox, are more than usually common.

The smaller fur-bearing animals, being similar to those found generally in the northern parts of the continent, do not require separate enumeration. The entire Upper Yukon basin, however, yields furs of exceptionally high grade.

Among a few skins brought back by us, is that of a mouse which Dr. C. H. Merriam has found to be a new species, and has described under the name of *Evotomys Dawsoni*.[1]

The salmon ascend the Lewes River so far as the lower end of Lake Marsh, where they were seen in considerable numbers early in September. They also, according to the Indians, run almost to the head-waters of the streams tributary to the Lewes on the east side. Salmon also run up the Pelly for a considerable distance above the mouth of the Lewes, but their precise limit on this river was not ascertained. The lakes and rivers generally throughout the country are well supplied with fish, and a small party on any of the larger lakes would run little risk of starvation during the winter, if provided with a couple of good gill-nets and able to devote themselves to laying in a stock of fish in the late autumn.

The salmon is confined to the Yukon tributaries. The principal fishes noticed are white-fish (*Coregonus Nelsoni*), lake trout (*Salvelinus Namaycush*), grayling (*Thymallus signifer*), pike (*Esox lucius*), and sucker (*Catostomus catostomus*).

[1] American Naturalist, July, 1888.

The Yukon district with the northern part of British Columbia, measured from the vicinity of Dease Lake to the intersection of the Pelly (Yukon) with the 141st meridian, comprises a length of over 500 miles of the Cordillera belt of the west, which, wherever it has been examined, has been found rich in minerals, and particularly in the deposits of the precious metals. The width of this particular part of the Cordillera belt is also great, as it appears, so far as our explorations have gone, to extend from the coast to the eastern ranges of the Rocky Mountains in the vicinity of the Mackenzie River. This portion of the Cordillera region, together with that of the more southern part of British Columbia, gives an aggregate length of between 1200 and 1300 miles, almost exactly equal to the length of the same metalliferous belt contained by the United States, and in all probability susceptible of an eventual mining development equally great.

In the northern districts the winter climate is a severe one, rendering the working season for ordinary placer-mines short, and likely also to present some special difficulties in the way of "quartz mining." There is, however, on the other hand an abundance of wood and water, matters of great importance in connection with mining, and means of communication once provided, mining operations should be carried on here at a reasonable cost.

It is difficult to arrive at even an approximate statement of the total amount of gold which has been so far afforded by the Yukon district, but from such inquiry as I was able to make in 1887, I estimated the value of gold obtained in that year at a minimum of $60,000; the number of men engaged in mining at 250.

Platinum is found in small quantities along all or nearly all the tributaries of the Yukon, in association with the gold. It has also been observed in the Cassiar district.

Gold and furs are at present the only articles of value derived from the great region here referred to as the Yukon district. It is impossible to secure accurate information as to the value of furs annually obtained, but sufficient is known to show that it must be very considerable. Petroff, in his report, states that the total annual value of the furs shipped by the Yukon

probably does not exceed $75,000,[1] and it is known that a great if not the greater portion of this total is derived from the region lying east of the 141st meridian.

In addition, however, to the furs taken from the Yukon district by this route, the Hudson Bay Company obtains a large quantity of skins from their posts on the Porcupine; these reach the market by the Mackenzie River route. A certain number of skins derived from the country north of British Columbia is, further, annually traded at the little post at the mouth of Dease River, and taken out by the Stikine. A considerable quantity of furs also finds its way each year by the Chilkoot and Chilkat passes to the head of Lynn Canal, and some are brought down by the Taku River to the coast, though the greater part of these last is probably derived from the north-western corner of the province of British Columbia. Information obtained on the spot indicates that the value of the furs reaching Lynn Canal from the interior is from $12,000 to $15,000 annually.

Without including the northern part of British Columbia, but restricting ourselves to the great area of 192,000 square miles to the north of the 60th parallel and west of the Rocky Mountains, which I have referred to as the Yukon district, the information now obtained is sufficient to warrant belief in its great value. It is known to be rich in furs, well supplied with timber, and it is traversed by a great length of navigable rivers. It is already yielding a considerable yearly product in gold, and presents every indication of wealth in other metals, and in deposits of coal. In its southern portion, situated between the 60th and 65th degrees of latitude, is comprised an area of probably not less than 30,000 square miles, suitable for eventual agricultural occupation, and presenting none of the characters of a sub-Arctic region, which have been attributed to it by some writers. In each of these particulars and in climate it is greatly superior to the corresponding inland portion of the territory of Alaska. It may, in fact, be affirmed that the region here spoken of as the Yukon district surpasses in material resources the whole remaining northern interior portion of the continent between the same parallels of latitude.

[1] Report on the Population, Industries and Resources of Alaska, p. 5, U.S. 10th Census, vol. viii.

The winter climate of the whole of this great region is a severe one, and its northern extremity lies within the Arctic circle, but the climatic conditions on the western and eastern sides of the continent are by no means comparable, and the isothermal lines, representing the mean annual temperature, trend not westward but north-westward from the Manitoba region. It is needless to recapitulate the causes which produce this difference in climate, but the lines as already approximately drawn upon the maps, represent the aggregate of influences which produce at the site of old Fort Selkirk on the 63rd parallel of latitude in the Upper Yukon basin, an attractive landscape, with well-grown forests and intervening slopes of meadow, while in the same latitude in Hudson Strait we find, even at midsummer, a barren waste of rocks and ice.

While the Yukon district and the northern portion of British Columbia are at present far beyond the limits of ordinary settlement, we may be prepared at any time to hear of the discovery of important mineral deposits, which will afford the necessary impetus, and may result, in the course of a few years, in the introduction of a considerable population into even its most distant fastnesses. It appears meanwhile eminently desirable that we should encourage and facilitate, in so far as may be possible, the efforts of the miners and others who constitute our true pioneers in the region, and to whom, in conjunction with the fur companies and traders, the peaceful conquest of the whole of our Great West has been due. In the future there is every reason to look forward to the time when this country will support a large and hardy population, attached to the soil and making the utmost of its resources.

The geology of the corresponding portion of the Cordillera belt in the southern part of British Columbia is as yet very imperfectly understood.

Speaking broadly, however, and with reference to the general features of the region, the rock-series represented are evidently similar to those found in the southern portion of British Columbia between the rocky mountains and the coast.

The Coast Ranges, where traversed by the valley of the Stikine, and again where crossed still further north by the Chilkoot Pass, consist, for the most part, of granite and granitoid

rocks, almost invariably of gray colour and frequently rich in hornblende. With these are occasionally included stratified or stratiform masses of mica and hornblende-schists, and both these and the granites are frequently traversed by pegmatite veins, diabase dykes and intrusive masses of coarse diorite. The schistose portions of these ranges may possibly represent the still recognizable remnants of rocks of Archæan age, or may be merely portions of much newer series which have suffered extreme alteration.

No demonstration of the date of the origin of the granitic rocks of the Coast Ranges was obtained in this region, but there is every reason to believe that it is comparatively recent, and due to a time lying between the Triassic and the Cretaceous; this is the case with their continuation to the south, near the northern part of Vancouver Island.[1]

The argillites of Wrangell, together with those met with near Juneau, and at Sitka, on the Alaskan coast, and also in various places along the east side of Lynn Canal, together with the altered volcanic rocks found in association with these on Lynn Canal and elsewhere (examined by me particularly in the vicinity of Seduction Point), closely resemble rocks of the same class composing the Vancouver group of the Queen Charlotte and Vancouver Islands.

The width of the belt of granitoid rocks composing the Coast Ranges is, on the Stikine, about sixty-five miles, measured from their sea border inland at right angles to the main direction of the mountains. It is somewhat less in the latitude of the Chilkoot Pass, but may be assumed to occupy a border of the mainland about fifty miles in width along the whole of this part of the coast. Broadly viewed, however, the coast archipelago in reality represents a partly submerged margin of the Coast Ranges, and granitic rocks are largely represented in it also. The examination of these two northern cross-sections of the Coast Ranges, serves, with observations previously made, to demonstrate the practical identity in geological character of this great orographic axis, from the vicinity of the Fraser River to the 60th parallel of north latitude—a length, in all, of about 900 miles.

[1] See Annual Report Geol. Surv. Can., 1896.

East and north-east of the Coast Ranges, the interior region traversed is, for the most part, floored by Palæozoic rocks of very varied appearance, and probably referable to several of the main sub-divisions of the geological scale. In so far as the information obtained in the region here in question enables conclusions on the subject to be formed, the lowest part of the rocks (1) consists of greenish and grey schists, generally felspathic or hornblendic, but often quartzose and including distinctly micaceous and talcose schists, with some bands of limestone; the lithological character of this sub-division being exceedingly varied. Apparently overlying these are (2) grey and blackish, often lustrous and sometimes more or less micaceous calc-schists and quartzites, including beds of limestone of moderate thickness, which are often more or less dolomitic. These are associated with, or pass up into (3) black argillites or argillite-schists, also containing thin beds of limestone, which, at one locality on the Dease, have afforded a small number of graptolites of Cambro-Silurian age. Next above these is a series (4) consisting chiefly of massive limestones, generally of grey or blue-grey colour where unaltered, but often locally changed into white or variegated crystalline marbles.

The preponderantly Palæozoic floor of the region east of the granites of the Coast Ranges, is broken through on two main lines by granitic axes. The first of these is cut across by the Dease River, a short distance below Dease Lake, and was again met with—over 300 miles north-westward—on the Pelly near the mouth of the Macmillan. Though referred to as a single granitic axis, this uplift probably consists rather of a series of alternating and more or less irregularly shaped granitic masses, which, however, preserve a general alignment. There are on the Upper Pelly in fact three separate granitic ridges in place of the single one met with on the Dease. In close association with these granites are some gneissic rocks and holocrystalline mica and hornblende-schists, which have not been referred to in previous paragraphs as they are regarded as probably Archæan, rather than as representing highly altered Palæozoic rocks. A small tongue of granite occurs on the Lewes a few miles above the mouth of the Little Salmon,

which may be connected with the south-western side of this granitic axis, but with this exception, its continuity between the Dease and the Pelly is indicated merely by the statement of Mr. J. McCormick that granites and mica-schists occur on the south-west side of Quiet Lake and near the Big Salmon River, below that lake. Its further extension in a north-westerly bearing is, however, proved by the occurrence of a great preponderance of rocks of the same character in the collection made by Mr. Ogilvie[1] on the lower Pelly or Yukon, between the mouth of the Lewes and Forty-mile Creek.

On comparing the position of this irregular granitic axis and its surrounding altered rocks with that of the richer deposits of placer gold so far discovered and worked, it will be found that they are closely associated. The chief placers and river-bars are, in fact, scattered along this line or belt, and extend, like it, all the way from Dease Lake and McDame Creek to Forty-mile Creek. Evidence was moreover found on the Pelly to show that the development of quartz veins in the Palæozoic rocks had occurred contemporaneously with the upheaval of the granites, and probably by some action superinduced by the granite masses themselves while still in a formative condition. While cutting the stratified rocks, the quartz veins seldom or never cut the granite masses in this district. These observations should afford an important clue to the further search for auriferous ground, as well as for the lodes from which the placer gold has itself been derived.

Of the second granitic axis of the interior region little is yet known, but it is probable that it is still less regular in character than the last. It occurs in the mountainous region to the east of Frances Lake and River, and probably also in the vicinity of the Pelly Lakes. Its lithological characters and those of the rocks in its neighbourhood are similar to those of the last described, and here again in its vicinity, on Frances Lake and on the Liard, paying gold placers have been found.

The granitoid rocks of the interior region are different in general appearance from those of the Coast Ranges, and

[1] Sent out by him in charge of the latest party of miners in the autumn of 1887.

resemble more closely the probably Archæan granites of the Gold Ranges in southern British Columbia.

Lithologically the granites and granitoid rocks of the Coast Ranges are generally fresh and unaltered in appearance, grey in colour and not often distinctly foliated, while those of the ranges of the interior show evidence of considerable alteration subsequent to their formation, are more highly quartzose and often reddish in tint.

The Mesozoic period is represented by strata of Cretaceous and Laramie age. These rocks are more recent in appearance than all the older formations, and rest quite uncomfortably on the latter, though they have since been to some extent involved in their flexures. On the lower part of the Lewes, below the mouth of the Little Salmon, these rocks are cut across by the river for a distance of at least thirty-five miles. Some fossil molluscs and plants have been obtained from this area, from which it would appear to include beds referable to the Middle or Lower Cretaceous and to the Laramie period: it is not improbable that the series is a consecutive one between these limits, as the total thickness represented must be very great. The strike of these beds varies much in direction, and the angles of dip are so irregular that no even proximate estimate of thickness could be formed, and it is impossible to arrive at any definite conclusion with respect to the trend of the basin in which they lie. The rocks comprise, in their lower portion, coarse conglomerates, grauwacke-sandstones, yellowish and grey quartzose sandstones, and dark calcareous slates. The upper portion, in which Laramie plants are found, consists chiefly of rather soft sandstones, shales and clays, generally of pale colours. Evidence of contemporaneous volcanic action is observable in both parts of the series, and the higher beds include lignite coal of good quality.

Some miles further up the Lewes, midway between the Little and Big Salmon rivers, peculiar green, grauwacke-sandstones and green, calcareous conglomerates occur, which are also provisionally referred, though with some doubt, to the Cretaceous. They are at least newer than the Palæozoic rocks, being composed of fragments of these and of the granites.

Conglomerates and sandstones similar to the last are again found near the lower end of Lake Labarge, on the east side, and are associated with black calcareous slates, which recur in several places along the same side of the lake, further up; and from these a few fossils have been obtained. These seem to show that the beds are on or near the horizon of Series C. of the Queen Charlotte Islands, which is of Middle Cretaceous age, approximately equivalent to the Gault.

On the Upper Pelly River, forty-three miles below Hoole Cañon, a single low outcrop of hard, dark shales, containing fossil plants of Cretaceous or Laramie age, was found, but in the absence of further exposures along the river in that vicinity, nothing can be said of the extent of this area, except that it must be quite limited in width. Again, on the Stikine River, between Glenora and Telegraph Creek, there are local occurrences of conglomerates and soft sandstones which may be regarded as probably Cretaceous, though no palæontological evidence is forthcoming.

The position of these last-noted areas, as well as that of those along the Lewes River, occurring as they do in a zone of country immediately within the line of the Coast Ranges, is analogous to that held by Cretaceous rocks on the Skeena, and in other localities still further southward in British Columbia. Further investigation will probably show that rocks of that age occur in many additional places, and occupy somewhat extensive areas in this belt of country. In the vicinity of the Lewes, particularly, it is noted that the plane of the original base of the Cretaceous, now thrown into a number of folds, is about that of the present surface of the country, and these rocks may therefore be expected to recur frequently in the form of troughs or basins, more or less strictly limited, and only to be discovered in detail by thorough examination. The loose material brought down by the Big Salmon River, appears to indicate the existence of a considerable development of these rocks not far up the valley of that stream.

No wide-spread Tertiary areas like those of the southern interior portion of British Columbia occur in the region here described. The most important occurrence of beds of this age is that which occupies the wide valley of the Upper Liard, but

its extent to the north-west and south-east was not ascertained. The rocks are soft shales, sandstones and clays, generally of pale colour, and holding beds of lignite in some places. Flows of basalt either cap these rocks or are included in their upper portion, and from the considerable angles of dip observed, the formation would appear to have suffered some flexure subsequent to its deposition.

CHAPTER III.

Basalt-flows in the Stikine valley—Discovery of jade along the route—Glaciation and superficial deposits—Boulder clay of the Upper Pelly and Lewes valleys—Mastodon or mammoth remains—Phenomena of the glacial period and its connection with the distribution of placer gold deposits—Where the richest of these deposits occur—Wide-spread auriferous character of the Upper Yukon basin—Later superficial deposits—Their character and importance—Volcanic ash deposit spread over the Upper Yukon basin—Mount Wrangell the probable source of the material—Period of the eruption—Its extent and duration—The placer gold mines of Cassiar—The Stikine River—Its importance as an avenue of communication—Size and general character—Pack trail from Telegraph Creek to the centre of the Cassiar mining district—Micrometer survey of the Stikine River—Mr. McConnell's notes and map—General trend of the Stikine valley—Width, depth, and velocity of the Stikine River—Most suitable vessels for its navigation—Fall of the river—The Stikine Indians—Little Cañon—Kloochman Cañon—The "Grand Rapid"—Aspect of the landscape.

IN the Stikine valley, east of the Coast Ranges, important local basalt-flows are met with, overlying old river and valley gravels, and the lignite reported to exist some miles up the Tahl-tan is, doubtless, also of Tertiary age and inferior in position to the basalts. Basalt effusions of a sporadic character may be frequent in other places in the region, as such were actually noted in three other widely separated localities, viz. above Hoole Cañon on the Pelly, at Miles Cañon on the Lewes, and again at the confluence of this river with the Pelly.

The basalts are at least pre-glacial in age, and though no characteristic fossils were observed in the associated bedded deposits, both may be provisionally classed from their analogy with similar deposits in the more southern portion of British Columbia, as Miocene.

Having become interested in the question of the origin of nephrite or jade, on account of its former extensive employment by the natives of the west coast for the manufacture of imple-

ments, I kept a close watch for this mineral along our route, and ultimately succeeded in finding several rolled pieces in gravel-bars along the Lewes. Of the pebbles collected by us at least five had the specific gravity and other physical characters of jade, though they have not yet been subjected to chemical or microscopical analysis. Several of these are evidently, however, pure and typical jade. One specimen is a pale-green translucent to sub-transparent variety weighing a pound and three-quarters, after a piece, probably equal to about one-fourth of the original mass, had been broken off and unfortunately lost. Some of the specimens collected indicate the passage, by admixture of other materials, of the pure jades into various altered rocks of volcanic origin. So far as I have been able to ascertain, this discovery of jade is, with one exception, the first actually direct one made in the region of the Pacific slope. The exception above alluded to is that of jade found at the Kwichpak mouth of the Yukon during Captain Jacobson's stay in that vicinity, which was obtained by him and taken to Berlin.[1]

Such details as appear to be of interest respecting glaciation, and the superficial deposits, are given in the subsequent descriptive portion of this report. The general bearings of these are here merely summarized in the briefest possible manner.[2]

Previous observations in British Columbia [3] have shown that at one stage in the glacial period – that of the maximum glaciation—a great confluent ice-mass has occupied the region which may be named the Interior Plateau, between the Coast Ranges and the Gold and Rocky Mountain ranges. From the 55th to the 49th parallel this great glacier has left traces of its general southward or south-eastward movement, which are distinct from those of subsequent local glaciers. The southern extensions or terminations of this confluent glacier, in Washington and Idaho Territories, have quite recently been examined by Mr. Bailley Willis and Prof. T. C. Chamberlin of the U.S. Geological

[1] See paper by Prof. A. B. Meyer, Jahresbericht des Vereins für Erdkunde zu Dresden, 1884.

[2] The substance of this summary has been published in advance in the Geological Magazine. Decade III. vol. v. p. 347 (Aug. 1888).

[3] Quart. Journ. Geol. Soc. vol. xxxi. p. 89. *Ibid.* vol. xxxiv. p. 272. Canadian Naturalist, vol. viii.

Survey,[1] and their observations tend to confirm the views above outlined, which had previously been stated by the writer. There is evidence to show that this inland-ice flowed also, by transverse valleys and gaps, across the Coast Ranges, and that the fiords of the coast were thus deeply filled with glacier-ice, which, supplemented by that originating on the Coast Ranges themselves, buried the entire great valley which separates Vancouver Island from the mainland, and discharged seaward round both ends of the island. Further north, the glacier extending from the mainland coast touched the northern shores of the Queen Charlotte Islands.

The littoral of the south-eastern part or "coast strip" of Alaska, presents features identical with those of the previously examined coast of British Columbia, at least so far north as lat. 59°, beyond which I have not seen it. The coast archipelago has evidently been involved in the border of a confluent glacier which spread from the mainland, and was subject to minor variations in direction of flow dependent on surface irregularities.

It is, however, in the interior region, explored and examined by us in 1887, between the Coast Ranges and the Rocky Mountains proper, and extending northward to lat. 63°, that the most interesting facts have come to light respecting the direction of movement of the Cordilleran glacier. Here, in the valleys of the Upper Pelly and Lewes, traces were found of the movement of heavy glacier-ice in a northerly direction. Rock-surfaces thus glaciated were observed down the Pelly to the point at which it crosses the 136th meridian and on the Lewes as far north as lat. 61° 40′, the main direction in the first-named valley being north-west, in the second north-north-west.

On Lake Labarge, in the Lewes valley, both the sides and summits of rocky hills 300 feet above the water were found to be heavily glaciated, the direction on the summit being that of the main (north-north-west) orographic valleys, while that at lower levels in the same vicinity followed more nearly the immediate valley of the river, which here turns locally to the east of north.

Glaciation was also noted in several places in the more

[1] Bulletin U.S. Geol. Survey, No. 40, 1887.

mountainous country to the south of the Yukon basin, in the Dease and Liard valleys, but the direction of movement of the ice could not be determined satisfactorily, and the influence of local action is there less certainly eliminated.

While the greater part of the area traversed is more or less completely mantled with glacial deposits, it will be observed, in referring to subsequent pages, that true boulder-clay was found in certain parts only of the southern and more mountainous portion of the region, while it spreads over almost the entire length of the upper Pelly and Lewes valleys, though not found quite exposed to their confluence. It may be stated also that the country is generally terraced to a height of 4000 feet or more, while on an isolated mountain-top near the height of land between the Liard and the Pelly rivers (Pacific-Arctic watershed) rolled gravel of varied origin was found at a height of 4300 feet, a height exceeding that of the actual watershed by over 1000 feet.

No remains of mastodon or mammoth were observed in the country traversed by us, but according to Campbell such remains occur not far from the site of Fort Selkirk, and they are known to be moderately abundant at points further down the river. Sir J. Richardson speaks of a tibia of *Elephas primigenius* sent to England by Roderick (Robert) Campbell from this region.[1]

Reverting to the statements made as to the direction of the general glaciation, the examination of this northern region may now be considered to have established that the main gathering-ground or *névé* of what I have called the great Cordilleran glacier or confluent glacier mass of the west coast, was included between the 55th and 59th parallels of latitude, a region which, so far as explored, has proved to be of an exceptionally mountainous character. It would further appear that this great glacier extended, between the Coast Ranges and the Rocky Mountains, south-eastward nearly to lat. 48°, and northwestward to lat. 63°, or beyond, while sending also smaller streams to the Pacific Coast.

In connection with the northerly direction of ice-flow here ascertained, it is interesting to recall the observations which I

[1] Am. Journ. Sci. and Arts, vol. xix., 1855, p. 132.

have collected in a recently published report of the Geological Survey, relating to the northern portion of the continent east of the Mackenzie River.[1] It is there stated that for the Arctic coast of the Continent, and the Islands of the Archipelago off it, there is a considerable volume of evidence to show that the main direction of movement of erratics was *northward*. The most striking facts are those derived from Prof. S. Haughton's Appendix to M'Clintock's Voyage, where the occurrence of boulders and pebbles from North Somerset, at localities 100 and 135 miles north-eastward and north-westward from their supposed points of origin, is described. Prof. Haughton also states that the east side of King William's Land is strewn with boulders of gneiss like that of Montreal Island, to the southward, and points out the general northward ice-movement thus indicated, referring the carriage of the boulders to floating ice of the glacial period.

The copper said to be picked up in large masses by the Eskimo, near Princess Royal Island, in Prince of Wales Strait, as well as on Prince of Wales Island,[2] has likewise in all probability been derived from the copper-bearing rocks of the Coppermine River region to the south, as this metal can scarcely be supposed to occur in place in the region of horizontal limestone where it is found.

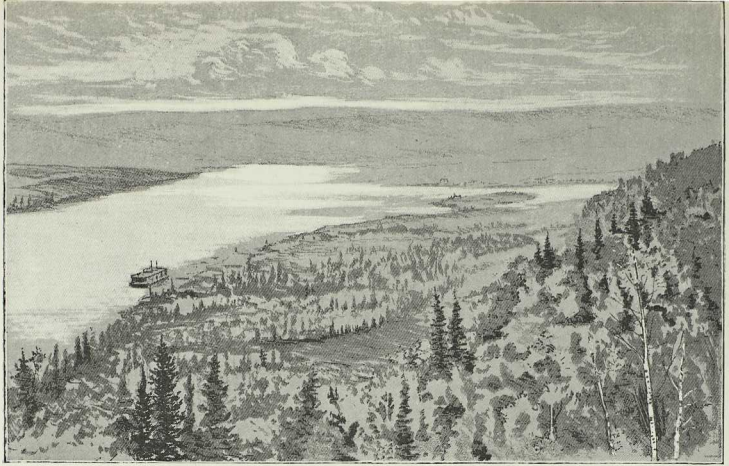
Dr. A. Armstrong, Surgeon and Naturalist to the *Investigator*, notes the occurrence of granite and other crystalline rocks not only on the south shore of Baring Land, but also on the hills at some distance from the shore. These, from what is known of the region, must be supposed to have come from the continental land to the southward.

Dr. R. Bell has found evidence of a northward or north-eastward movement of glacier ice in the northern part of Hudson Bay, with distinct indications of eastward glaciation in Hudson Strait.[3] For the northern part of the great Mackenzie valley we are as yet without any definite published information,

[1] Notes to accompany a Geological Map of the Northern Portion of the Dominion of Canada East of the Rocky Mountains, p. 57 R., Annual Report Geol. Surv. Can., 1886.

[2] De Rance, in Nature, vol. xi., p. 492.

[3] Annual Report Geol. Surv. Canada, 1883, p. 14 D.D., and Report of Progress, 1882-84, p. 36 D.D.



JUNCTION OF FORTY MILE AND YUKON RIVERS.

but Sir J. Richardson notes that Laurentian boulders are scattered westward over the nearly horizontal limestones of the district.

Taken in conjunction with the facts for the more northern portion of the continent, already pretty well known, the observations here outlined indicate a general movement of ice outward, in all directions, from the great Laurentian axis or plateau which extends from Labrador round the southern extremity of Hudson Bay to the Arctic Sea; while a second, smaller, though still very important region of dispersion—the Cordilleran glacier mass—occupied the Rocky Mountain region on the west, with the northern and southern limits above approximately given, and a length, in a north-west and south-east direction, of at least 1200 miles.

While the study of the phenomena of the glacial period is one not without its bearings on economic problems even in the eastern part of the continent, it has, in British Columbia and the Yukon district, a direct value in its connection with the distribution of the placer gold deposits, and on the existence and position of the buried channels of rivers and streams, in which some of the richest of those deposits often occur. Thus the greater part of the "fine" gold found along the river-bars and banks of the larger streams in the Yukon district is doubtless proximately derived from the gravels and other superficial deposits in which these streams have re-excavated their beds since the period of glaciation. By the general dispersion and intermixture of these materials, composed of the *débris* of the older rock formations, it is even possible that the existence of a few comparatively limited original areas of great richness might account for the latter day wide-spread auriferous character of the alluviums of the Upper Yukon basin.

A circumstance of some interest in connection with the later superficial deposits of that part of the Upper Yukon basin drained by the Lewes and Pelly rivers, is the occurrence of a wide-spread layer of volcanic ash or pumiceous sand. The existence of a peculiar white line or band in the upper parts of scarped banks along the river, was first remarked not many miles below the point at which we embarked on the Pelly. As

its character was not at first understood, I omitted to note the precise point at which it was first seen, but am of opinion that it probably extends to the east of the place where we reached the river. After its character and importance had been recognized, however, it was looked for and noticed almost continuously along the whole course of the Pelly, as far down as the mouth of the Macmillan, it was not distinctly recognized, but according to Mr. McConnell (1888) it extends down the river for about ten miles below Fort Selkirk. It is likewise seen along nearly the whole course of the Lewes, being last noted at the narrows between Lake Nares and Bennett Lake, known as Caribou Crossing.

This ash deposit appears to be entirely due to a single period of eruption. It is homogeneous in character wherever seen, forming a single layer not divided by intercalations of other material, and has been spread everywhere over the entire area characterized by it. It is much more recent in date than the white silt deposits, the last properly referable to the glacial series, these having been deposited after the river-valleys were excavated in the glacial materials, and at a time when the rivers had cut down nearly or quite to their present levels. This is made evident by the circumstance that it overlies the deposits of river and valley-gravels and sands in all cases, except in those of some low river-flats, where these deposits sometimes cover it to a depth of several feet. In most places it is overlain merely by the surface soil with a depth of six inches to two feet, and in a few instances it was noted as constituting the actual surface of terraces of moderate height, the present forest being rooted in it.

The ash appears to have fallen tranquilly, much in the manner of snow deposited from a calm atmosphere. The examination of scarped banks along the two rivers showed it to occur near the surface of terraces about 200 feet in height, as well as on lower terraces and river-flats down to within about ten feet of the actual river-level in August and September. It was also detected in some places on the sloping fronts of terraces. The thickness of the layer was no doubt originally pretty uniform, and it still retains this uniformity where it rests upon wide flat terraces. Its average normal thickness for the Pelly, as a whole, was estimated at about five inches, but this is somewhat

exceeded along the part of the river immediately above the Macmillan. On the Lewes, below Rink Rapid, its normal thickness is about a foot, but above this point it becomes much less, and where last seen, at Caribou Crossing, is not over half an inch thick, and only to be recognized when carefully looked for.

Where the ash deposit rests undisturbed upon the original surface, this appears very generally to be a yellowish or reddish quartzose sand. There are, in some cases, remains of burnt trees at the base of the layer, and traces of similar forest fires are found as well in the sand or soil overlying it.

The volcanic ash is thicker on the lower part of the Lewes than elsewhere, and the thickest part of the deposit on the Pelly lies nearly due east of the portion of the Lewes just referred to. The greater mass of the deposit in that direction shows that it was derived from the westward, and a line drawn across the portions of the Pelly and Lewes above defined, lies between the 62nd and 63rd parallels of latitude, with a nearly east-and-west bearing, so that if produced to the westward it would pass, at a distance of about 200 miles, through the mountain region near the Copper Region, of Alaska, which includes Mount Wrangell. Mount Wrangell is the nearest known volcano,[1] and this or one of the neighbouring mountains in the same group, may not improbably have been the source of the material which has been so widely spread over the Upper Yukon basin.

Respecting the date of the eruption to which the ash-bed is due, very little can be said with certainty. As already noted, the rivers have not certainly cut their beds perceptibly deeper since the deposit occurred on their flood-flats, so that the period to which it belongs cannot be an exceedingly remote one. It was further observed in one place, on the Lewes, to rest upon stratified sands a few feet thick, which in turn overlie a mass of drift logs still quite sound and undecayed. This fact, with the general appearance and mode of occurrence of the deposit, leads me to believe, that while the eruption must have happened at least several hundreds of years ago, it can scarcely be sup-

[1] See Lieut. H. T. Allen's Reconnaissance in Alaska, Washington, Government, 1887.

posed to have taken place more than a thousand years before the present time.

That the eruption of which the occurrence is marked by the ash-bed of the Lewes and Pelly, was on a great scale, is sufficiently evident from the extent of the deposit; which must necessarily be very much greater than the area to which the present observations refer. By drawing a line to include the outer limits of the observed extent of the ash, a roughly triangular area of about 25,000 square miles is outlined, and if we assume the average depth of the layer over this area alone to be three inches, the mass represented would be equivalent to a prism one mile square, with a height of 6240 feet, or (making allowance for interspaces in the comminuted material) equal to nearly a cubic mile of rock.

Since the year 1873, when the placer gold mines of Cassiar were first developed, the Stikine River has become a somewhat important avenue of communication from the coast to the interior of the northern part of British Columbia. Like the Fraser, the Skeena, the Nass and several other smaller streams, it rises to the east of the broad belt of mountains which constitutes the Coast Ranges, and cuts completely through this belt with a nearly uniform gradient. In size and general character the Stikine closely resembles the Skeena, which reaches the coast 200 miles further south. It is navigable for stern-wheel steamers of light draught and good power, to Glenora, 126 miles from Rothsay Point, at its mouth, and under favourable circumstances to Telegraph Creek, twelve miles farther. Above Telegraph Creek is the "Great Cañon," which extends for many miles and is quite impassable either for steamers or boats, though traversed by miners in winter on the ice. The headwaters of the Stikine are unknown, but lie for the most part to the south of the 58th parallel of north latitude, in a country said to be very mountainous. From Telegraph Creek, the head of navigation, a pack-trail sixty-two miles and a half in length, constructed by the British Columbian Government, follows the valley of the Stikine, generally at no great distance from the river, and eventually crosses from the Tanzilla or Third North Fork to the head of Dease Lake, which may be regarded as the centre of the Cassiar mining district.

My personal acquaintance with the Stikine, so far as Telegraph Creek, was supplemented by the observations of Mr. McConnell, who remained behind for the purpose of making a micrometer survey of the river from the furthest point reached by Mr. Hunter's survey of 1877 to Telegraph Creek. Mr. McConnell's notes and map with specimens collected by him have been consulted in the following sketch of the river, and are drawn upon particularly in respect of its geological features.

The general trend of the Stikine valley for twenty miles from the sea, is east and west, corresponding in direction to Bradfield Canal, which penetrates the coast thirty miles to the south, and also to part of the northern portion of Behm Canal and Burroughs' Bay, still further south. At this distance from the coast the river bends through a quadrant of arc, and assumes a nearly due north direction; this it maintains for about sixty-six miles, beyond which the valley is continued in a nearly direct north-eastward course to the vicinity of Dease Lake, but in its upper portion is occupied, not by the main river, but by the Tanzilla or Third North Fork, the main river entering this continuous valley from the southward.

The current of the navigable portion of the Stikine is swift throughout, but there are no rapids properly so called, though the Little Cañon (fifty-three miles above the great bend) forms a serious impediment to navigation when the river is at its highest stage in June or July, in consequence of the great velocity of the current in this narrow and rocky though deep gorge. The width of the Stikine immediately opposite Telegraph Creek was found on May 29th to be 480 feet only, but here it is deep, and had a velocity of 6·08 miles per hour, as determined from several observations. A few days later it was rising fast, and the velocity was considerably greater.

Stern-wheel steamers for the navigation of the river should have good engine power, and should draw not more than four feet of water when loaded.

The height of the river above sea-level at Telegraph Creek, as deduced from simultaneous barometric observations at the mouth and at this place, is 540 feet, giving an average fall of over four feet to the mile by the course of the stream. The

actual fall on the upper part of this length of the river must, however, considerably exceed this figure, while that of the lower portion is inconsiderable. Under ordinary circumstances the ascent of the river to Telegraph Creek, with a suitable steamer, occupies about three days, and it is generally necessary to carry a line ashore at a few places. The extensive flats near the mouth of the river render it necessary to enter it about high tide. Mr. Hunter ascertained that the channel across these flats has from one to two feet only of water at low tide. A considerable proportion of the traffic is carried on by Indians with canoes, and the Stikine Indians are very expert in all the necessary operations of tracking and poling in swift water.

The entrance to the Stikine from the sea is not distinguishable in its main orographic features from that of many of the salt-water inlets by which this part of the West Coast is dissected.

The valley bottom maintains an average width of from two to three miles so far up as the Little Cañon; this place may be regarded as nearly marking the head of the old salt-water inlet which had been silted up by the river. The cañon is about three-fifths of a mile long, and in places not more than fifty yards wide. It is bordered by massive granite cliffs, 200 to 300 feet in height, above which, on the west side, rugged mountain slopes rise. On the east are low rocky hills representing part of a former spur of the mountain, through which the cañon has been cut. A tract of low land separates these hills from the eastern side of the main valley, and it is difficult to conjecture under what circumstances the river has taken its present course.

Eight miles further up is the "Kloochman Cañon," but it is nearly 300 feet in width and offers no impediment to navigation. At four miles above the "Kloochman Cañon" is the so-called "Grand Rapid," which, in consequence of recent changes in the river, is now by no means formidable, though the water is still particularly swift and the river wide and shallow. Here the valley begins very markedly to open out, the mountains retiring further from the river and decreasing in altitude, while irregular, basaltic hills, of no great height, appear between the river and the bases of the mountains. This, taken in conjunc-

tion with the dry climate which characterizes the country to the east of the mountains, and the fact that most of the slopes have been bared of timber by fire, gives an entirely different aspect to the landscape.

The Stikine is joined by some important tributaries in the part of its course above described, though none of these have yet been examined in detail.

CHAPTER IV.

Valley of the Scud River—Clearwater River—First South Fork—Telegraph Creek—Origin of its name—The glaciers of the Stikine valley—First or Little Glacier—Great Glacier—Dirt Glacier—Flood Glacier—General composition of the central ranges—Basaltic rocks and the occurrence of placer deposits of gold—Composition of rocks in the vicinity of Telegraph Creek—Terrace deposits at the mouth of the Stikine—Difference between the coast and inland climates—Vegetation of the Coast Ranges and Telegraph Creek in May—Local variations of climate—Cultivation at Telegraph Creek and Glenora—Date when Stikine usually opens for navigation—When closed—When first discovered—The first discovery of placer gold on the bars of the Stikine—Its exploration by Major Pope—Discovery of gold in the Cassiar region—Trail from Telegraph Creek to head of Dease Lake—Country traversed by the trail—The Tahl-tan River—Gold-mining in the Tahl-tan valley—Tooya, or Second North Fork—Caribou Camp—The Tooya valley—Valley of the Tanzilla, or Third North Fork.

ABOUT seven miles below the Little Cañon, the valley of the Scud River opens to the east, but the exact position of the mouth of the stream has not been fixed on the map. Some gold has been found by prospectors on this stream, but no workable placer deposits. It is said to head in a low country behind the Coast Mountains, and if this be correct, must nearly inosculate with branches of the Iskoot and First South Fork of the Stikine.

Six miles above "Kloochman Cañon," the Clearwater River enters the Stikine on the west side, by several mouths. The latter is a stream of considerable size, and is navigable for canoes for some distance. It is said to head near the sources of one branch of the Taku River, and is noted by the Indians for the great number of salmon which ascend it.

The First South Fork joins the Stikine about a mile and a half below Telegraph Creek. It is a large turbid stream, and for a number of miles from the main river, flows in a rough narrow gorge, between high hills and mountains. Further up, according to the Telegraph Exploration sketch, it is bordered

by level, partly timbered terraces or "benches." The summit between its head-waters and those of the Iskoot, on the route followed by Mr. Leech, is given on his authority at 5000 feet. Salmon do not ascend this stream.

Telegraph Creek is an inconsiderable stream, which falls rapidly to the river through a narrow rocky cleft in the bordering hills of the right or north-west bank of the Stikine. Its name is due to the fact that here the Western Union Telegraph line was intended to cross the Stikine. The little town of Telegraph Creek occupies the narrow delta and the lower terraces bordering it on both sides, its site being identical with that of "Ford Mumford" of the older maps. Glenora, twelve miles below Telegraph Creek and on the same side of the Stikine, consists of a single row of houses built along the edge of the river at the foot of a steep bank. Both places were at one time busy little towns, but are at present very much reduced in importance, though I believe it will probably not be long before further mining developments in the Cassiar district will lead to the renewal of their activity.

The glaciers constitute one of the most remarkable features of this part of the Stikine valley. There are a number of these on both sides of the river, in its lower part; but four only of special importance, all situated to the west of the river, and all but the first on the eastern slopes of the most massive central ranges of the mountainous region.

Mr. John Muir, who spent some time on the Stikine in 1879, gives an interesting popular description of its glaciers in a letter dated from Sitka in December of that year, and published in the San Francisco Bulletin. Mr. Muir informs me that no more systematic account of his observations in this region has yet been made public.

The glacier known by the miners as the First or Little Glacier (named the Popoff Glacier by Blake) fills a high valley on the north side of the river, about ten miles from its mouth. As seen from a distance it offers no features of particular interest, but resembles many other minor glaciers of the Coast Mountains.

The next and most important glacier is that universally known on the river as the Great Glacier. Before entering the

Stikine valley, this glacier has a width estimated at from one-half to three-quarters of a mile, but upon freeing itself from the bordering mountains immediately expands in a fan-like manner, its actual front upon the river being from three to three and a half miles in width. Large streams issue from beneath the ice, the position of outflow frequently changing from year to year.

Next to its size, the most remarkable feature about this glacier is the regularity of the fan-like form in which it terminates. It resembles in this respect the Davidson Glacier on Lynn Canal.

The miners state that during the few years of their knowledge of the Stikine, the Great Glacier has steadily and notably receded, though the total amount of such recession can evidently not have been more than the distance from the wooded bordering-moraine to the present ice-front. The Indians relate as a tradition, that at a former period the glacier stretched completely across the valley, the Stikine passing beneath the ice through a tunnel-like opening. It is, however, impossible to determine whether this is a remembered fact or only an inference. Curiously enough, a copious hot spring is situated immediately opposite the glacier on the east side of the Stikine valley.

Ten miles above the Great Glacier, and also on the west side of the valley, is the Dirt Glacier, so named by the miners because of the great quantity of rocky *débris* with which its surface is covered.[1] This is much smaller than the last, having a width estimated at a quarter of a mile, but possibly greater. Like the Great Glacier, it comes quite down on the river-flats.

The last important glacier, sixteen miles still further up the river, is the Flood Glacier. This also comes down to the level of the river-flats, but does not closely approach the river. From the valley of this glacier a great rush of water occurs almost every year towards the end of the summer. This, no doubt, arises from the blocking by the glacier of the mouth of some lateral valley in which a lake is formed, and from time to time breaks through the glacier dam. The quantity of water thus liberated is so great as to raise the river from a low stage

[1] Also so named on sketch map in Report on Customs District, Public Service and Resources of Alaska Territory, by W. G. Morris, 1879.

to half-flood level for a short time. There is a large quantity of *débris* also on this glacier, though less than on the last.

The Great Glacier, rising many miles back in the higher ranges of the mountains, in the material which it has brought down and deposited in its moraine, affords a mode of ascertaining the general composition of the central ranges. This material was found by Mr. McConnell to consist almost entirely of grey granite of medium grain, composed of felspar, quartz and hornblende in nearly equal proportions, but holding also a little mica and occasional crystals of sphene. Diorites and mica-schists occur in smaller quantity, together with coarse pegmatite, which is evidently derived from veins intersecting the granite.

A short distance below the "Grand Rapid," distinctly stratified rocks of dark colour cap some of the mountains and rest upon the granites. These beds have a dip of N. 70° E. < 30°, which brings them down to the level of the river near the rapid. They consist of hard argillites and grauwacke-quartzites, interbedded with grey and brownish impure limestones, the whole being considerably disturbed and cut near the granites by coarse grey porphyritic dykes of that rock. The argillites were not observed to hold staurolite, mica, or other crystalline minerals like those of Wrangell, and otherwise differ somewhat in appearance from these, though their relation to the granitic rocks appears to be similar. They are followed in ascending order by a massive grey-blue sub-crystalline limestone of considerable though undetermined thickness, which can be traced in the mountains for some distance on both sides of the valley. These limestones are believed to represent those afterwards noted on the Dease and there referred to the Carboniferous period.

Altered volcanic rocks only, were seen along the river for about twelve miles above the Clearwater, but there is reason to believe that outliers of Tertiary basalt also occur in this part of the valley. At the distance just mentioned above the Clearwater, and about six miles and a half below Glenora, exposures are found of slaty argillites and dark shaly rocks, containing some impure limestone, all very much broken and disturbed, and associated with altered volcanic materials. Some beds of these shaly limestones prove on microscopical examination to

consist chiefly of organic fragments which are not, however, sufficiently distinctive for the reference of the beds.

From this point to Telegraph Creek, basaltic and other comparatively modern volcanic rocks become prominent features, the basalts appearing as remnants of horizontal flows, the broken edges of which form scarped cliffs. These rocks are due to a period antecedent to that of the glacial deposits, and are of Tertiary age. Analogy with neighbouring parts of British Columbia indicates that they may be assigned with probability to the Miocene. The basalts have evidently flowed along and partially filled the old river-valley, and unconformably overlie the old altered volcanic rocks previously alluded to, as well as all the other rock series.

About two miles below Glenora, the basaltic rocks were noticed in one place to have filled the old river-bed, conforming in their lower layers to the slopes of its sides, and to have been subsequently cut across obliquely by the present river. Other examples of this character are of special interest in connection with the occurrence of placer deposits of gold.

Between Glenora and Telegraph Creek, the rocks seen below the basalts include at least two distinct series. The first and oldest of these is represented by a number of occurrences of altered volcanic rocks, like those previously referred to, as well as by considerable exposures (beginning about a mile above Glenora) of grey and blackish, rather cherty quartzites, often nearly on edge. The second consists of slightly indurated conglomerates, sandstones and shales, the conglomerates being often very coarse and containing pebbles both of the older volcanic series and of the granites and granitoid rocks. These lie at comparatively moderate angles of inclination. No fossils were observed in them, but in their lithological character as well as in their position relatively to the Coast Ranges, they resemble rocks of Cretaceous age met with in other parts of British Columbia, both to the south and north of the Stikine, and may be provisionally referred to that period.

In the immediate vicinity of Telegraph Creek, the prevalent rock is a grey-green, speckled, altered volcanic material, which proves to be a fine-grained diabase-tuff. The high hill immediately opposite Telegraph Creek, on the other side of the river,

is composed of similar old volcanic rocks, comprising compact diabase and a massive diabase-agglomerate.

About two miles below Telegraph Creek, on the right bank of the river, a portion of the basaltic filling of the old valley forms a range of columnar cliffs about 200 feet above the present water-level. A second similar remnant occurs just above Telegraph Creek, on the same side, and a portion of it extends up Telegraph Creek itself for a mile or more. Basaltic dykes, which may have served as sources of supply of molten material at the time of eruption, cut the older rocks. Though in some cases simulating the appearance of terraces, the basaltic shelves along the sides of the valley are quite distinct from and of earlier date than these.

The portion of the Alaskan coast which I have seen, viz. that to the south of the 59th parallel, shows the same general absence of terrace deposits which has already been noted and commented on in the case of the British Columbian coast. In the vicinity of the mouth of the Stikine, terraces fifteen to twenty feet in height are found, resembling the wooded flats met with further up the river, but as they are here upon tide-water, they indicate doubtless an elevation of the coast-line to that amount. Further up the river, the first appearance of high-level terraces is at about two miles below the Great Glacier. Those here seen are quite narrow, and were estimated to be 500 and 700 feet respectively above the river. The river, for the first time, shows bordering-terraces of from thirty to fifty feet in height, about six miles below the Little Cañon, and similar terraces are frequently seen above this point. On the mountain above Glenora a distinct but small terrace was seen from a distance at an estimated height of 1500 feet above the river. At Telegraph Creek the two principal terraces are 90 and 200 feet respectively above the river-level.

The traverse of the Coast Ranges by the Stikine River, from its mouth to Telegraph Creek, affords an excellent illustration of the difference between the coast and inland climates, repeating to a great extent the phenomena met with in making a similar traverse of the same ranges in the southern part of British Columbia. The annual precipitation at Wrangell, at the mouth of the Stikine, is over sixty inches, while in the

vicinity of Telegraph Creek, distant only 140 miles, but on the inland side of the mountains, the precipitation is so small that irrigation is necessary to cultivated land.

Nor does this comparison of rain-fall sufficiently mark the great difference between the two climates. The prevalence of clouded skies in the coast region is accompanied by a saturated state of the atmosphere, precisely opposite conditions being found on the eastern side of the mountain belt, at not more than eighty miles inland from the general line of the coast. The coast climate is, of course, much more temperate than that of the interior, which, even no further off than Telegraph Creek, becomes one of extremes. Miners state that the snow accumulates on the river-flats of the lower part of the Stikine, within the mountains, to a depth of from eight to ten feet, while at Telegraph Creek on the eastern slope of the range and on the Tahl-tan River it seldom exceeds eighteen inches. At the latter places horses and mules have been wintering out for a number of years. The great depth of snow retards the advance of spring all along the portion of the river where it occurs.

Vegetation is much farther advanced in spring on the inland side of the Coast Ranges than elsewhere. In the middle of May the cotton-woods and other deciduous trees at the mouth of the Stikine and along its lower part showed merely a general faint greenish tint as the buds opened. Four days later, in the vicinity of Telegraph Creek, the appearance was almost that of early summer. A great number of plants were in flower, and butterflies and humming-birds were abundant. As the river is ascended the change from a very moist to a dry climate is indicated by the variation of the species of plants.

The local differences of climate are important. Thus Glenora, though about twelve miles only from Telegraph Creek, is said to experience much greater cold in winter, and the snow-fall is also greater, being estimated at three feet and a half. Less snow falls on the Tahl-tan than elsewhere, the amount increasing both to the east and west of that place. Strong winds blowing up stream or inland are prevalent in the Stikine valley in summer, but occur in the reverse direction, as a rule, in winter.

During the few days we spent at Telegraph Creek, in the latte

part of May, the wind generally blew up the river and was often strong. The high distant ranges of the Coast Mountains to the west were usually enveloped in clouds, and heavy showers were evidently of common occurrence. The sky at Telegraph Creek was also as a rule largely obscured, but after passing over the Coast Mountains the clouds were more broken, and produced merely a few drops of rain now and then; the conditions being similar to those met with in the dry country to the east of the same range in the Fraser valley, much further south.

Cultivation in the vicinity of Telegraph Creek and Glenora is practically confined to the raising of small quantities of vegetables and of barley and fodder for animals. There is, however, in this vicinity, in the aggregate, a considerable area of land which might be tilled if there were sufficient local demand to warrant it. Excellent potatoes are produced, and though the leaves are occasionally touched by frost, the crop is seldom affected. It has further been ascertained by trial on a sufficient scale that not only barley, but wheat and oats will ripen, and that all ordinary garden vegetables can be produced. The record is a remarkable one for the 58th degree of north latitude.

According to Mr. J. C. Callbreath, of Telegraph Creek, the Stikine generally opens for navigation between April 20th and May 1st. The river usually freezes over before the end of November. The highest water occurs in the early summer, generally in June. Horses and mules find grazing on the Tahltan from April 20th or May 1st to about December 1st, after which date they require some hay.

Though the position of the Stikine is indicated on Vancouver's charts by the open channels of the river, and the shoals about its estuary are mapped, the existence of a large river was not recognized by that navigator, who visited this part of the coast in 1793. According to Mr. W. H. Dall, the river was first found by fur traders in 1799. In 1834 the Hudson Bay Company fitted out a vessel named the *Dryad* for the purpose of establishing a post and colony at the mouth of the Stikine, but the Russians, being apprised of this circumstance, sent two small armed vessels to the spot, and constructed a defensive work, which they named Fort Dionysius, on the site of the

present town of Wrangell. Finding themselves thus forestalled, the Company retired. This dispute was compromised in 1837, when an arrangement was made by which the Company leased for a term of years all that part of the Russian territory which now constitutes the "coast strip" of Alaska, and the "fort" was handed over to the Company, the British flag being hoisted under a salute of seven guns, in June, 1840.

The first discovery of placer gold on its bars was made in 1861, by two miners named Choquette ("Buck") and Carpenter. In the following spring several prospecting parties were fitted out in Victoria, and a number of men passed the summer in mining on the river. In 1863, the Russian authorities, hearing of the discovery of gold, despatched the corvette *Rynda* to ascertain whether the mining was being carried on in Russian territory. A boat party from this vessel, under Lieutenant Pereleshin, ascended the river to a point a few miles above the Little Cañon, occupying May 23rd to June 1st on the expedition. Mr. W. P. Blake accompanied this party, and in addition to the sketch-map published by the Russians, his report on the Stikine, previously alluded to, is based on it.[1]

A Hudson Bay post was established on the east side of the river in 1862 or 1863 and maintained till about 1874, when it was moved to the vicinity of Glenora, where it remained till 1878, when it was abandoned.

In 1866, explorations for the line of the Western Union or Collins' Telegraph Company were extended to the Stikine under Major Pope. These were continued in 1867 and embraced most of the principal tributaries of the river. The results were not separately published, and the whole enterprise of which they were a part was abandoned. The sketch-maps then made were, however, partly embodied in the small map accompanying Mr. W. H. Dall's work on Alaska (1870), and with greater completeness in other subsequent maps of the region.

In 1873, Messrs. Thibert and McCullough, travelling westward from the Mackenzie, discovered gold in the Cassiar region, and fell in with the miners already engaged in placer work on the Stikine in the autumn of that year. The subsequent

[1] Geographical Notes upon Russian American and the Stickeen River; Washington, 1868. Also, Am. Journ. Sci. and Arts, vol xliv., 1867, p. 96.

history of the river is included in that of the Cassiar mining district.

The trail from Telegraph Creek to the head of Dease Lake was opened by the Government of British Columbia in 1874. It has since been kept in a fair state of repair, and is a good route for pack animals. It follows the north side of the Stikine and Tanzilla valleys, and is sixty-two miles and a half in total length.

On leaving Telegraph Creek, the trail makes a steep ascent to the level of a broad terrace, and runs along at a considerable height above the river, till it again descends, at eleven miles, to the valley of the Tahl-tan or First North Fork, near its mouth. The main valley of the Stikine is here about four miles in width, and is bordered by high hills and mountains of rounded forms; those to the north often nearly bare, while those on the opposite side are generally either wooded or strewn with burnt logs where fires have passed. The river occupies a cañon, with precipitous banks often 300 feet in height, which has been cut in the bottom of this great valley. It is very rough and rapid, but there are no true falls. Terraces are well developed at several levels on both sides of the river, which is frequently bordered by vertical basaltic cliffs.

The country traversed by the trail between Telegraph Creek and the Tahl-tan is wooded only in patches, the trees being chiefly black pine (*Pinus Murrayana*) and aspen (*Populus tremuloides*), with occasional specimens of white birch, and alder and willow in the hollows. The soil is reddish and rather sandy, and appears very dry, being but scantily clothed with thin, tufty grass and bear-berry.

The Tahl-tan River, crossed near its mouth by a good bridge, is a large and rapid stream, which rises about thirty miles to the north-westward. Its valley is narrow and almost cañon-like where it reaches the Stikine, and has cut through basalt-flows and heavy underlying gravel deposits to a depth of about one hundred and fifty feet, though its right bank, just above the crossing, is composed of the older rocks. It is resorted to by the Indians for salmon fishing during a part of the summer, and there are several temporary houses and a number of graves. The angle between this river and the Stikine, on the right bank,

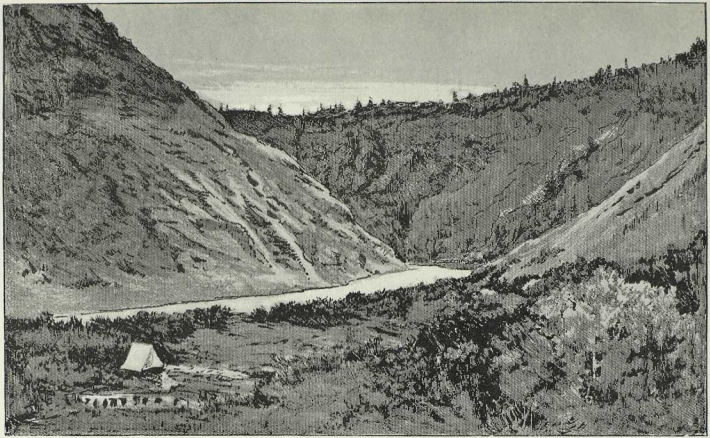
shows three clearly defined, superposed, columnar basalt-flows. The opposite angle, up which the trail zig-zags, is in the form of a long, narrow point, composed of large pieces of basalt lying in great confusion, with deep interspaces and crevices. This is generally known as the "lava-bed." Gold mining was at one time carried on successfully for some miles up the Tahl-tan valley.

The Tahl-tan occupies a portion of an important valley which carries, to the north-westward, the upper branches of the Taku and the furthest sources of the Lewes River. The Indians travel along this valley, and it appears worthy of attention as a route from the navigable waters of the Stikine to the Yukon basin.

The distance from the Tahl-tan to the Tooya, or Second North Fork, is about six miles. For half this distance, to Ward's house (now abandoned, like other places of call along this route) the trail runs near the Stikine River, whose immediate valley still continues to be occupied by basaltic-flows. Above these, however, the sides of the valley are generally formed of regular and high terraces of horizontally stratified sands, gravels and earthy deposits, which are rather silts than true clays. The gravels frequently include large boulders. At Ward's, the trail turns away from the river and cuts across a high point to the Tooya, the highest terrace-level crossed being about 1000 feet above the river. On these high terraces the vegetation was perceptibly less advanced than in the lower parts of the valley. Swampy spots are frequent, and the country, as we recede from the vicinity of the Coast Mountains, has evidently a more humid climate and is more subject to summer frosts. Potatoes and other crops are successfully grown at Ward's, situated on one of the lower terraces, but irrigation is there necessary.

The Tooya valley, where it is crossed by the trail, is a great gorge, about 600 feet in depth, cut out through the terrace deposits. The river, which is spanned by a small bridge, is a wild torrent—almost a series of cascades.

From "Wilson's house" to Caribou Camp, about twelve miles, the trail crosses an extensive high terrace or plateau, with a nearly level or slightly undulating surface, which is generally wooded with aspen, black pine and white spruce of



TAHL-TAN VALLEY, AT TRAIL CROSSING

Bank on the right shows basalt, capping old gravel deposit. Hill on left composed of old crystalline rock

fair growth. The Tooya valley is here said to run nearly parallel with the main valley of the Stikine and at no great distance from it, but is invisible from the trail. No mountains were seen to the north-eastward, but high, rounded mountains, with broad, bare summits, continue to border the south-east side of the Stikine valley. About midway between Wilson's and Caribou Camp, the Stikine, or Too-dessa of the Tahl-tan Indians, coming from the southward, enters the main valley, cutting through the bordering mountains in a narrow cañon, which the Indians report impassable. Their route to the upper waters of the river crosses the mountains to the west of this cañon. They state that after again reaching the Stikine, above the cañon, they can ascend it in canoes without difficulty for a long distance.

No rock exposures were seen along this part of the trail, and only occasional groups of boulders. The vegetation and appearance of the country afford evidence that the climate is still a dry one.

The trail reaches the edge of the valley of the Tanzilla, or Third North Fork, about a mile south-westward from Caribou Camp. This valley is cut out to a depth of 450 feet below the level of the plateau, and is about a mile in width from rim to rim. The sides show evidence of extensive landslips, both old and recent. The river is a comparatively small though swift and muddy stream, with an estimated width of 180 feet and depth of about three feet. No rocks are exposed in the valley, the entire depth of which appears to be excavated in bedded clays and silts, which weather to grey, earthy slopes.

CHAPTER V.

The trail from Caribou Camp to Dease Lake—The terraces at the sides of the Tanzilla—The mountains—The Tanzilla valley part of a river-course of very ancient date—Volcanic origin of the rocks near Telegraph Creek—Pre-glacial age of the basaltic rocks—The old river-bed below Glenora—Basaltic formation of the Stikine—Its importance in respect to the distribution of gold—"Heavy" gold found along that portion of the stream characterized by the basalt—The old channel—Remuneration bars worked up the Tahl-tan valley—Characteristic formation of the country between Telegraph Creek and Dease Lake—Dease Lake the central point of the Cassiar district—Placer mines of value awaiting discovery in this district—This district more accessible than that of Caribou—Construction of a waggon-road—Suitable materials easily obtainable—No serious impediment presented to the construction of a railway—The survey of the Stikine—The route a direct one to Dease Lake—Also a direct line from the Pacific Coast to the Mackenzie River—Arrival of the expedition at the head of Dease Lake—Dates of the opening and closing of the lake—Its elevation and length—The richest gold deposits discovered at Dease Creek—The head-quarters of the Gold Commission—Country surrounding the lake—Vegetation—Agriculture not practicable in this region—Resemblance of rocks to the gold-bearing series of the Caribou district—The ancient pre-glacial valley—The present valley—Estimated value of gold produced by Cassiar district—Summary and particulars as to the condition of the workings in the various localities—Difficulties of mining on account of frozen ground—Prospecting for metalliferous veins in the Cassiar district—Its accessibility to the coast—Facilities afforded for the construction of a good road—The district very imperfectly prospected—Probable existence of rich creeks—"Quartz-mining" compared with alluvial-mining.

FROM Caribou Camp to the vicinity of Dease Lake, or for about twenty-six miles, the trail runs along the north-west side of the Tanzilla. The valley of the stream gradually loses its depth, owing to the fact that, while the grade of the stream is considerable, the terraces at its sides continue at about the same level. These consist, so far as can be seen, of similar silty and clayey materials, but the edges of the terraces are less marked, and they show a tendency to merge into slopes, which rest upon the bases of the mountains bordering the valley. The mountains which extend to the south-east of the river become higher here, and take the form of a well-marked range, which is known to the Indians as *Ho-tai'-luh*. Swampy spots become frequent and the vegetation more alpine in character,

with evidence of a considerably greater rainfall. A great part of the forest all along this portion of the valley has been destroyed by fire. Rock is seen in place only on approaching the bases of the mountains.

The part of the valley which connects the Tanzilla with Dease Lake is floored by terrace deposits, and is without doubt very deeply filled with such material, as no solid rock is seen in it. It has evidently been part of a through river-course of very ancient date, but in what direction the stream that originated the valley flowed, it is now difficult to surmise. It has, however, been again occupied by a river in comparatively recent post-glacial times, subsequently to the formation of the terrace deposits, as it is traversed by a well-marked river-bed, filled with rolled stones and gravels. This old channel appears to rise slightly towards Dease Lake, and there can be little doubt that the stream by which it was formed flowed out of the lake.

Respecting the older rocks which characterize the greater part of the country between Telegraph Creek and Dease Lake, few details were noted, and no approach to a general section was obtained, as they are not usually exposed except along the bases of the mountains, which are, as a rule, at some distance from the route of travel. These may be described as consisting of grey and greenish-grey quartzites and grauwackes, with a large proportion of altered volcanic materials, generally felspathic, but passing into diabases and becoming in some cases more or less schistose. Rocks originally of volcanic origin notably preponderate in the vicinity of Telegraph Creek, while near Dease Lake they are less abundant, and at about two miles from the lake, on the trail, massive grey fine-grained limestone occurs, in exposures which are nearly continuous for about a mile. None of the mountains in sight on either side of the valley are distinctly granitic, and rocks of this character were observed only in one locality, where they occupy a relatively small area.

The pre-glacial age of the basaltic rocks is shown by their relation to the terraces of the valley, and also by the occurrence upon them of large granitic boulders.

A few miles below Glenora, where the basalt filling of the old valley has been cut across, it seems the old river-bed is

below the present water-level, indicating, in connection with previous observations, that the grade of the original river was greater than that of the present.

Though the basalts of Tertiary age actually seen by me are confined to the Stikine valley, it is highly probable that further explorations will prove their occurrence in other valleys, and possibly also the existence of similar rocks, in the form of plateaux of some size, in the region east of the Coast Ranges.

The basaltic formation of the Stikine is important in respect of the distribution of gold. The gold along the Stikine was said by the miners to be "spotted," or irregular, in its occurrence, but the greater part of the "heavy" gold was found just along that portion of the stream now characterized by the basalts, and it appears even possible to trace a connection between the richer bars which have been worked and those places in which the present river has cut through or followed the old basalt-protected channel. Such being the case, it seems very desirable that the old channel should be fully prospected, but this I cannot learn has ever been attempted. If gold should be found in it in paying quantity, it might easily be worked, and would give rise to a considerable renewal of activity in mining. It is not known to what extent similar conditions may occur up the Tahl-tan valley, where also remunerative bars were worked some years ago.

The most characteristic later formation of the country between Telegraph Creek and Dease Lake is the silty deposit which has already been referred to in several places. The whole of the great valley has evidently in later-glacial times been filled with this deposit, which must have been laid down in a comparatively tranquil lake-like body of water, into which coarser material was in some places washed by entering torrents, as in the case of the Tooya. It appears to me possible that this body of water was held in by means of glacier-ice accumulated on the Coast Ranges on one side and those of the Cassiar Mountains on the other. The increased height of the terraces in the vicinity of Dease Lake, as compared with those near Telegraph Creek, may show that the terrace-deposits have been laid down near the front of a retreating glacier-mass, the water-level of the lake being reduced *pari passu*, with its reces-

sion. The highest terrace-level observed near the Tahl-tan, is at an approximate elevation of 1700 feet above the sea, while half way between the Tooya and Dease Lake the terraces run up to a height of about 2800 feet. At the head of the lake a well-marked terrace-edge was observed at 520 feet above the lake, or 3180 feet above the sea. The irregular surface of the same terrace sloped upward to a further height of about 100 feet, and granite boulders were found on the summit of a limestone hill 1000 feet above the lake, or 3660 feet above the sea. If the supposition of the considerable inland extension of the glaciers of the Coast Mountains at one epoch of the glacial period be correct (and it is strictly paralleled by similar circumstances in the more southern part of British Columbia), the greater part of the gigantic erratics met with may probably have been derived from the Coast Ranges, through the Cassiar Mountains : possibly other ranges in the region are characterized by similar rocks.

Dease Lake is the central point of the Cassiar district, and though, as shown by statistics subsequently quoted, the yield of gold has greatly fallen off since the palmy days of its first discovery, it is very probable that further placer mines of value may yet be found in this region (of which a great part still remains to be carefully prospected), and there is every reason to believe that quartz mining and other industries will before long be developed on a considerable scale. Even at the present moment this district is more easily accessible than that of Caribou, and when a waggon-road shall have been built from the head of navigation on the Stikine to Dease Lake, it should be easy to lay down goods at the latter point at very reasonable rates.

The construction of a waggon-road, with moderately favourable grades, between Telegraph Creek and Dease Lake, would not be very difficult or expensive. The first ascent from Telegraph Creek is steep, but might easily be overcome. Between eight and ten miles from Telegraph Creek, or for a distance of about two miles, the road would have to follow a rough hill-side above the cañon, where some blasting and grading would be required. The descent to the Tahl-tan would entail some heavy side-hill cutting in rock and earth and a

bridge would be necessary. The ascent and crossing of the "lava bed" would entail about a mile of rough work on the opposite side of the Tahl-tan, and should the line of the present trail be followed, a long and steep ascent, with grading in gravel and clay, would be required at Ward's, and again in descending to and ascending from the Tooya valley, but no rock work would be necessary. It seems quite probable, however, that a better route might be found for a road, at a lower level, from Ward's to the mouth of the Tooya, in following the side of the main valley. In either case a good bridge would be required at the Tooya. Beyond this, all the way to Dease Lake, no further serious obstacle presents itself. Portions of the route are clayey and swampy, and to render these easily passable, from eight to ten miles of corduroy in all would be required, and for this suitable material could be obtained near by in all cases.

Should the construction of a railway be contemplated, the difficulties to be surmounted would be greater in proportion, particularly between Telegraph Creek and the Tahl-tan, where the line would have to follow the side of the cañon, which is very rough and rocky. Beyond this point, so far as the valley can be seen from the trail, it presents no very serious impediments. Below Telegraph Creek, to Glenora, or a little further, a railway would involve some moderately heavy side-hill work; but further down the Stikine, to the sea, it might follow the river-flats at a nearly uniform level. The greatest difficulty to be apprehended on this part of the line would be that likely to arise in winter from the very heavy snow-fall on the river below the Little Cañon.

It may be pointed out in this connection that the survey of the Stikine and of the valley leading by the Tanzilla to Dease Lake shows the route to be an exceedingly direct one to Dease Lake, and that, taken in conjunction with the valleys of the Dease and Liard Rivers, it affords almost an air-line from the Pacific coast to the great Mackenzie River.

We reached the head of Dease Lake on June 5th, and eventually left the lake on the morning of June 19th, spending thus thirteen days in all upon the lake. At the date of our arrival the lake, with the exception of a small area at its head was

still covered with the decayed but unbroken ice of the previous winter, and this did not finally break up and disappear till the 16th. Meanwhile, almost all our time and attention were devoted to sawing out boards and building three boats.

The following dates, obtained from Mr. Robert Reid, of Laketon, are those of the opening and closing of the lake for the past few years :—

Year.	*Lake opened.*	*Lake closed.*
1882	June 9th	December 5th or 6th
1883	May 30th (Clear from end to end)	December 5th
1884	June 2nd	December 2nd
1885	June 3rd	December 1st (Frozen completely across)
1886	June 5th	December 16th (Crossing on 17th)
1887	June 16th	

Dease Lake has an elevation of 2660 feet above the sea, and lies nearly due north-and-south on the 130th meridian. It has a total length of twenty-four miles, with an average width of less than one mile, being somewhat narrower at the northern than at the southern end. Dease Creek, on the delta of which is situated Laketon, the chief place of the Cassiar district, enters on the west side at sixteen miles and three quarters from the head of the lake, and is the largest tributary stream. It is also the most important, being that on which the richest of the gold deposits were discovered, and on which gold is still worked to a limited extent. A certain amount of business is still carried on here, and it is the headquarters of the Gold Commissioner. The old Hudson Bay Post was situated about two miles from the lower end of the lake, on the east side. A small steamer was put upon the lake when the mines were in a flourishing condition, and is still employed in making occasional trips up or down the lake with supplies.

The country about the lake is everywhere wooded, though "timber" trees are found only in sheltered valleys or on low land. It is not roughly mountainous, though several prominent summits exist. Near the northern end of the lake do the mountains begin to crowd down closely to the water's edge.

The lake is shallow and marshy at both ends, but elsewhere is evidently very deep, though no soundings have been made in it.

The vegetation gives evidence of a greater rainfall, and conditions more alpine and less favourable than those met with on the trail to the south-eastward, and sharply contrasting with that of Telegraph Creek and the Tahl-tan. The effect of the ice upon the lake in spring in retarding the vegetation in its immediate vicinity, was very apparent. Agriculture can scarcely be regarded as practicable in this region, and the results of gardening, however carefully conducted, are small. Potatoes can be grown, but in some years they are much injured by frost; carrots, lettuce, cabbage, cauliflowers and turnips may be made to afford a fair return.

Such rock-exposures as could be reached near the shores of the lake were inspected, and the material brought down from the hills by several streams was examined. The rocks as a whole closely resemble those of parts of the gold-bearing series of Caribou district.

Dease Creek is said to be about twelve miles in length and to rise in a lake about five miles long. The ancient pre-glacial valley has, at the same later-glacial period, been filled with clayey and gravelly deposits, among which large and often glaciated boulders are common. These deposits frequently resemble boulder-clay, and are possibly entitled to be so called. The present valley has been cut down through them, and often to a considerable depth into the rock beneath them. The mining has occurred chiefly in the bed of the stream, along the surface of the solid rock, in the sides of the valley, and in various places in the gravel deposits which still remain; also at the head of the flat on which Laketon stands, where the stream issues from the narrow recent valley. Much quartz occurs in the wash of the stream, and the gold, being "coarse," is evidently of local origin and has been liberated by the disintegration of the rocks in the immediate vicinity of, if not entirely within, the actual drainage-area of the stream.

The following table, based on the reports of the Minister of Mines of British Columbia, clearly illustrates the sudden rise and gradual decadence of the gold yield of Cassiar district:—

Estimated value of Gold produced by Cassiar District, from 1874 to 1887.

1873	Not known.
1874	$1,000,000
1875	830,000
1876	556,474
1877	490,830
1878	519,720
1879	405,200
1880	297,850
1881	198,900
1882	182,800
1883	119,000
1884	101,600
1885	59,600
1886	63,610
1887	60,485
Total	$4,886,069

No estimate has been formed for the yield of the mines in the first year of their operation (1873), but as that for the following year appears probably to be overstated, it may, for the purpose of arriving at a general estimate of the whole, be assumed that the sum of one million includes both years. The value of the gold may be stated as from $16 to $17 per ounce, though that of Dease Creek is usually priced at about $15·50 only.

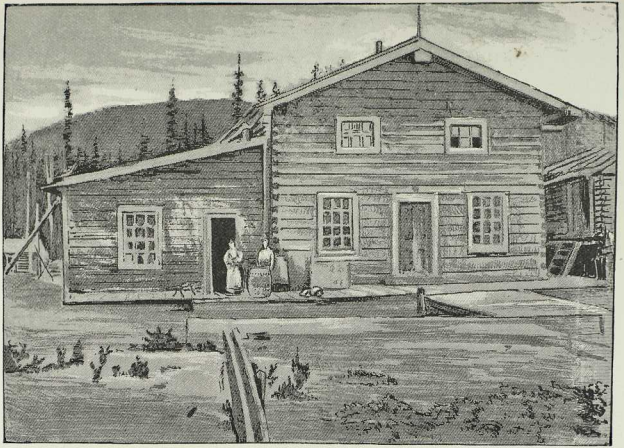
In the Report of Progress of the Geological Survey for 1886-87, I was enabled to give a general note on the various creeks worked for gold in Cassiar and on the Stikine. The information there given was chiefly furnished by Mr. G. B. Wright. I am now able to add to this, particulars as to the actual condition of the workings in 1887. These were largely obtained through the kindness of Mr. J. S. Crimp, the present Gold Commissioner for Cassiar district, though facts were also gathered from several old miners who were among the first to enter the country. As explained on a previous page, my opportunities of personally investigating the Cassiar district were restricted by the necessity of pushing on to our main field of exploration. Chiefly from the sources above-mentioned the following summary account of the different localities is derived.

Stikine River.—Gold discovered, 1861. Very fine gold can be found on almost all parts of the river, but very little profitable work was ever done below the mouth of the Clearwater. The rich ground may be said to have begun about nine miles below Glenora, and to have extended thence to the Grand

Cañon, above Telegraph Creek. Here Sheck's or Shake's Bar, and Carpenter's, Fiddler's and Buck's Bars were situated, the richest being between Glenora and Telegraph Creek, though gold was also worked in a few places in the Grand Cañon. With the exception of a few spots in the lower part of the cañon, below the Tahl-tan, and one nearly opposite Wilson's, all the gold was very fine. Coarse gold was also found on the lower part of Tahl-tan, which proved quite profitable, and bars were worked for a distance of ten or fifteen miles up the river. Pellets supposed to be of silver, but probably of arquerite or silver-amalgam, were also found on the Tahl-tan. The bars on the Stickine at first averaged $3 to $10 a day to the hand, and as much as two to three ounces were sometimes obtained, but not more than $1 to $3 can now be got, and work has practically ceased. It is stated that none of the higher benches so far prospected will pay for hydraulic work, but it is doubtful whether these have been examined with sufficient care, as the area of such benches is very considerable.

Dease Creek.—The bed of this creek has been gone over several times, and is now nearly worked out. It formerly yielded $8 to $50 a day to the hand, and paid well from the head of the flat, at its mouth, for six miles up. Above this a few isolated good claims were found, particularly the Caribou Company's claim, eight miles up, from which much heavy gold was obtained. This claim has been worked over four times. The best remaining claims are bench claims on the south side of the creek, some of these being upon an old high channel which yields well in places. Some hydraulic work on a small scale is being carried on. In 1886 there were sixteen whites and thirty-five Chinese at work, and the total amount produced was about $15,000. The gold is generally well water-worn and somewhat mixed in character, varying in value from $15·50 to $16 per ounce.

Thibert Creek.—The bed of this stream is also worked out. It paid for about six miles up from the mouth, yielding at about the same rate as the last. Bench claims are now being worked, two by the hydraulic method, the rest by tunnelling. An old high channel had also been found on the south side of this creek, upon which two claims are being worked, one paying very



J. LEDUC'S HOUSE—SIXTY MILES POST.

well. Yield in 1866, nearly the same with Dease Creek, about twenty-two whites and twenty-five Chinese being employed. Gold valued at $16 per ounce. On a tributary named Mosquito Creek very good prospects have lately been obtained—as much as $40 to a six-foot set of timbers. Work is now going on here.

Defot Creek.—A tributary of Cañon Creek, on the same (west) side of Dease River with the last. It rises on a plateau high above the river, where great numbers of quartz reefs occur, and the gold found is quite rough and full of quartz. Large nuggets have been obtained, including one of fourteen ounces in weight. Some work is still in progress, though the creek-bed is worked out. Gold worth $17 per ounce.

Cañon Creek.—No paying deposits found.

Cottonwood Creek.—This large stream heads in the same mountains with the last, but no paying deposits have been found upon it.

Beady Creek.—A little mining was done here in 1874 and 1875, but nothing of importance ever found.

Eagle River.—No mining ever developed.

McDame Creek.—Discovered 1874. The highest average daily yield varied from $6 to $100 to the hand when mining was at its best. Most of the gold was obtained in what appeared to be an old high-level channel, which crossed points of terraces or benches on both sides of the present stream. A very small proportion of the yield was from the stream-bed. Four or five whites and forty Chinese are now at work here, the greater number of the Chinese being employed on wide flats, which occur about nine miles up the creek. Bench claims run for about seven miles up the creek or to Holloway's Bar. Gold worth from $17·75 to $18 per ounce.

Snow Creek, a tributary of the last.—The richest claim found in Cassiar was near the mouth of this creek, yielding for a week 300 ounces for six to eight men. Only two men now at work.

Quartz Creek, a branch of Trout Creek, which is also a tributary of McDame Creek.—Good claims were worked here, yielding rough gold full of quartz. Much quartz in the vicinity. Two miners now at work.

Rosella Patterson and Dennis Creeks.—Yielded moderate amounts of gold, paying "wages," say, at $6 a day. Now abandoned.

The remaining creeks mentioned in the report cited, viz. *Gold Creek*, *Slate Creek*, *Somer's Creek* or *First North Fork of McDame*, *Third North Fork of McDame*, *Spring Creek* and *Fall Creek*, are now abandoned, though several of them yielded a considerable amount of gold at one time.

Sayyea Creek.—Near the head-waters of the Upper Liard, yielded excellent prospects, but has never been properly examined. The gold obtained was found in the benches, and some of it was very coarse. The creek yielded at the rate of $10·90 a day to the hand for a short time, to three miners who discovered it.

Walker Creek.—Said to be distant about seventy miles in an easterly direction from the mouth of McDame Creek. Some work has been done here, but no great quantity of gold obtained.

Black, Turnagain or "Muddy" River.—Reached by trail running easterly from a point opposite the mouth of McDame Creek, and said to be ninety miles distant. Fine gold stated to have been obtained to the value of $20 per day to the hand, and it is generally believed that coarse gold may occur on its head-waters. In 1874 prospectors found streams about seventy miles south-east of Dease Lake, which are supposed to be tributaries of this river, and yielded $6 a day in coarse gold, but at the time this was considered too poor to work.

Considerable difficulties were experienced in mining operations in some parts of the Cassiar district on account of frozen ground, often met with below the wooded and mossy surface. It is on record that on Dease Creek the ground continued to be frozen to the end of a tunnel driven in one hundred and fifty feet from the slope of the hill, and at a depth of forty feet from the surface; but after the woods and moss had been burnt off, little further complaint was heard of frozen ground.

Very little has yet been done in the way of prospecting for metalliferous veins in this district, but from what I have been able to learn it would well repay a thorough examination, and the comparative ease with which it may be reached from the

coast, together with the facility it affords for the construction of a good road to the very centre of the district, should not be forgotten. A specimen of galena, holding a little copper and iron pyrites, from the "Acadia Claim," South Fork of McDame Creek, was given to me some years ago by Mr. J. W. McKay. This has since been assayed by Mr. C. Hoffmann, and proves to contain seventy-five ounces of silver to the ton of 2000 lbs. A piece of native copper, fifteen pounds in weight, was at one time found in Boulder Gulch, Thibert Creek.

Taking into consideration the great extent of generally auriferous country included in the Cassiar district, it must be conceded, that apart from the immediate vicinity of the well-known productive camps, it has been very imperfectly prospected. A great part of the district has in fact merely been run over in search of rich diggings, the simplest and cheapest methods of prospecting only having been employed in the quest. It is not improbable that additional rich creeks like those of the vicinity of Dease Lake may yet be discovered elsewhere, and it may be considered certain that these are great areas of poorer deposits which will pay to work with improved methods, and will eventually be utilized. It is also to be anticipated that "quartz mining" will ere long be inaugurated, and will afford a more permanent basis of prosperity than alluvial mining, however rich.

CHAPTER VI.

Discovery of the Cassiar district by the Hudson Bay Company—Dease Lake found and named by Mr. J. McLeod, chief trader—The Indian Bridge—Geographical information obtained by Mr. McLeod—Tooya River the furthest point reached by him—Attempt by Mr. McLeod's successor to establish a trading post—Hostile Indians—Success of Mr. R. Campbell—A winter of constant dangers—Sufferings from starvation—The post abandoned in 1839—The country practically forgotten from this date until 1872—Discovery of gold near the abandoned site of Fort Hallett on the Liard River in 1871—Population in 1874—Town of Laketon—Total yield of gold from the district, including the Stikine—Active prospecting in the outlying regions—A great influx of miners in 1876—Fall in the yield of gold—Decline in the production of the district and the number of miners since 1876—The Peak or Blue Mountains—The Cassiar Range—Length of the Dease River—Height of Dease Lake and the confluence of the Dease and Liard—Descent of the Dease River—Its ascent—Boating done principally by crews of Coast Indians—Principal features of Dease River—Cottonwood Creek—Eagle River—Skree Range—Cottonwood Rapid—McDame Creek—Sylvester's Landing the point of supply for miners on McDame Creek—The Dease nine miles below Sylvester's—Sylvester's trail to Turnagain or Black River—Valley of the Rapid River—The last main reach of the Dease—The "Lower Post" the furthest outwork of "civilization"—Dates of opening and closing of the Liard River—Main geological features of the Dease—General aspect and association of the rocks to the east of the Cassiar Range—Their resemblance to that of the Rocky Mountains—Dease River fossils—Tertiary shaly clays and coarse soft sandstone extremely developed above the mouth of the Dease.

THE Cassiar district of the northern interior of British Columbia may be said to have been twice discovered, first by officers and employees of the Hudson Bay Company, and again, after a considerable interval, by the gold miners.

The Hudson Bay Company made an unsuccessful attempt, in 1834, to reach the trade of the interior country west of the Rocky Mountains from the mouth of the Stikine. In the summer of 1834, Mr. J. McLeod, chief trader, was exploring the Liard River above Fort Halkett, and endeavouring to discover some stream flowing to the westward. He found and named Dease Lake,[1] crossed to the head-waters of the Stikine, which he proposed to name the "Pelly River," and travelled westward

[1] Dease Lake and River were so named by McLeod after Peter Warren, the Arctic explorer.

in the valley apparently as far as the Tooya or Second North Fork. The Indian bridge (afterwards named Terror Bridge by Mr. R. Campbell), by which this river was crossed at the foot of "Thomas' Fall," was so fragile a construction that neither McLeod nor any of his eight men ventured to attempt it, and from this point he and his party retraced their steps.

The geographical information obtained by McLeod is incorporated in Arrowsmith's map of 1850. McLeod's route from the head of Dease Lake, as shown on these maps, crossed the Tanzilla within a few miles of the lake, and followed its left bank, recrossing before the main Stikine enters the valley, probably by an Indian suspension bridge, which is reported still to exist, within a mile or two of this point. On careful consideration of the facts there can scarcely be any doubt that the Tooya River was McLeod's furthest point.

In 1836, McLeod's successor at Fort Halkett was instructed to establish a post across the mountains and to extend the trade down the Stikine or "Pelly," as it was then called from McLeod's naming. He left Fort Halkett early in June, with a party of men and two large canoes, but the expedition entirely miscarried. The appearance, or reported appearance, of a large force of hostile Indians at Portage Brulé, ten miles above Fort Halkett, so alarmed the party that they turned back, abandoning their goods, and ran down stream to Fort Simpson.

In 1838, Mr. R. Campbell volunteered his services to establish a trading post at Dease Lake, and in the spring of that year he succeeded in doing so. He was accompanied by a half-breed and two Indian lads. After ascertaining that the "Pelly" of McLeod was identical with the Stikine, he returned to Dease Lake, where, to employ his own words, "we passed a winter of constant danger from the savage Russian (Coast) Indians, and of much suffering from starvation. We were dependent for subsistence on what animals we could catch, and, failing that, on '*tripe de roche*.' We were at one time reduced to such dire straits that we were obliged to eat our parchment windows, and our last meal before abandoning Dease Lake, on 8th May, 1839, consisted of the lacing of our snow shoes." [1]

[1] The discovery and exploration of the Yukon (Pelly) River. Winnipeg, 1885.

The post, thus abandoned, was not again re-occupied. It had become unnecessary, owing to the leasing of the "coast strip" of Russian America by Sir George Simpson for the Company, in consequence of which the trade of the interior was entirely controlled on both sides by the Company.

From that time the country appears to have been practically forgotten until 1872, when the discovery of gold by Messrs. Thibert and McCulloch brought about an entire change in its conditions. Henry Thibert, a French-Canadian, left the Red River country in 1869 on a hunting and prospecting expedition to the west. In 1871 he met McCulloch, a Scotchman, and together they passed the winter near the abandoned site of Fort Halkett, on the Liard River, suffering in their turn severe hardships from scarcity of food. Near this place, probably on what was known afterwards as McCulloch's Bar, gold was first found. In 1872 they reached Dease Lake, having been informed that it was a good locality for fish, with the intention of securing a sufficient supply for the ensuing winter. Being told, however, by the Indians, that white men were engaged in mining on the Stikine not far off, they crossed by the trail from the head of the lake and reached the mining camp at Buck's Bar. Early in 1873 they set out on their return to the original discovery of gold, but meeting with success on Thibert's Creek, at the lower end of the lake, they were deterred from going further, and remained working there during the summer, being joined afterwards by thirteen other miners from the Stikine. Dease Creek was discovered during the same season, and Captain W. Moore was among the first to begin work there. Thibert is still mining in Cassiar, but McCulloch lost his life some years since on a winter journey on the Stikine.

In 1874 the population, exclusive of Indians, was estimated to have reached 1500. The placers of McDame Creek were discovered. Miners descended the Liard for a long distance, and worked McCulloch's Bar and other river bars. The little town of Laketon was built at the mouth of Dease Creek, and beef cattle were for the first time brought across country from the Upper Fraser. The total yield of gold from the district (which, from a mining point of view, includes the Stikine) is roughly estimated to have been equal to $1,000,000.

In 1875 the population is estimated to have been 1081, and the yield of gold equalled about $830,000. Three hundred head of cattle were brought from the Fraser overland. This and the preceding season were the best years of the district. Prospecting was actively carried on in outlying regions, Sayyea Creek being discovered near the Liard head-waters, and the Frances River also apparently examined.

Owing to the flattering accounts sent out, a great influx of miners occurred in 1876, the population being at one time estimated at 2000. Profitable work could not, however, be found for so many men, and the yield of gold fell to $499,830. Walker Creek, said to be from seventy to eighty miles east of McDame Creek, was discovered, but that stream never proved very remunerative. Defot Creek was also found, and in 1878 proved rich for a limited area.

Since that time the production of the district and the number of miners employed have gradually declined, and no important new creeks have been discovered, though reports of their existence have from time to time been circulated. The Black or Turnagain (Muddy) River is the most recent of these, some attention being drawn to it in 1886.

Though the region about Dease Lake is as a whole rather low, with isolated mountains and ridges here and there prominent, that to the east and north-east is different, being studded with rugged mountains, and constituting an important mountain range with north-west and south-east trend, and a transverse width of nearly fifty miles. This range appears to represent a continuation of that named in various maps the Peak Mountains or Blue Mountains, but as its connection to the south-eastward is as yet uncertain, and as neither of these names possesses either a distinctive character or any special fitness, I believe it will be most appropriate and convenient to call the range the *Cassiar Range*, and shall accordingly so designate it.

The entire length of the Dease River is one hundred and ten miles, but following all the sinuosities of the stream, one hundred and eighty miles.

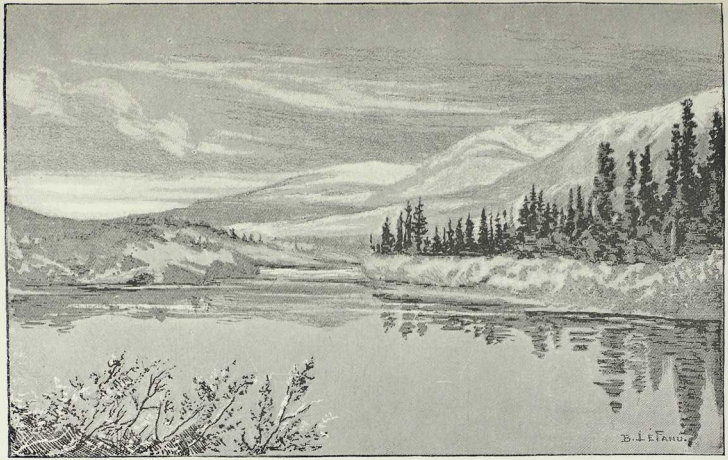
The height of Dease Lake, as previously stated, is 2660 feet. That of the confluence of the Dease and Liard is about 2100

feet. The velocity of the current was estimated at three miles an hour, as a general average, but there are several little rapids, as well as some rather long tranquil reaches.

The river, from Dease Lake to the Liard, may easily be descended in two days, but the ascent is a comparatively slow process, depending much on the height of the water, and, when the bars and beaches are not bare for tracking, is a tedious affair. It is possible that the river might be navigated by small stern-wheel steamers of good power, as there are no insuperable obstacles, but doubtful whether such an enterprise would be a remunerative one, even if the traffic were to assume proportions much greater than at present. Such goods as are now required at McDame Creek (fifty-five and a half miles below Dease Lake by the course of the stream) and at the little trading post at the mouth of the river, are easily taken down stream in large flat-bottomed boats, which go back light, by poling and tracking, without great difficulty. The boating on the river has been done principally by crews of Coast Indians, who are engaged and brought into the interior for the purpose.

On leaving Dease Lake, the river is a small stream, averaging from 100 to 150 feet only in width, extremely tortuous and rather swift, meandering in a wide, flat valley. At about eight miles from the lake it enters the mountains, the valley at the same time gradually narrowing and becoming bordered by mountains from 4500 to 5000 feet in height. At thirteen miles from Dease Lake, it expands into a little lake about a mile and three quarters in length, and between this and the mouth of Cottonwood Creek it flows through three more similar lake-like expansions. These are probably formed in all cases by the partial blocking of the valley by *débris* brought in by tributary streams, of which Cottonwood Creek itself is the last and most important. These lakes constitute impediments to navigation, as they freeze over in the autumn long before the ice takes on the river, and remain frozen till late in the spring.

Dease River rapidly increases in size, and soon doubles its volume, owing to the number of affluent streams, of which Cottonwood Creek is the first which may be called a river.



DEASE RIVER ABOVE "FIRST LAKE," LOOKING WEST.

This stream occupies an important valley, bordered by high ranges. No paying deposits of gold have ever been found either on this or on Eagle River, which enters the Dease from the south about four miles further down. Eagle River also flows between high mountains, and its valley appears to be parallel to, and analogous with, that occupied by Dease Lake. It is evidently the "Christie River" of McLeod,[1] but this name has entirely passed out of use, and it appears hopeless to endeavour to reinstate it. Cottonwood Creek is shown on Arrowsmith's maps, according to McLeod and Campbell, but is not named.

There is a considerable development of terraces at high levels on the sides of some of the mountains, particularly in the part of the valley which runs along the base of the Skree Range. Well-marked terraces were here seen on the west side of the valley, at an estimated height of 2000 feet above the river, or about 4600 feet above the sea.

Immediately below the mouth of Cottonwood Creek is the Cottonwood Rapid, in which the course of the river is impeded by a number of boulders. The rapid is not a formidable one, or at all dangerous to run, with ordinary care. The river below Cottonwood Creek runs nearly due east for about ten miles, with a rather strong current. It then turns more to the northward, and after making several large flexures, reaches Sylvester's Landing, at the mouth of McDame Creek, in about eight miles. Immediately opposite the mouth of McDame Creek is a remarkably prominent and abrupt rocky mountain, which it is proposed to name *Sylvester Peak*. Its height was estimated at 7000 feet, but the circumstances did not admit of its measurement.

Sylvester's Landing is the point of supply for the miners on McDame Creek, also a post for Indian trade. McDame Creek was discovered to be auriferous in 1874. It has since been constantly worked, and, with its tributaries, has yielded much gold, but is now believed to be nearly exhausted. Its valley

[1] I have endeavoured in all cases to identify the original names given by the first explorers in this country, and also to ascertain the native names of places, but where these have passed entirely out of use by the miners and traders now in the country, it becomes necessary to drop them, though in so doing the strict law of priority is, no doubt, transgressed.

is wide and important, running north-westward for about seven miles, and then turning nearly due west.

The mountains bordering McDame Creek, viewed from Sylvester's Landing, are singularly different from any before met with. They are evidently composed for the most part of limestone, and characterized by the occurrence of long, bare slopes of shattered rock-fragments. They are scarcely at all wooded, and in this respect resemble the bare limestone crests of parts of the Rocky Mountains in more southern latitudes.

Potatoes and turnips of large size are grown every season without difficulty on McDame Creek.

Nine miles below Sylvester's, the Dease makes its great bend toward the north, the intervening portion of the river somewhat changing its character from that above described, rock exposures being comparatively frequent in its banks and bed, where they produce several little rapids. Forty-mile Creek enters from the south at somewhat less than the specified distance below Sylvester's. It appears to be the "Stuart River" of McLeod, shown on Arrowsmith's map of 1850, but neither on this nor on that of 1854 is McDame Creek indicated. Sylvester's trail to Turnagain or Black River (Muddy River of miners) runs up this valley, and follows a tributary—Sheep Creek—to the south-eastward, passing near the base of *Sheep Mountain*, a high rugged peak estimated at 8000 feet, situated about five miles and a half south of the Dease. The distance to the trading outpost on Turnagain River is estimated at ninety miles, but is probably less. Horses are employed in packing over the trail.

The valley of the Rapid River joins that of the Dease at its great bend, just alluded to, but the stream, running parallel with the Dease for some distance, enters it several miles lower down.

The northerly course of the river carries it very obliquely through the eastern portion of the Cassiar Range. The quantity of snow resting upon the mountains was observed to be very small, and Sylvester successfully winters his horses here, without cutting hay or otherwise providing for them, the depth of snow in winter being so small that it does not seriously interfere with grazing. This favoured district is, in

fact, homologous with that in the vicinity of Telegraph Creek, being in the dry lee of the Cassiar Range, just as that is in a similar situation with respect to the Coast Mountains. Much of the valley, with the slopes of the hills, is open or partially wooded with groves of black pine (*P. Murrayana*) and aspen poplar. The grass has the tussocky bunch-grass character usually found in dry regions, and it is intermixed with the small sage (*Artemisia frigida*). The bear-berry (*Arctostaphlyos uva-ursi*) is not uncommon, and the strawberry and lupin (*Lupinus Nootkatensis*) were in flower. *Anemone patens* was here also observed for the first time, but long past flowering. Making allowance for the time occupied in reaching this place from Telegraph Creek, the progress of vegetation here was palpably less advanced, but the showing was still a remarkable one for the latitude, elevation and distance from the sea of the region.

Below the Rapid River the Dease becomes relatively wide, with numerous gravel-bars, and in some places many islands, with frequent "drift piles" or accumulations of timber. Terraces are well shown on the sides of the mountains, and reach a height of about 2000 feet above the river.

A few miles before reaching the second great bend, a stream joins from the west, which has become known to the miners as French Creek, and is probably the "Detour River" of old maps. It rises on the north-east slope of the Cassiar Mountains, and is not large.

The last main reach of the Dease extends from the second great bend to its mouth, a distance of thirty-one miles in a direction of N. 55° E. Though the course of the river is far from being direct, the general bearing leaves the base of the Cassiar Range nearly at a right-angle. In descending this part of the river, the mountains soon become invisible from the river-valley, which is bordered by undulating lowlands, or low diffuse hills which rise to a plateau at some miles distant, from 400 to 500 feet above the stream. Banks of frozen soil were seen in one or two places beneath a peaty or mossy covering. The climate is evidently more humid than before, and less favourable to vegetation. The current of the river is swift, and there are two or three inconsiderable rapids, but none of impor-

tance till within about four miles of the mouth, where there are several strong rapids; these at certain stages of the water are reported to be dangerous, and in all our boats shipped more or less water. Terraces, as much as 300 feet in height, approach the river in some places in this part of its course, and when cut into generally show stratified gravels which sometimes rest directly on low exposures of rock.

The larch (*Larix Americana*) was first seen five miles below the second great bend, and below this place becomes quite abundant in cold, swampy spots, where it grows with the black spruce (*Picea nigra*).

Blue River (the "Caribou River" of Campbell) joins the Dease twelve miles below the second great bend. It is a stream fifty feet wide at the mouth, with clear water, and derives its supply from the north-eastern slopes of the Cassiar Range, to the north of French Creek.

The "Lower Post," which is the furthest outwork of "civilization" or trade in this direction, is situated at the edge of a terrace forty feet in height on the left bank of the Liard, about half a mile above the mouth of the Dease. It is of a very unpretentious character, consisting of a few low log buildings. In the vicinity the woods have been entirely destroyed by fire.

The Liard River is said to open, as a rule, from the 1st to the 5th of May, though in 1887 this did not occur till the 18th of that month. In the autumn of 1886 it was frozen over on November 21st.

It would be impossible, without the expenditure of much time, to make anything like a complete geological section on the line of the Dease, the main geological features are, however, sufficiently apparent.

At the first little lake, a granitic area is entered, which may be regarded as constituting the axis of the Cassiar Range, and which extends on the river to the mouth of the Cottonwood, constituting the entire Skree Range, and apparently also Anvil Mountain and the surrounding high mountain region, with a transverse width of about thirteen miles. The granite here differs somewhat from that found on the Stikine in being more highly quartzose and occasionally garnetiferous. Mica is present in great abundance, and is in some specimens black, in others of

characteristic pale, silvery colours. The existence of distinctly gneissic rocks was not ascertained, but the lithological character of the series resembles that of the lowest rocks of Shuswap Lake and other districts in the interior of British Columbia to the south, which have been provisionally referred to the Archæan.

The valley of Cottonwood Creek appears to coincide with the north-eastern edge of the granites for a number of miles. The mountains to the north of it, and extending eastward along the north side of the Dease, are evidently composed of stratified rocks, including important beds of limestone, the average dip being about N. 45° E.< 30°. The northern spur of the mountain which terminates the Skree Range, opposite the mouth of Cottonwood Creek, shows the overlap of the stratified rocks upon the granites at a considerable height above the river. The mountains which run southward on both sides of Eagle River valley seem to be also granitic for the most part, though a greenish-grey felsite was collected on the river from the northern spur of the mountain to the east of the valley.

Little was ascertained respecting the rocks composing the mountains between Eagle River and Sylvester's Landing, but granite does not reappear in them.

Eleven miles south of the second great bend, on the right bank of the river, is a low, rocky cliff, about fifteen feet above the water, capped by about ten feet of bedded white silts. The rocks are blackish, sandy shales, rather hard in some places, carbonaceous, and holding a little impure lignite. They are extremely irregular in dip, and are broken and jumbled up with a hard, grey quartzite, which is seen in places as the underlying rock, but is even then singularly shattered. The aspect of the shales is that of those of the Tertiary rocks, and it is possible that this locality represents an old shore-line, but more probable that the rocks form part of an ancient slide, or are upon the line of disturbance of a fault.

From the second great bend to the mouth of the Dease, the underlying rocks consist of grey and black schists, the former generally calc-schists, and the latter more or less highly carbonaceous. They are interbedded with thin limestones, which often weather brown. The calc-schists are frequently glossy, and in some places form very thin, paper-like layers. Some of

these rocks closely resemble those met with at the "Grand Rapid" on the Stikine. The general strike is north-west by south-east, but the direction and angle of dip is very varied, and the beds are frequently much disturbed and twisted, and traversed by veins of quartz and calcite. There are probably frequent repetitions of the same horizon, but the general arrangement may be synclinal, the dark shales and schists occupying the higher position, and being most abundant about the middle of this length of the river-section. Graptolites were found in the dark shales, particularly at a locality in a north bend of the river, eleven miles westward in a direct line from the mouth, and in appearance the whole series is much like that of the Cambrian calc-schists and Cambro-Silurian graptolite-shales of the Kicking Horse (Wapta) valley, west of the summit, on the line of the Canadian Pacific Railway.

The general aspect and association of the rocks to the east of the granite axis of the Cassiar Range closely resembles that of the Rocky Mountains about the 51st parallel, but differs in the large proportion of metamorphic materials of volcanic origin, which, from the *débris* brought down by streams, must be even more abundant than the exposures along the river would indicate. This difference is paralleled by the similar change which is met with on the 51st degree of latitude, in passing from the Rocky Mountains proper to the interior plateau of British Columbia.

A small collection of graptolites, made at the point above indicated, has been submitted by Mr. J. F. Whiteaves to Prof. Charles Lapworth, of Mason College, Birmingham, who has kindly examined them, and furnishes the following note:—

"The graptolites collected by Dr. Dawson from the Dease River are identical with those examined by me from the rocks of the Kicking Horse Pass, some time last year. The species I notice in the Dease River collection are:—

Diplograptus euglyphus (Lapworth).
Climacograptus, comp. *antiquus* (Lapworth).
Cryptograptus tricornis (Carruthers).
Glossograptus ciliatus (Emmons).
Didymograptus, comp. *sagittarius* (Hall).
New form allied to *Cænograptus*.

"The graptolite-bearing rocks are clearly of about middle Ordovician age. They contain forms which I would refer to the second or Black River Trenton period, i.e. they are never newer than the Point Levis series and older than the Hudson and Utica groups. The association of forms is such as we find in Britain and Western Europe, in the passage-beds between the Llandeilo and Caradoc limestones. The rocks in Canada and New York with which these Dease River beds may best be compared are the Marsouin beds of the St. Lawrence valley and the Norman's Kill beds of New York. The Dease River beds may, perhaps, be a little older than these.

"Mr. C. White describes some graptolites from beds in the mountain region of the west, several years ago, which may belong to the same horizon as the Dease River zones, though they have a somewhat more recent aspect.

"The specific identification of the Dease River fossils I regard as provisional. While the species correspond broadly with those found in their eastern equivalents, they have certain peculiarities, which may, after further study or on the discovery of better or more perfect specimens, lead to their separation as distinct species or varieties.

"It is exceedingly interesting to find graptolites in a region so far removed from the Atlantic basin, and also to note that the typical association of Llandeilo-Bara genera and species is still retained practically unmodified."

Overlying these old rocks, in several places at about eight miles from the mouth of the Dease, are shaly clays and coarse, soft sandstones, associated with which a thin bed of lignite was observed. These are evidently Tertiary, and referable to the series afterwards found more extensively developed on the Liard, above the mouth of the Dease. Some very obscure remains of leaves were noticed, but none were collected. The beds dip at various angles, sometimes as high as 15°, and thus appear to have been, to some extent, affected by flexure subsequent to their deposition. It is not improbable that a considerable part of the higher plateau by which the river is here bordered on both sides, is composed of these newer rocks resting upon the upturned edges of the schists.

CHAPTER VII.

Name of the Liard River defined—The Liard and Frances ascended as far as Simpson Lake about 1834—The same route to Frances and Finlayson Lakes explored in 1840—Geographical information obtained—Width and velocity of the Upper Liard—General bearing of the Liard and Frances Rivers—The Lower Cañon—Formation of the rocks—Islands at the confluence of the Liard with the Frances River—The Liard subject to freshets—Trend of the valley above the confluence—Sayyea Creek—Good gold "prospects" found in this creek—Other tributaries of the Liard—Composition of gravel bars and shores of the Liard—Favourable indications in respect of mineral development—Gold found in layers of gravel deposit—Average width and rate of current of the Frances—The Middle Cañon—General course of the river above the Middle Cañon—Simpson Lake—Indian map of the tributary system—An attractive field for further exploration—False Cañon—Simpson Mountains—Formation of the mountains in the vicinity of the Frances—Upper Cañon, the last serious impediment to navigation—Rocks of the Upper Cañon—The river from the Upper Cañon to Frances Lake—Moose Island—Difference of level between Frances Lake and the mouth of the Dease—Elevation of Frances Lake—Simpson's Tower—Campbell Mountains—Resemblance of Frances Lake to a large number of lakes in British Columbia—Natural beauty of Frances Lake—Thomas River—Abundance of fish—Character of the country and mountains surrounding the lake—Composition of the central parts of the Toot-sho Range—Promising aspect of surface gravel at the mouth of the Finlayson River.

THE name of the Liard River, or Rivière aux Liards, refers to the abundance of the cottonwood or poplar, and was no doubt originally given to its lower portion. This name has been corrupted to "Deloire," in which form it is generally in use by the miners of the Cassiar country. It is often spoken of as the West Branch by traders on the Mackenzie, and has also been named the Mountain River, and sometimes the Great Current River or Courant-fort. It is called Too-ti' by the Indians of the country along its upper part, while according to Petitot, the Indians nearer the Mackenzie name it Eréttchichié and Thèttadéssè.[1]

This river and the Frances appear to have been ascended by McLeod, about 1834, as far as Simpson Lake, but in 1840 Mr. R. Campbell explored the same route to Frances and Finlayson

[1] Bulletin de la Société de Geographie, vol. x., p. 152.

Lakes (as subsequently mentioned in greater detail), and obtained the most accurate geographical information available to the present time. Sir J. Richardson, however, in his Arctic Searching Expedition (1851) gave such particulars of the Liard as he was able to gather from hearsay (Vol. i., p. 167; ii., p. 203), and mentions having received in 1848, while on the Mackenzie, Honolulu papers of late date by this route from the Pacific. On the older maps, the Black or Turnagain River is designated as the main continuation of the Liard, but it is much smaller than the "North-west Branch" of these maps, to which the name is now applied.

The Upper Liard, just above the mouth of the Dease and opposite the post previously referred to, is 840 feet in width, and on the 24th of June, 1887, was found to have a maximum velocity of 4·54 miles per hour. It is a turbid yellowish stream, and contrasts in this respect with the clearer water of the Dease, which river, at the confluence with the Liard, probably carries about half the volume of water above assigned to the latter.

From the mouth of the Dease River to the confluence of the Frances River, the general bearing of the Liard is nearly due north-west, the distance, in a straight line, being thirty-three miles, or following the course of the river, forty-five miles. The Frances River, which was followed from the last-named point, disregarding its minor flexures, has a nearly direct north-and-south course. A straight line drawn from the mouth of the Dease to the Lower end of Frances Lake is ninety-four miles in length, but the distance between these points, following the flexures of the river, is one hundred and thirty-five miles.

Six miles above the mouth of the Dease, by the course of the river, the entrance of the *Lower Cañon* is reached. The cañon is three miles in length, and at high water it is said to be necessary to portage the whole of this distance. We were obliged to lighten the boats and make four small portages over rocky points, where the current was dangerously swift. The latitude, observed at noon near the middle of the cañon, was 60° 01′ 09″. Finding that we were so near the northern boundary of British Columbia (lat. 60°), we made a small cairn of stones on a prominent rocky point; a post was erected in the centre, and on this the latitude was marked. The 60th

parallel may be said to coincide almost exactly with the lower end of the cañon.

The rocks in the Lower Cañon resemble those described as characterizing the lower part of the Dease River. Quartzites are also present, and all the rocks are occasionally locally silicified. The whole series is much disturbed and contorted, and is broken by innumerable small, irregular seams and veins of quartz and calcite with some dolomite, though no well-marked or important lodes were seen. Galena is reported to have been found in some of the veins, and to have yielded a small return in silver on assay.

The Liard is full of islands at its confluence with the Frances, rendering it difficult to estimate the relative importance of the two streams, but they appeared to carry about an equal quantity of water. The Liard is, however, evidently more subject to freshets; Frances Lake doubtless serving to regulate the flow of the Frances River, which is of a clear, pale, amber colour, and does not thoroughly mingle with the yellowish, turbid water of the Liard for some miles. Above the confluence, the Liard valley is seen to trend off in a south-westerly direction for ten miles or more, after which it again turns to the north-westward, and, from the scanty information available concerning it, seems to flow along the eastern side of the northern continuation of the Cassiar Range, from which it receives most of its water.

Sayyea Creek, which is an inconsiderable stream, flows in from the west about fifty-five miles above the mouth of the Frances. Good gold "prospects" were found on this creek in 1873, a number of pieces worth ten dollars having been obtained, but little work has ever been done. Of a party of miners who spent the winter of 1874-5 in its vicinity, four died of scurvy. Of the other tributaries of the Liard, which must be numerous, I have been unable to ascertain anything authentic.

The gravel-bars and the shores of this part of the Liard are almost half composed of rolled quartz pebbles, which have evidently been derived from veins traversing relatively soft schistose rocks like those of the cañon. The great quantity of such vein material present in this district may be regarded as a favourable indication in respect of mineral development. Some

small bars have paid to work along this part of the river, and gold is also found in some layers of the gravel deposit which overlies the older rocks along the cañon and above it, where "wages" at $4 a day can be made. The amount of cover which it soon becomes necessary to remove in following the paying layers, has prevented extensive mining, but probably these gravels might be advantageously worked as a whole, by sluicing or by the hydraulic method.

For the first few miles above its mouth the Frances is extremely tortuous, so much so that the distance following the actual course of the river to the foot of the cañon is twenty-two miles. This river, like the Liard, was at a medium stage near the end of June, 1887. Marks along the banks showed that it had been about six feet higher in the spring, and that it had since been falling. Its average width in this part is about 600 feet, and the rate of the current, at the medium stage above referred to, about four miles and a half an hour.

The highest land immediately bordering on this part of the river is a terrace at a height of about 150 feet above it, the surface of which is in some places composed of almost pure sand, upon which open woods of *Pinus Murrayana* grow. Larch was observed to be moderately abundant in damp, shady localities, and the banks were in some places diversified with flowers, of which *Potentilla fruticosa* and *Primula mistassinica* were specially noted.

Quartz is not so abundant a constituent of the gravel of the river-bars on this part of the Frances as it is on the Liard below, and no basalt blocks or boulders were observed here.

The *Middle Cañon*, as it may be called for the purpose of distinguishing it, is about three miles in length, the river being hemmed in by broken, rocky cliffs of 200 to 300 feet in height for the greater part of this distance. We took our boats up along the south-east bank, making four short portages of part of the stuff, and two of both boats and load, across narrow, rocky points. One portage of greater length, on the opposite bank, would overcome all the really bad water, but the banks on that side are rougher, and the whole force of the current sets against the cliff in one place in a dangerous manner. The total fall in the cañon is estimated at about thirty feet.

Above the Middle Cañon, the general course of the river is again north-north-westward for about twelve miles. It is usually bordered by quite low land on both sides, and the valley between the southern end of the Simpson Mountains and northern part of the Tses-ī-uh Range is about three miles in width. The wide, uniform plateau country is now, however, left behind, and we enter a generally mountainous region, though the highest summits in this immediate vicinity scarcely exceed 3000 feet above the river. Their forms are rather rounded and flowing, and the slopes of those on the east bank are nearly bare of trees, while the opposite range is generally wooded, but evidently with trees of small growth. The river itself is wide and deep, with a rather slack current.

Near the end of this reach of the river, two considerable streams enter on the west side, and on one or other of these, at no great distance from the river, Simpson Lake of McLeod and Campbell is situated. As the Indians who had accompanied us from the mouth of the Dease had deserted before we reached this place, I was unable to ascertain any definite particulars respecting the lake, though it is reported to be a good one for fish. The position of Simpson Lake, as indicated by broken lines on the map, must therefore be regarded as quite uncertain. The same doubt applies to the Indian names of several rivers tributary to the Frances above this point, for although one of the local Indians had made an elaborate charcoal drawing of the whole system for us, upon a sheet of canvas used as a boat cover, it proved to be extremely difficult to recognize the features represented. The Indian map, such as it is, serves to show that the streams tributary to the Frances River rise in a number of lakes; some of these are reported to be of considerable size, and offer a most attractive field for further exploration. We were told, however, that none of the lakes in this region are equal in size to Frances Lake, for which we were heading, a statement borne out by the circumstance that both this and Dease Lake are known in their respective districts as Too-tsho, or "big lake," while the Frances and Dease Rivers are, as already mentioned, both similarly named Too-tsho-tooa', or "big lake river."

From the point just noted, the direction of the river changes

to north-east, cutting across the direction of the Tses-ī-uh Range, which terminates at the edge of the river in low, wooded hills. The current is moderately swift throughout, and in one place the river is bordered on both sides by low, rocky banks, but no rapids are met with. This we named the *False Cañon*. One or possibly two streams enter from a valley which runs to the east of the range just mentioned, but they are not of large size. Greyish-green, quartzose mica-schist and greenish silvery schists were seen in one or two places, and in the low rocky banks above alluded to, blackish argillites and grey quartzites, of a less altered appearance than usual, but from which no fossils were obtained, occur.

From the end of this reach the general course of the stream again becomes north-north-west for about thirteen miles, running for the greater part of this distance parallel to, and a mile or two miles from the base of a mountain range, which comes in to the east of the Tses-ī-uh Range. The country to the west of the river is here either flat or characterized merely by low, rounded and wooded hills for many miles back, the eye ranging across this country to the continuation of the Simpson Mountains, which, with generally rounded forms and no striking summits, reach elevations of 6000 to 6500 feet. These mountains do not form a strictly connected range, but appear rather as a series of mountainous areas, separated by wide, low passes. The Indian map above referred to shows three or four lakes in this region, supplying a stream named *Too-tshī-too-a*, which flows into the Frances, reaching it probably just above the Upper Cañon. None of these lakes were visible from any point reached by us. On the opposite side, one stream of considerable size joins the Frances. This is supposed to be the *Agā-zī-za* of the Indians, and, if so, is represented as rising in a chain of small lakes, some of which drain in an easterly direction to the Macpherson (*Eg-īs-e-too'-a*) River. The valley occupied by these lakes is a travelled route employed by the Indians.

The current is swifter in the upper than in the lower portion of this part of the Frances, and there are numerous islands in the river, but no rock-exposures occur. The mountains to the east of the river are high, but have blunt, rounded forms.

Much bare rock shows in their sides, but there is no appearance of stratification, and this, with their form and colour, and the great abundance of that material found in the streams in this vicinity, renders it nearly certain that they are composed of granite.

The mountains so far met with in the vicinity of the Frances form rather isolated ranges or masses, which rise somewhat abruptly from generally low country, or are separated by wide valleys, the appearance being that of a mountain system partly buried in later deposits; though no Tertiary rocks, either in place or as loose fragments, are met with above the Middle Cañon. The granitic mountains last referred to form an outlying spur or buttress of the most important range of the district, the axis of which is here about twelve miles east of the river. This it is proposed to designate the *Too-tsho Range*.[1] The southernmost high summit observed was named, from its form, *Tent Peak*. It is situated in latitude 60° 52′ 45″, and has an altitude of 7860 feet above the sea.

The river next makes an abrupt turn to the west for four miles, a mile and a quarter of this distance being occupied by a series of rapids, which are rocky and rather strong, and have a total fall of about thirty feet. The banks rise steeply from the river to heights of 100 to 200 feet, though the rocky cliffs along the water are of inconsiderable height, scarcely anywhere exceeding fifty feet. This place may be named the *Upper Cañon*, and is the last serious impediment to the navigation of the river. We found it necessary to make several short portages, but with a large boat and at a good stage of the river, it is probable that one portage of about a thousand feet in length, on the south bank, would overcome all the dangerous water, while the boat might be tracked up light. A stream, with moderate current at the mouth and about fifty feet wide, enters a short distance below the cañon, coming from the mountains to the north of Tent Peak. The rocks of the Upper Cañon comprise black, glossy calc-schists, black quartzite or chert, bluish limestone, and some green-grey silvery schist. Similar rocks are seen again a couple of miles up the river, above the cañon, where a

[1] From the native name of Frances Lake. I was unable to ascertain the Indian name of this range, if indeed it has any such.

rapid occurs. The dips are all low, and, so far as observed, uniformly in a northerly direction. Some of the schists are highly silicified by action subsequent to their deposition, and parts of all the rocks, including the limestone, are reticulated with narrow quartz seams. Near the upper part of the cañon some hard conglomerates occur, holding schistose fragments, as well as limestone pebbles, in which crinoidal joints are observable. It is not improbable that two unconformable series of rock occur here, but I was unable to find means of distinguishing them in the sections.[1]

From the Upper Cañon to Frances Lake, a distance of twenty-one miles and a half in a straight line, the river maintains a northerly direction with considerable uniformity. It is deep, with a moderate current, for about eight miles, or to *Moose Island*, above which for ten miles the current is again swift, averaging from four and a half miles to five miles an hour. It again becomes slack for a short distance below the lake. Some portions of this part of the river are much broken up by islands and gravel-bars.

Our actual working time on Frances River, from its mouth to the lake, was sixty-seven hours and a half. The difference of level between Frances Lake and the mouth of the Dease is 477 feet. By assigning ninety feet to the fall in the three cañons, and dividing the remainder by the total length of the river (less the aggregate length of the cañons), we obtain an average rate of descent very slightly exceeding three feet to the mile, which is about what might be anticipated from the current met with in the river, as compared with that of other streams in the district.

The elevation of Frances Lake above the sea, as determined by a series of barometer observations extending from the 8th to the 16th of July, is 2577 feet. Three miles from its lower end the lake bifurcates, forming two approximately equal and nearly parallel arms, with lengths of about thirty miles. The two arms are about eight miles apart, and are separated by a group of low, rounded mountains; the culminating point, with an elevation of 5230 feet, was named Simpson's Tower by

[1] If so, the rocks here noted may represent the Cretaceous to which they are lithologically similar.

Campbell, the lake itself receiving its name at the same time in honour of Lady Simpson. The eastern side of its east arm is bordered by the Too-tsho Range or hills attached to it, while the country to the west of the west arm rises more gradually to the bases of the Campbell Mountains, some miles distant. Though so far referred to as a single lake, this body of water is in reality entitled to be considered as a group of lakes. It appears best, however, to retain Campbell's original name for the whole body of water, rather than to multiply names for which there is no immediate call.

Frances Lake closely resembles a large number of lakes in the mountainous regions of British Columbia, and has the long narrow parallel-sided outline characteristic of lakes occupying old valley-excavations, the drainage of which has become interrupted in various ways. In this case, as in a number of others, there can be little doubt that the lake is held in by morainic accumulations.

Except along the upper part of the eastern side of the east arm, the mountains do not slope down abruptly to the shores of the lake. Elsewhere, the lake is almost continuously bordered by a terrace-like plateau, which is widest to the west, and has an average elevation of about 300 feet. This resembles the low country about Dease Lake, though even more uniform and less sloping in character, and is not far from the same actual elevation above the sea in both cases. The streams entering the lake generally cut down through the edges of this plateau-like margin, in deep narrow gorges; the sections show that it is composed largely of rock, though levelled up to some extent by the addition of superficial gravelly deposits. There is, in addition to this, a second lower terrace, not so well marked, and not often of great width, at an elevation of ninety feet above the lake. This is seen on both arms, and is composed of gravel and other detrital deposits.

Few lakes which I have seen surpass Frances Lake in natural beauty, and the scenery of the east arm, bordered on the east by the rugged masses of the Toot-sho Range, is singularly striking. The mountains of this range are very varied in form, and a number of points surpass 7000 feet in height, while one was found to attain an elevation of about

9000 feet. This is named *Mount Logan*, for the late Sir W. E. Logan. Heavy masses of snow rest in some of the valleys, but no true glaciers are produced, a fact indicating a comparatively small snowfall.

The west arm terminates in a nearly circular basin about a quarter of a mile in diameter; at one side of this a fair-sized river, easily navigable for boats, flows in. The east arm was not followed to its head, though its termination in low land was seen. Here also, according to Campbell's sketch, a considerable river, which he has named Thomas River, enters.

The two valleys, the lower parts occupied by the east and west arms of the lake, run on far beyond the heads of these arms. Each of the rivers flowing in these valleys eventually bifurcates, and all four streams thus formed rise in lakes. The river flowing into the head of the west arm is named *Yus-sez'-uh*, and the lake on its western branch is known as *Us-tas'-a-tsho*. No name was obtained for the lake on its eastern branch, which is evidently, however, Macpherson Lake of Campbell.

The mountains to the north in which these rivers rise, were too distant to enable us to fix them with any great accuracy from points occupied by us on Frances Lake, but the whole country in that direction, from such views as were obtained of it, appeared to be rugged and high.

The water of Frances Lake is clear and of a pale, brownish tint, and the lake is evidently very deep in its upper portions, though rather shallow where encumbered by the morainic accumulations already alluded to, and it does not appear to be subject to very great fluctuations. Driftwood is very abundant along some parts of the shores, particularly in the west arm, and it is probable that much of this is brought down by the river entering at the head of this arm. Lake-trout, white-fish, pike, and suckers were found in the lake in considerable abundance.

The site of the old Hudson Bay post is just above the narrow entrance to the east arm, on the edge of the bank, facing westward. Though Mr. Campbell had given me an accurate description of its position, it was so completely overgrown with bushes and small trees, that it was discovered with difficulty.

The outline of the old stockade, with bastions at the corners, is still visible, though all traces of the structure itself has disappeared. This post has been abandoned since 1851.

All the lower country about Frances Lake is well wooded, and the mountains are also covered with forest, save where exceptionally steep and rocky, to a height of at least 1500 feet above the lake, while trees of smaller growth extend in the valleys considerably higher. The most abundant tree, here as elsewhere in the region, is the white spruce (*Picea alba*). It frequently attains a diameter of two feet, growing tall and straight on low ground and in sheltered places. The black spruce (*Picea nigra*) is also abundant. The larch (*Larix Americana*) is characteristic of damp, cool, northern slopes, and birch (*Betula papyrifera*) is moderately abundant, though not large. The shores, and particularly the delta-flats at the mouths of streams, are characterized by groves of cottonwood (probably all referable here to *Populus balsamifera*) and black pine (*Pinus Murrayana*).

Large tracts of country have been burnt over, many years ago, and extensive recent fires have swept the western side of the upper part of the east arm. Where a second growth has had time to spring up, it generally consists of mixed spruce, aspen and birch. Alders are common, but scarcely arboreal, along the borders of the lake. In the middle of July thickets of wild roses in full bloom were seen in many places.

Taken as a whole, the growth of the forest and appearance of the country is remarkably pleasing, considering the high and northern position of the lake. The only characteristic difference of the woods here, as compared with those of the interior of British Columbia about the 54th parallel, is the great abundance and depth of the soft, mossy and lichenous floor which is everywhere found in them. The trees are also often well bearded with moss, affording evidence of a continuously moist atmosphere, to be accounted for by the almost daily occurrence of light showers and the great prevalence of clouded skies, which was found throughout this part of the country. As before noted, however, the snowfall cannot be great, nor is there any indication that the total annual precipitation is very considerable.

The high rugged central parts of the Too-tsho Range are composed largely or entirely of grey granite; its pebbles and boulders everywhere abundant, and particularly so along the beaches of the east arm. There is, too, a notable abundance of quartz along all the beaches of the lake, this material being derived from innumerable veins which traverse the schists in all directions, though most often found parallel to the bedding-planes, and generally assuming forms more or less lenticular. The largest of these are often several feet in width, and those seen in the cañon of the Finlayson, near its mouth, are of workable dimensions, if only moderately rich in gold. Specimens of quartz veins, containing some iron and copper pyrites, from the east side of the east arm about midway up it, were found to contain traces of gold on assay by Mr. Hoffmann.

In general appearance the rocks of Frances Lake very closely resemble those from which the rich placer gold deposits of Dease Lake are derived, and they are probably of about the same age. Several "colours" to the pan were obtained from surface gravel at the mouth of Finlayson River, which struck me as specially promising in aspect, and there seems to be no reason why some of the streams flowing across the schistose rocks into the lake or in its vicinity should not prove to be richly auriferous. This entire district well deserves careful prospecting. After my return to the coast, in the autumn, I ascertained from Charles Monroe that he and some other miners had actually done some prospecting in the vicinity of the lake at the time when the Cassiar mines were yielding largely, and the more enterprising men were scouring the country in search of new fields. He reached the lake from Cassiar by the same route we had followed. On comparing notes, we found that he had worked for a short time at the mouth of the Finlayson, where he found the gravel to pay at the rate of from $8 to $9 a day.

CHAPTER VIII.

Arrival at Frances Lake—Difficulties of overland journey towards the Pelly—Search for the trail used by the Hudson Bay Company—No sign of a trail discovered—Indian assistance unobtainable—The expedition compelled to make the best of its own resources—Continuation of journey—Slow rate of progress—Finlayson Lake eventually reached—Observations taken—Arrival at the Pelly River—The region between Frances Lake and the Pelly—General character of the country and climate—The lower part of the Finlayson—McEvoy Lake—Length and elevation of Finlayson Lake—Fish plentiful—Low and swampy character of the shores—Distance from the head of the lake to the nearest point on the Pelly—Vegetation in the vicinity of the Pelly—Soil of the river terraces—Quartz vein-stuff everywhere abundant—First camp on the Pelly—Hoole Cañon—Pelly Range—Identification of Hoole River—Banks and beaches of the Pelly above Hoole River—The river at Hoole Cañon—Ross River—The Pelly between the cañon and Ross River—Rocks of Hoole Cañon and its vicinity—General course of the Pelly from Ross River to Glenlyon River—Lapie River—Formation of the mountains north and south of the Pelly—Densely wooded character of the northern slopes—Forest growth—Rapids in the vicinity of the Glenlyon—Composition of rocks between the Ross and Glenlyon—Occurrence of rocks of Laramie or Cretaceous age—Tributary streams—The Pelly below Glenlyon River—Glenlyon Mountains—The Detour—Macmillan River—Coalescence of the Macmillan and Pelly valleys—Upper part of the Macmillan unexplored—First human beings met with since leaving Dease River—Confluence of the Upper Pelly and Lewes Rivers—The Pelly below the Macmillan—Granite Cañon—Character of the country—The current from Granite Cañon to the confluence.

WE reached Frances Lake on the morning of the 8th of July, and had we been able to find any local Indians to serve as guides and assist in carrying over our stuff, we should have proceeded at once to the best point for that purpose, and continued our journey overland toward the Pelly. As it was, it became our first object to endeavour to find the trail used many years previously by the Hudson Bay Compay, of which a general description had been furnished by Mr. Campbell. This necessitated a careful examination of the west shore of the west arm to its head, which enabled us to identify, with tolerable certainty, the stream which Campbell had named the Finlayson. It was supposed that the Indians might have

employed the same route in the periodical journeys which they were known to make from the Pelly down the Frances to the little trading post at the mouth of the Dease; but though the remains of an old log *câche* of the Hudson Bay Company were eventually found, together with the nails and ironwork of a large boat which had evidently been burnt on the beach near it, no sign of a trail could be discovered. It thus appeared very doubtful whether we should be able to make our way across to the Pelly, with sufficient provisions and the necessary instruments for the continuation of our survey in the Yukon basin.

In order to exhaust the possibility of obtaining further assistance before making the attempt, I made a light trip in one of our boats round into the east arm; this was known to exist from Campbell's report, but its narrow entrance had not even been observed on our way up the lake. Thus I was enabled to sketch the east arm, but no Indians were found. In fact, we discovered traces of only a single camp which had been made during the same summer, most of the Indian signs being two or more years old.

All that could now be done was to make the best of our own resources. We went carefully over all our stuff, discarding everything which was not absolutely essential, and making up the remainder in packs, together with as much food as could be carried. This done, we stowed a great part of our camp equipage, together with some provisions, in a strong log *câche*, which was constructed for the purpose in the bay immediately south of the mouth of the Finlayson, and moved on the north side of the delta to what we believed to be the best starting-point of that stream. We then hauled out our two boats, and on the 17th and 18th of July carried our remaining stuff to a point some miles up the Finlayson and above the cañon and cascades, which render its lower part utterly impassable. Here we set up the Osgood canvas boat, which we had also carried over. Into this a portion of our stuff was put, and two of our Coast Indians were instructed to endeavour to track it up the shallow and winding stream, while the rest of the party found their way as best they could along the valley, with heavy packs. The walking was extremely fatiguing on account of the deep moss, alternating

with brush and swamps, and as the weather was very warm and the mosquitoes innumerable, our rate of progress was slow. On arriving at the forks of the stream we unfortunately took the wrong branch for several miles, thus losing time, but we eventually reached a lake which we recognized as Finlayson Lake, on July 24th. The canvas boat did not arrive till the evening of the next day; for we had great difficulty in getting it up the shallow stream, which was badly blocked with fallen trees. In the meantime, observations for latitude and time were taken, and a raft was constructed on which the stuff might be floated to the head of the lake; the latter lay in the general direction of our route.

The lake proved to be nine miles and a half in length, and near its head we again found the ruins of a Hudson Bay *cache*, but no appearance of a trail. Having selected the most promising looking place from which to continue our journey, we took out the raft-sticks, in order that they might remain dry and serviceable for our Indians on their return, and made a second small *cache* of provisions. The Osgood boat being almost worn out by its hard usage on the Finlayson, and being besides quite too heavy to carry overland in addition to our other stuff, was also drawn up and abandoned.

Soon after leaving the lake we came upon small streams which evidently drained towards the west, and about noon on the 29th of July we had the satisfaction of reaching the bank of the Pelly River. From this place our five Coast Indians were sent back with instructions to take the articles left in the *cache* on Frances Lake to Mr. Reed, at Dease Lake. This duty, we subsequently learned, they faithfully performed.

Having constructed a canoe from the canvas brought over for that purpose, we began the descent of the Pelly on the 1st of August.

Though the region between Frances Lake and the Pelly may be described as a mountainous one, no very high summits were seen; the elevations are, as a rule, rounded and regular in outline, and form broad, plateau-like areas above the timber-line in some places. The Too-tsho Mountains, which run along the east arm of Frances Lake nearly due north, turn more to the westward beyond the head of the lake.

It is probable that the general character of the country fairly represents that of a wide belt to the west of the Frances River and north of the Liard, including the Campbell and Simpson Mountains and their vicinity. The mountains are about equal in altitude to those last mentioned, averaging from 5000 to 6000 feet. The country is traversed by wide, wooded valleys; that occupied by the Finlayson is the principal one. The climate evidently becomes less moist as Frances Lake and the vicinity of the Too-tsho Mountains are left.

The lower part of the Finlayson for about four miles, near its mouth, forms a series of rapids and small cascades in a narrow, rocky gorge, making in this distance a total descent of 300 feet to the lake. Above this cañon it is rapid for several miles, with gravelly bars, and quite shallow, but further up it becomes a narrow and often deep stream, flowing between muddy or sandy banks. At twenty-two miles from its mouth it divides into two equal branches; the northern comes from *McEvoy Lake*, the southern from Finlayson Lake. Each of these streams, at their confluence, is from twenty-five to thirty feet in average width and about two feet deep. The northern branch, however, soon becomes shallow, rapid and stony, while that coming from Finlayson Lake is extremely crooked, winding in all directions in a flat valley about a mile in width, and is besides, as already mentioned, very badly blocked by fallen trees.

Finlayson Lake (*Tle-tlan'-a-tsoots* of the Indians) is nine miles and a half in length and irregular in form. Its elevation above sea-level is 3105 feet, and it may be regarded as occupying the summit of the watershed between the Mackenzie and the Yukon, as no stream of any importance enters it. The country about it is all low, but diversified, to some extent, by wooded ridges and hills, which rise highest near its upper end. The water is apparently shallow throughout, and has, in consequence, a much higher temperature than that of Frances Lake. It is well stocked with white-fish and lake trout, and also, no doubt, with the other species found in Frances Lake.

The immediate shores of the lake are generally low and often swampy, and the country is covered with small, poor timber; much of this has been killed by fire.

The distance from the head of the lake to the nearest point on the Pelly, in a straight line, is about fifteen miles, but the low tract of country already referred to runs some miles to the south of such a line for the greater part of the way. The actual watershed in this low country is probably not fifty feet above the lake, but there is no evidence that the lake ever discharges toward the Pelly. Its height above sea-level is about 3150 feet. Small streams, rising to the west of the lake, flow together to form a respectable brook about half way across. This occupies a wide, terraced valley, the bordering ridges gradually diverge as the Pelly is approached, and the river itself is bordered by undulating terrace-flats several miles in width.

On ridges west of the head of Finlayson Lake *Abies subalpina* becomes moderately abundant, but the white and black spruce are still the characteristic trees, and the former is well grown in sheltered valleys. The vegetation in the vicinity of the Pelly was much further advanced than any we had yet seen, and the climate of the valley is evidently more favourable than that of the watershed region. The soil of the river-terraces is a fine, silty material, which, judging from the luxuriance of plant growth, must be very fertile.

In consequence of the width of the valleys and the mantle of drift deposits, few rock-exposures were met with along the whole route from Frances Lake to the Pelly. But quartz vein-stuff is everywhere very abundant, and on the terrace overlooking the Finlayson, on the north side, three miles below the lake, a large mass of quartz occurs in places. The extent of this mass of quartz could not be ascertained, as it protruded from the soil only in isolated spots over an area several hundred feet in length and breadth.

Our first camp on the Pelly was situated in lat. 61° 48′ 52″, long. 131° 01′ 06″, the height of the river being at this place, as approximately determined from the mean of a number of barometer observations, 2965 feet. The river is here 326 feet wide, with a current slightly exceeding two miles and a half an hour, and a middle depth of seven feet. From explorations made at the time of the existence of the Hudson Bay post, as well as from Indian report, the river is known to be navigable

by boats for a considerable distance above this point, and to rise in two lakes, the position of which is approximately indicated on the map, according to Mr. Campbell's sketch. Our camp was about two miles above the mouth of the stream which has already been mentioned as rising on the portage near Finlayson Lake, at the angle of the Pelly, the old post named "Pelly Banks." We saw no trace of the buildings which formerly existed.

From the site of our first camp to Hoole Cañon, is a distance of thirty-one miles in a straight line; its direction is a few degrees north of west. The river, however, forms a wide curve to the south of this line, and is tortuous in detail, the actual distance, following its course, being fifty miles. The main orographic river-valley is here not confined between parallel ranges of mountains. There is a wide tract of irregularly hilly country, bounded to the south by a well-defined mountain range at a distance of from ten to twelve miles. This range is crowned by a series of square-outlined pyramidal peaks, which are probably composed of stratified rocks. It is proposed to distinguish it as the *Pelly Range*. To the northward, no definite boundary to the low hilly region can be seen. The actual trough in which the river meanders is scarcely more than a mile in average width, and is generally bordered by terraces a hundred feet or more in height.

Thirty-three miles, by the course of the river, below our starting-point, a tributary comes in from the mountains to the southward, about fifty feet wide by one deep, and very rapid. This is identified as Hoole River. Its water is blueish in tint, and clearer than that of the Upper Pelly, which by this time has become slightly turbid from material derived from its soft, silty banks. The river, between our first camp and Hoole River, has a moderate current, scarcely exceeding four miles and a half an hour, though with several little "riffles" or small rapids.

Just below the mouth of Hoole River is a rapid about 600 feet long, with a total fall estimated at about ten feet. There is an easy portage on the right or north bank, but a fair-sized boat might run through without danger at most stages of the water. From this rapid to Hoole Cañon the water is swift, and there are several little rapids.

The banks and beaches of the Pelly above Hoole River are generally silty or muddy, though the strength of the current is sufficient to produce well-washed gravel-bars in mid-stream. Below that point the banks and beaches are also as a rule gravelly, in conformity with the swifter flow of the stream.

The banks along the south side of this part of the river are for the most part densely wooded, and where shady and damp the growth of timber is small and scrubby, with much black spruce. The banks on the opposite side above Hoole River show numerous open, grassy patches, and below that place grassy slopes preponderate over the wooded area, the grass having the characteristic growth and dry, tufted appearance of "bunch-grass." The trees are similar to those found along the rivers previously described, except that *Pinus Murrayana* and larch do not occur, and but a single white birch was noted, near the mouth of Hoole River.

At Hoole Cañon, the river makes a knee-like bend to the north-eastward, and is restricted between rocky banks and cliffs about a hundred feet in height. These render it impracticable to use the line, and the water is very rough and dangerous. The distance by the river is about three-quarters of a mile, by the portage half a mile, the highest point being one hundred feet above the river. The portage is on the south side of the river, and we found traces on it of skids which had been laid by the Hudson Bay Company many years ago, but no sign that it had been employed by the Indians, who in all this district generally travel by land, making rafts when they are obliged to cross any of the larger rivers.

Sixteen miles and a half below the cañon in a straight line, or twenty-three miles by the course of the Pelly, is the mouth of a river which is identified as the Ross River of Campbell.[1] This stream, which comes from the north-eastward, is to all appearance equal in volume to the Pelly, having a width of 290 feet, with a current of four miles and a half an hour. Its water is turbid and milky, and colder than that of the Pelly, leading to the belief that it is not derived from lakes, like that stream, or that if lakes do occur on its upper waters, they are much less

[1] So named after Chief Factor Donald Ross.

LAKE LINDEMAN, LOOKING UP FROM OUTLET.

in area than those of the Pelly. Like other streams from that direction, it carries clear, blue, mountain water, and brings down quartzites, argillites and schists of the usual character, together with a great abundance of quartz-gravel.

The Pelly, between the cañon and Ross River, is swift throughout, with numerous little rapids. To the south of the river there is still a wide extent of low, wooded country between it and the continuous range before referred to as the Pelly Mountains. To the north the view is more limited, particularly near the mouth of the Ross River, owing to the existence of a long, steep ridge, parallel to the course of the Pelly, and from 600 to 800 feet in height above it. The southern face of this ridge, which is cut through by the Ross River, is more than half, open grass land, and would afford excellent pasturage.

The rocks of Hoole Cañon and its vicinity are chiefly white marble, associated and interbedded with grey and bleak cherty-looking quartzites, which are often thin-bedded and sometimes rather schistose, and precisely resemble the Cache Creek quartzites of southern British Columbia.

From the mouth of Ross River to the Glenlyon River, the general course of the Pelly is almost direct, on a bearing of N. 50° W., the distance being sixty-four miles. In consequence of the number of minor flexures in the stream, this is increased by the river to eighty-two miles. Ten miles below the Ross, following the river, *Lapie River*,[1] sixty feet wide by one foot deep, and resembling in its general character and colour of water Hoole and Ketza Rivers, comes in from the south. Twenty-three miles from the same point a smaller tributary joins from the north, which is supposed to be the Orchay of Campbell.

All the way from the Ross to the Glenlyon the Pelly is closely bordered on the north by ridges and hills of considerable height, which become mountains of 4000 to over 5000 feet before the last-mentioned stream is reached. These entirely preclude any outlook over the country on that side. To the south, the important and well-marked Pelly Range is continued to a point

[1] This stream was not named by Campbell. I call it Lapie River, after one of his Indians, he having given the name of the other (Ketza) to a neighbouring tributary.

opposite the Orchay River, where it appears to terminate in a group of mountains lower than those of its eastern part, but still from 5000 to 6000 feet in height. The forms of the mountains are bold, consisting of steep crests and ridges, with intervening narrow gorges, and they appear to be covered with low herbaceous growth, giving them a greenish tint. There are few bare, rocky summits, and the whole appearance is that of a range shaped by normal processes of denudation from schistose or other crumbling rocks of a stratified character and nearly uniform hardness. They still carried a few patches of old snow on the 4th of August. The greater humidity of this part of the valley is particularly marked by the densely wooded character of the slopes on the north side of the river.

The Pelly, for more than half the distance between the Ross and Glenlyon, continues to be pretty swift, and is much divided among islands and gravel-bars; the remaining part is comparatively tranquil, with the exception of the rapids in the immediate vicinity of the Glenlyon. The forest growth throughout is much like that previously described, save that the birch is now moderately abundant, and the black pine (*P. Murrayana*) appears, coming in first on dry northern slopes thirteen miles eastward from the Glenlyon. Cottonwood, aspen, alder, spruce, and willows are the prevailing trees on the river-flats, which are usually about ten feet above low water level. Frozen soil was again seen in several places along the shady side of this part of the river, extending from about eighteen inches below a mossy and peaty sod to the water level, with a depth of ten feet or more. Some of these banks were being rapidly undercut by the water, which thaws the soil wherever it comes in contact with it, and causes large masses, with the superincumbent sod and trees, to fall into the stream.

The rapids above alluded to as near the Glenlyon are two in number. The first occurs in an S-shaped bend about two miles east of the Glenlyon; the second just below the mouth of that stream. The upper rapid is wide and rather shallow, with some rocky impediments. It is easily run with a canoe, but at low stages of the river doubtfully passable for a steamer not of light draught. The current in the second rapid strikes full on the face of a rocky bank on the right of the river, and

forms a heavy confused wash in consequence, but is otherwise unimpeded and deep.

The rocks seen along the Pelly, between the Ross and Glenlyon, while resembling in a general way those previously described, differ in their greater alteration and in the evident importance in their composition of products originally of volcanic origin. The most abundant are blackish-grey and greenish quartzites and schists, often more or less micaceous, and in places passing into true mica-schists.

The most interesting fact developed on this part of the Pelly is, however, the occurrence of rocks of Laramie or Cretaceous age. These were noted in a single low exposure on the south side of the river, twenty-seven miles and a half west of the mouth of Ross River. They consist of black carbonaceous or possibly plumbaginous shales, rather hard, and interbedded with grey-brown sandstones, the whole dipping nearly due south at an angle of forty-five degrees. But this single occurrence of rocks of this character was found, and no rocks are seen for several miles up or down the stream, so that the area characterized by the formation to which they belong is uncertain.

The total distance, following the course of the river, from the Glenlyon to the Macmillan, is ninety-one miles. The tributary streams in this distance, again measuring by the course of the Pelly, down stream, are as follows:—Glenlyon River, the Earn River of Campbell, and the Tummel River of Campbell. From this point to the Macmillan no tributary streams were observed, the country to the northward evidently draining toward the last-named stream, and that to the south, at no great distance, being in all probability within the drainage-basin of the Lewes.

For about twenty miles below the Glenlyon River the Pelly is more than usually free from abrupt bends, and few islands are met with. It is bordered to the south by *Glenlyon Mountains,* whose highest points exceed five thousand feet. Lower irregular hills border the north bank, and these, as usual, show extensive grassy slopes on the southern exposures. At the distance from the Glenlyon just mentioned, the river turns abruptly to the northward, making a sharp bend, and

cutting completely through the ridge which has previously bounded it on that side. After a sinuous course of about fifteen miles (about midway in which it receives the Earn River), to the north of the ridge, it turns again with equal abruptness to the southward, rounding the west point of the ridge, which here dies away. This peculiar flexure is distinguished on the map as *The Detour*. To the south of the ridge is a wide valley, which lies in the general direction of the river, and which doubtless represents a pre-glacial valley of the Pelly, though now apparently floored by drift deposits. The distance from bend to bend of the river, through this disused valley, is eight miles and a half, and the height of its floor above the water-level was estimated at about two hundred feet. As far as the lower end of The Detour the current is swift, and there are a number of little riffles; some of these might be called rapids, though none are of a character to impede navigation.

The Macmillan and the Pelly valleys coalesce at an acute angle at the western point of the range of hills which alone has separated them for some distance, and the two streams must run nearly parallel for many miles above their junction. The Macmillan is bordered to the north by a well-defined range of low mountains, which continues to the westward for about ten miles as the bordering range of the united streams. At the confluence, the Pelly appeared to be somewhat the larger river at the time of our visit, and it is probably so at all properly comparable stages of water. The Macmillan water is much more turbid than that of the Pelly, and of a yellowish colour. The temperature of both rivers was identical on the 9th of August, being 54° F. It may probably be assumed from this circumstance that the origin of the rivers is similar, and that the Macmillan, like the Pelly, rises in or flows through considerable lakes, in which the water is warmed to a like extent. The suspended matter of the Macmillan may be entirely due to the washing away of silty banks, which is the usual cause of the turbidity of streams in this district. The upper part of the Macmillan has never been explored, but its size would indicate that it may rise as far to the eastward as the Pelly, and probably, like it, in mountains representing the

western ranges of the Rocky Mountains. We do not, however, know to what extent this river shares with the Stewart the drainage of the comparatively low country to the northward. I afterwards met a couple of miners (Messrs. Monroe and Langtry) who had ascended the Macmillan for several days in a boat, but, not finding encouraging "prospects," had returned. They reported the existence of a large area of low land with good soil, and had met with no impediments to navigation so far as they had gone.

Ten miles above the mouth of the Macmillan we encountered a couple of Indians, father and son, working their way up the Pelly with a small dug-out canoe. They were the first human beings we had met with in the country since leaving the mouth of the Dease River, forty-three days previously, but as we were totally unable to communicate with them except by signs, it was impossible to obtain any definite information from them. They were evidently at a loss to know whence we had come, and evinced a peculiar interest in examining our little canvas canoe.

The range of hills bordering the Pelly on the south, near the mouth of the Macmillan, is composed of granite, which appears in several places on the river. This is of greyish and greenish-grey colours, and similar to that of the Glenlyon Range, though it apparently forms a distinct though parallel granitic axis.

From the mouth of the Macmillan to the confluence of the Upper Pelly and Lewes Rivers is a distance, in a straight line with a general bearing a few degrees south of west, of forty-six miles. A considerable portion of this part of the river is, however, extremely tortuous. The distance from the Macmillan to the mouth of the Lewes, measured along the course of the stream, is seventy-four miles.

Four miles below the mouth of the Macmillan, on the north bank, is a small log cabin, the first sign of habitation we had seen. We afterwards ascertained that two miners had lived here during the winter of 1886-7. At five miles and a half below the Macmillan the Pelly was found to be 754 feet in width, with a current of 2·3 miles per hour; a few miles below this the river turns south-westward and then nearly due south, entering Granite Cañon at thirteen miles from the Macmillan.

The cañon is four miles in length, with steep, rocky, scarped banks and cliffs, 200 to 250 feet in height. In the cañon are several little rapids, but the water is deep, and with the exception of some isolated rocks, the navigation would be quite safe for steamers, even at a low stage of water. As the river is much confined, however, it is probable that rough water may be found here during floods. Just beyond the cañon, or sixteen miles and a half below the Macmillan, a small stream, about ten feet by three inches, enters from the southeastward. The bed is wide, and it appears at seasons of flood to become a formidable torrent. At thirty-six miles from the Macmillan another small stream was observed on the south side, but with this exception, the river receives no further tributaries before meeting the Lewes.

After passing the ridge which is cut through by Granite Cañon, the country on both sides of the river for about fifteen miles is quite low. No mountains or high hills are in sight on any bearing to the westward, and wide terraces run far back from the river at heights of 150 to 200 feet above it. These are often lightly wooded, largely with aspen, and are clothed with a good growth of grass, presenting a very attractive appearance. The soil is good, and at the time of our visit the country was very dry.

For the remaining distance to the mouth of the Lewes, the river is more closely bordered by low hills and ridges, which seldom exceed a height of 400 feet. At one place the stream is confined between high and somewhat rocky banks, but no rapid is met with. The southern slopes of the hills are generally open and grassy, and would afford excellent pasturage. The northern exposures are still thickly wooded. Just above its confluence with the Lewes, the Pelly makes an abrupt turn to the south, and runs for several miles along the eastern base of a scarped cliff of basalt. From Granite Cañon to the confluence, the current scarcely exceeds two miles and a half an hour.

CHAPTER IX.

Total length of the Upper Pelly—Its elevation—Estimated fall in Hoole Cañon—The river navigable for stern-wheel steamers—Streams and small rivers flowing into the Pelly—Gravel bars of the Pelly—"Small" and "heavy" colours found in considerable number—Country about the confluence of the Lewes and Upper Pelly—Temperature of the water—Ruins of Fort Selkirk—Fort Yukon—Exploration of the Upper Liard and Yukon by Mr. Robert Campbell—Campbell's men discouraged by the "Wood Indians"—Fort Selkirk established in 1847-48—Fort Yukon established—The Pelly and Yukon identical—Navigation of the Liard—The post at Pelly Banks—Dimensions and construction of Fort Selkirk—Its interference with the trade of the Chilkoot and Chilkat Indians—The occupants expelled and the fort pillaged by the Indians—The buildings demolished by the local Indians—Fort Yukon maintained till 1869—The Hudson Bay Company expelled by the United States Government—Abandonment of the fort—Posts established from Fort Simpson on the Mackenzie to Fort Yukon—Time taken by "returns" to reach the market—Ascent of the Lewes and arrival at Lake Lindeman—Ascent of the Yukon by explorers of the Western Union Telegraph Company—Survey of the Lewes by Lieutenant Schwalka—Course of the river from Fort Selkirk to Rink or Five-finger Rapid—Velocity and width of the river below Rink Rapid—Ingersoll Islands—The terraces and flats bordering the river—Character of the river valley—Description of Rink Rapid—Pleasing appearance of the country—Hoo-chee-Roo Bluff—Stratification of the rocks—Nordenskiöld River—Little Salmon River—The valley of the Lewes between Rink Rapid and Little Salmon River—Bars worked for gold above the Nordenskiöld—Rock exposures—Coal seams—General bearing of the Lewes from Little Salmon River to the mouth of the Big Salmon or D'Abbadie River—The Seminow Mountains—Particulars respecting the Big Salmon River—"Fine" gold found all along the river.

THE total length of the Upper Pelly, following the course of the river, from the point where we first reached it at the west end of the Campbell's Portage to its confluence with the Lewes, is 320 miles. The elevation at the first-mentioned point is about 2965 feet, that at the confluence 1555 feet, giving a total fall of 1410 feet, or 4·4 feet to the mile, a considerable portion of which, however, occurs in the numerous little rapids and riffles of its course. In Hoole Cañon the estimated fall is about twenty feet.

With the exception of Granite Cañon, where warping might have to be resorted to at one place, the river would be easily navigable for stern-wheel steamers so far up as the mouth of

the Macmillan, and the latter stream is also navigable for a considerable though unknown distance. Above the Macmillan, I believe, no serious difficulty would be met with in taking a small stern-wheel steamer of good power up to the mouth of the Ross River, and possibly as far as the foot of Hoole Cañon. A line might have to be carried ashore at a few of the stronger rapids, but the chief difficulty to be encountered would be from shoal water at low stages. Where the river is widely spread and swift, a depth of three feet could scarcely be found across some of the gravelly bars. The Ross River is a navigable stream at its mouth, but its upper part is quite unknown. Hoole Cañon is, of course, quite impassable for a steamer of any kind, and the rapid seventeen miles east of it, at the mouth of Hoole River, might prove to be a difficult one to surmount by warping, as its fall is estimated at about eight feet. Above this point, the river is again, however, an easily navigable one for small steamers to the furthest point seen by us, and possibly so far as the lakes.

All the streams and small rivers flowing into the Pelly from the south and rising in or beyond the Pelly and Glenlyon Mountains, are notably swift, and most of them are evidently subject to heavy freshets.

On the lower part of the Upper Pelly there are numerous groves on or not far from the banks, with good spruce up to two feet in diameter. Spruce of the same size is found also on the whole upper part of the river, but is relatively less abundant there.

As in the case of the Upper Liard and Frances Rivers, quartz derived from veins is an abundant constituent of the gravel-bars of the Pelly, and numerous small quartz veins were observed in the rocks in many places. Where the granites are approached, the veins cut all the rocks except these, and it appears that the development of the quartz veins is due to the same period of disturbance which has given rise to the uplift of the granite axes or their extrusion. Small "colours" of gold may be found in almost any suitable locality along the river, and "heavy colours," in considerable number, were found by us as far up as the mouth of Hoole River, in the bottom of a gravel-bed there resting on the basalt. The river has been

prospected to some extent by a few miners, but no mining of importance has yet been done on it.

The country about the confluence of the Lewes and Upper Pelly is generally speaking low, with extensive terrace-flats running back to the bases of rounded hills and ridges, of which none in sight probably exceed 1000 feet above the river. The moderate current which has been described as characteristic of the Upper Pelly for some distance above the confluence, continues to its mouth, but the Lewes is much swifter, and though at the point of junction divided among wooded islands, is evidently the larger stream, carrying a volume of water considerably greater than that of the Pelly, though probably less than twice as great. It does not, however, necessarily follow from this that the Lewes is to be considered the principal head stream or continuation of the Yukon.

The water of the Lewes is of a bluish, slightly milky cast, and is easily distinguished from the brownish muddy colour by which the Pelly is characterized below its junction with the Macmillan. The temperature of the water in both rivers was found to be practically identical, on the 17th and 18th of August, at 7 p.m., being 59° F.

The river below the confluence of the Pelly and Lewes averages about a quarter of a mile in width, and though its appearance is placid and there is no rough water, it is uniformly swift. Of this width about two-thirds had an average depth of ten feet, with a surface velocity of four miles and three-quarters an hour.

The ruins of Fort Selkirk, formerly a post of the Hudson Bay Company, stand on a partly open flat, on the south side, at a short distance back from the river, and about a mile and a half below the confluence of the Pelly and Lewes. One chimney, built of basalt blocks which must have been brought across the river, and cemented with clay which has been baked almost into brick by the combustion of the ruins of the fort, still stands erect and uninjured. The lower part of a second is near it, and the fragments of several others strew the ground, which is partly overgrown by small aspens. These, and the traces of a couple of excavations which have probably been cellars, are all that now remain to mark the site of the buildings which were pillaged by Indians from the coast in 1852.

Fort Selkirk, of which the ruins alone now exist, was at one time the most important post of the Hudson Bay Company to the west of the Rocky Mountains in the far north, and with the exception of Fort Yukon, it was the farthest permanent post ever maintained by the Company to the north-west.

Mr. J. McLeod appears, in the same year in which he reached the Stikine (1834), to have ascended the Liard as far as Simpson Lake, and to have brought back the information according to which the river was represented on Arrowsmith's map of 1850. It was owing to the energy of Mr. Robert Campbell, however, that the exploration of the Upper Liard and Yukon is almost entirely due. The only published account of Mr. Campbell's work, so far as I know, is that which appeared in the Royal Reader, Fifth Book, Toronto, 1883, p. 435, and which was reprinted, with slight alterations at Winnipeg in 1885, as a small pamphlet entitled "Discovery and Exploration of the Youcon (Pelly) River." From this source and from additional facts furnished by Mr. Campbell in answer to questions addressed to him, as well as from allusions in the unpublished journals of Chief Factor James Anderson, the following brief account is drawn up.

After the abandonment of Dease Lake post in 1839, Mr. Campbell was, in the spring of 1840, commissioned by Sir George Simpson to explore the "north branch" of the Liard to its source, and to cross the height-of-land in search of any river flowing to the westward, especially the head-waters of the Colville, the mouth of which on the Arctic Ocean had recently been discovered by Messrs. Dease and Simpson.

Mr. Campbell writes:—"In pursuance of these instructions, I left Fort Halkett [on the lower Liard] in May, with a canoe and seven men, among them my trusty Indians, Lapie and Kitza, and the interpreter, Hoole. After ascending the stream some hundreds of miles, far into the mountains, we entered a beautiful lake, which I named Frances Lake, in honour of Lady Simpson. . . . Leaving the canoe and part of the crew near the south-west [*sic*] extremity of this [the west] branch of the lake, I set out with three Indians and the interpreter. Shouldering our blankets and guns, we ascended the valley of a river, which we traced to its source in a lake ten miles long,

which, with the river, I named Finlayson's Lake and River." From this point, Mr. Campbell struck across to the Pelly, which he then named in honour of Sir H. Pelly, a Governor of the Company.

During Campbell's absence the remainder of the party built a house at the point between the two arms of the lake, which was then named "Glenlyon House," but was afterwards known as Frances Lake House or Fort Frances. Returning down the river, they met a trading outfit which had been despatched for them, at Fort Halkett, and turned back with it to Frances Lake, after sending out a report of their proceedings.

The Company now resolved to follow up those western discoveries, and in 1842 birch bark, for the construction of a large canoe to be used in exploring the Pelly, was sent up from Fort Liard. In the same year Fort Pelly Banks was constructed, or its construction begun, and early in June, 1843, Campbell left that place in the canoe which had been made, accompanied by Hoole, two French-Canadians and three Indians.

They saw only one family of Indians ("Knife Indians") till they reached the mouth of the river which Campbell called the Lewes. Here was a large camp of "Wood Indians," and these, after recovering from their surprise at the sight of the party, so discouraged Campbell's men by their stories of the number and ferocity of the people on the lower river, that he was obliged to turn back.

For some years afterwards the operations of the Company did not extend beyond "Pelly Banks," though during the summer, hunting parties were sent down the Pelly to collect provisions, and in that way information was received respecting the river and the Indians inhabiting its vicinity.

In the winter of 1847-48 boats were built at Pelly Banks, and early in June following Campbell set out to establish a fort at the confluence of the Pelly and Lewes Rivers. This was named Fort Selkirk, and was at first situated on the extreme point of land between the two rivers, but this point being found subject to floods during the disruption of the ice, the post was in the spring of 1852 moved to a site a short way below the mouth of the Lewes, on the left bank. The inner work of the new

buildings was still unfinished at the time of the Indian raid, noticed further on.

Meanwhile an entry was being made into the Yukon basin from another direction. Mr. J. Bell had already in 1842 reached the Porcupine or Rat River, and had descended it for three days' journey. He was in 1846 in charge of the Hudson Bay post on Peel River, near the mouth of the Mackenzie, and was instructed again to cross the mountains and to further explore the Porcupine River. In pursuance of these instructions, he in that year reached the mouth of the Porcupine and saw the great river into which it flows, which the Indians informed him was named the Yukon. In 1847 Fort Yukon was established at the mouth of the Porcupine by Mr. A. H. Murray.

It still remained, however, for Campbell, in 1850, to prove that the Pelly and Yukon were identical. This he did by descending the river from Fort Selkirk to Fort Yukon, after which he ascended the Porcupine, crossed the mountain-portage, and returned to Fort Simpson by the Mackenzie.[1] One result of this journey was to show that the route from Fort Selkirk by way of the Porcupine River to the Mackenzie was preferable to that originally discovered. The navigation of the Liard was both arduous and dangerous, and several lives had been lost in boating on that stream. Added to this was the length of the land transport from Frances Lake to the Upper Pelly and the fact that great difficulty had been found in maintaining the posts in that district.

[1] Mr. Campbell states that when again on his way down the river from Fort Selkirk to Fort Yukon, in 1851, he found that a great number of the Indians had been carried off during the previous winter by some virulent disease.

He has further informed me, in answer to my inquiries on the subject, that the Stewart River was so named after his "dear and gallant friend and assistant-clerk, James G. Stewart, son of the late Hon. John Stewart, of Quebec." Stewart was sent out in the winter of 1849 to follow the Indian hunters in quest of meat. He found them some distance north of this river, which he crossed on the ice.

White River, Mr. Campbell named on account of its milky colour. Of the other streams entering between Forts Selkirk and Yukon he says, "Antoine River" was named after the interpreter at one time at Fort Yukon, a son of his interpreter Hoole; "Forcier River," after his guide, Baptiste Forcier; "Lolique River," for Forcier's wife; and "Ayonie's River," below the White River, was named after the natives of that quarter

In 1849, the post at Pelly Banks, with the exception of the men's house, was accidentally burnt. In 1850 it was finally abandoned, and in the spring of 1851 Fort Frances was likewise abandoned.[1] The abandonment of these posts was not due to any hostility of the natives, who were on the contrary most friendly, but in consequence of the circumstances above noted, and the fact that while these establishments were very expensive to maintain, they merely bought furs which would otherwise have been carried by the Indians themselves to other posts, if these particular, and to them more convenient ones, had not been in existence.

The several ruined chimneys of Fort Selkirk still to be seen, with other traces on the ground, are in themselves evidence of the important dimensions and careful construction of this post. The establishment consisted, I believe, in 1852, of one senior and one junior clerk and eight men. The existence of this post in the centre of the inland or "Wood Indian" country had, however, very seriously interfered with a lucrative and usurious trade which the Chilkoot and Chilkat Indians of Lynn Canal, on the coast, had long been accustomed to carry on with these people; acting as intermediaries between them and the white traders on the Pacific and holding the passes at the head-waters of the Lewes with all the spirit of robber barons of old. In 1852, rumours were current that these people meditated a raid upon the post, in consequence of which the friendly local Indians stayed by it nearly all summer, of their own accord. It so happened, however, that they absented themselves for a couple of days, and at that unlucky moment the Coast Indians arrived. The post was unguarded by a stockade, and, yielding to sheer force of numbers, the occupants were expelled and the place was pillaged, on the 21st of August. Two days afterward Campbell, having found the local Indians, returned with them and surrounded the post, but the robbers had flown. Being now without means of support for the winter, Campbell set off down stream to meet Mr. Stewart and the men who were on the way back from Fort Yukon. He met them at the mouth of

[1] Forts Frances and Pelly Banks are erroneously stated in Dall's "Alaska and its Resources," to have been burnt and pillaged, p. 115, foot-note and p. 508.

White River, and after turning them back with instructions to arrange for wintering at Fort Yukon, set out himself in a small canoe up the Pelly River, crossed to Frances Lake, descended the Liard and arrived at Fort Simpson with the tidings of the disaster, amid drifting ice, on the 21st of October.

Being anxious to obtain Sir George Simpson's permission to re-establish Fort Selkirk, Campbell waited only till the river froze, when he left Fort Simpson on snow-shoes and travelled overland to Crow Wing in Minnesota, where he arrived on the 13th of March. On the 18th of April he reached London, but was unable to obtain from the directors of the company the permission he desired. A short account of this remarkable journey appeared in the *Perthshire Advertiser* and *Inverness Courier*, but I do not know the precise date of the publication.

In the autumn of 1853, one of Campbell's hunters arrived at Fort Halkett on the Lower Liard by way of the Pelly and Frances. This is the last traverse of Campbell's Portage of which I can find any record, though it may doubtless have been used by the Indians subsequently. From this man it was learnt that the buildings at Fort Selkirk had been all but demolished by the local Indians for the purpose of getting the ironwork and the nails. He also stated that the Chilkats, being unable to carry away all their plunder in the preceding year, had taken merely the guns, powder and tobacco. They had câched the heavier goods, which were afterwards found and appropriated by the local or wood Indians. At a later date the ruins of the post must have been burnt, as their present appearance indicates.[1]

Fort Yukon, at the mouth of the Porcupine, was continuously maintained till 1869, when the Hudson Bay Company was expelled by the United States Government as represented by Capt. Charles W. Raymond, Corps of Engineers, U.S. Army; he having ascertained by astronomical observations that the post was situated to the west of the 141st meridian. He describes his proceedings as follows.—"On the 9th of August, at 12 noon, I notified the representative of the Hudson Bay Company that the station is in the territory of the United States; that

[1] Of Reid House, shown on Arrowsmith's map of 1854, near the Stewart River and to the north of Fort Selkirk, I have been unable to learn anything. Mr. Campbell never heard of it, and if it had any existence it was probably a temporary outpost of Fort Yukon.

the introduction of trading goods, or any trade by foreigners with the natives, is illegal, and must cease; and that the Hudson Bay Company must vacate the buildings as soon as practicable. I then took possession of the buildings and raised the flag of the United States over the fort."[1] The fort was afterwards abandoned and allowed to go to ruin.

The utmost credit must be accorded to the pioneers of the Hudson Bay Company for the enterprise displayed by them in carrying their trade into the Yukon basin in the face of difficulties so great and at such an immense distance from their base of supplies. To explorations of this kind performed in the service of commerce, unostentatiously and as matters of simple duty by such men as Mackenzie, Fraser, Thompson, and Campbell, we owe the discovery of our great north-west country. Their journeys were not marked by incidents of conflict or bloodshed, but were accomplished on the contrary with the friendly assistance and co-operation of the natives. Less resolute men would scarcely have entertained the idea of utilizing, as an avenue of trade, a river so perilous of navigation as the Liard had proved to be when explored. So long, however, as this appeared to be the most practicable route to the country beyond the mountains, its abandonment was not even contemplated. Neither distance nor danger appears to have been taken into account, and in spite of every obstacle a way was opened and a series of posts established extending from Fort Simpson, on the Mackenzie, to Fort Yukon. Fort Simpson may itself be regarded, even at the present day, as a post very far removed from the borders of civilization, but this further route, which nearly half a century ago became familiar to the Company's voyageurs, stretched out beyond it for over a thousand miles. Mr. James Anderson, in 1853, writes thus of the Liard River: "You can hardly conceive the intense horror the men have to go up to Frances Lake. They invariably on re-hiring endeavour to be exempted from the West Branch [Liard]. The number of deaths which have occurred there is fourteen, viz. three in connection with Dease Lake and eleven in connection with Frances Lake and Pelly Banks, of these last three died from starvation and eight from drowning."

[1] Report of a Reconnaissance of the Yukon River, 1871, p. 16.

At the time of the establishment of Forts Yukon and Selkirk, and for many years afterwards, the " returns " from the furthest stations reached the market only after seven years, the course of trade being as follows : *Goods.*—1st year, reach York Factory ; 2nd year, Norway House ; 3rd year, Peel River, and were hauled during the winter across the mountains to La Pierre's House ; 4th year, reach Fort Yukon. *Returns.*—5th year, reach La Pierre's House and are hauled across to Peel River ; 6th year, reach depôt at Fort Simpson ; 7th year, reach market.

We left the confluence and began the ascent of the Lewes on the 18th of August, and arrived at Lake Lindeman, where the portage to the coast begins, on September 16th. We were during this time on the one travelled route of the country, and every few days fell in with small parties of miners, generally on their way out, up the river. A few men were still found working on bars, and six or eight passed down stream with the purpose of wintering at or near Forty-mile Creek.

The Lewes River was discovered and named by Mr. Campbell in 1842, as already stated. It is indicated in an approximate manner, according to information supplied by this gentleman, on Arrowsmith's map of 1854. Mr. Campbell informs me that he was well aware of the existence at its head of a portage to the sea by which the Chilkat Indians came inland to trade. This route he had the intention of exploring, but the question of supplies and other difficulties prevented him from doing so. Communication was occasionally had by this route with the Hudson Bay steamer which traded along the coast, and it was thus that the Honolulu paper mentioned as received in 1848 by Sir J. Richardson, on the Mackenzie, was sent inland. Such communication was, however, only accomplished by travelling parties of Indians.

In 1867, explorers in the employ of the Western Union Telegraph Company ascended the Pelly or Yukon from Fort Yukon to the mouth of the Lewes, returning down the river. In the same year another explorer of the Telegraph Company reached the Hotolinqu (of Telegraph Survey map, not the river subsequently so called by miners), which is now known to be one of the furthest if not the most remote source of the Lewes. This he did from the direction of the Stikine, but was recalled before

he had, by descending the river, proved its relation to the Lewes.

The head-quarters of the Lewes River were first reached from the head of Lynn Canal about 1878. Between the date of the explorations of the Telegraph Company and this time, the Lewes may have been visited by traders ascending from the Lower Yukon, but of this we have no record. Previous to 1883, however, the river and some of its tributaries had become well known to a number of miners and prospectors, and when Lieutenant Schwatka, in the last-mentioned year, crossed the Chilkoot Pass and descended the Lewes, he merely followed in their footsteps. To Lieutenant Schwatka is, however, due the credit of having made the first survey of the river, a survey which Mr. Ogilvie's work of 1887 has proved to be a reasonably accurate one, in so far as its main features are concerned.

While the general course of the Upper Pelly is remarkably straight, that of the Lewes makes several important and well-marked bends, and is besides interrupted by lakes, and otherwise irregular.

From the site of Fort Selkirk to Rink or Five-finger Rapid, the course of the river is nearly straight, the bearing being about S. 50° W., and the distance, measured by the stream, fifty-five miles. The current of this part of the river is swift throughout, averaging about four miles and a half an hour and seldom being under four miles. At a point six miles below Rink Rapid, where the course of the river was uninterrupted by islands, and its velocity and width about normal, the rate of flow was found to be 4·8 miles per hour, the width 732 feet. There are numerous islands, which differ from most of those met with on the Pelly in frequently occupying positions in mid-channel instead of being merely portions of river-flats cut off by lateral sloughs. A few miles above the mouth of the Lewes, these islands are particularly numerous for a distance of about five miles, and the total width of the stream from bank to bank is increased to nearly a mile. This group has been named Ingersoll Islands by Schwatka.

The terraces and flats immediately bordering the river are at first quite low, but in ascending, increase in height till they

stand often at 100 to 200 feet above it before reaching Rink Rapid.

The river valley is generally wide and somewhat ill-defined, the ridges and low hills bounding it seldom exceeding 1000 feet in height. Near the mouth of the river these are irregularly disposed, but further up, those on the north-east bank become more uniform and run parallel to the stream like the hills on that part of the Pelly near the Macmillan.

Two miles below Rink Rapid the Lewes makes a right-angled bend to the south-westward. The rapid itself is caused by the occurrence of several bold rocky islands which obstruct the river, and is only a few yards in length where the water flows swiftly between them. The channels are deep and unobstructed, and at low stages of water might, I believe, be ascended by a steamer of good power even without the assistance of warping. At high-water this rapid would, of course, be more formidable, as the velocity of the stream would be increased. It is pretty evident that a fall has at one time existed here, but the barrier of conglomerate which has produced it has now been cut completely through by the river. Below the main rapid there is a second "riffle" or minor rapid which appears to be somewhat stony, but which would not be a serious impediment to a properly constructed steamer.

The general, appearance of the country along this part of the river is pleasing, and resembles that of the corresponding part of the Pelly. It is usually wooded, but the southern exposures of some of the hills are partly open, and dry, grass-covered terrace-flats are frequent. The trees are of the same species before mentioned, and birch is moderately abundant.

For about twelve miles above the Hoo-chee-koo Bluff no rocks were seen, after which, for eight miles, or to Rink Rapid, there are frequent exposures of rocks of a different series, of much less altered appearance, and all probably referable to the Cretaceous. These include coarse, hard, dark, grauwacke-sandstones, with softer shaly sandstones, passing into dark sandy shales, all more or less calcareous.

The rock of the islands and banks of the actual rapid is coarse conglomerate which often contains boulders of granite up to eighteen inches in diameter, and is interstratified with irregular

beds of yellowish sandstone, the appearance of the conglomerate being much like that of the conglomerate of Jackass Mountain on the Fraser River, though somewhat less altered. Immediately above the rapid, on the south-east side of the river, grey and blackish shales, with thin beds of sandstone and of limestone, appear from below the conglomerates. These were found to contain fossils in considerable abundance, though representing but a few species.

Quartz vein-stuff is much less important as a constituent of the river-gravels than it is on the Upper Pelly, Upper Liard, and other streams to the eastward.

From Rink Rapid to the mouth of the Nordenskiöld the general bearing of the river is nearly due south, the distance in a straight line being twelve miles.

The Nordenskiöld is a small swift river with clear bluish water, which enters the Lewes on the west side. It was estimated as eighty feet wide by six inches deep, a couple of hundred yards above its mouth. Its valley is not a wide or important one, it being in fact difficult to decide from which direction the stream comes a few miles back from the Lewes. The Little Salmon (or Daly, as re-christened by Schwatka) joins the Lewes on the opposite side, and was estimated to carry about twice as much water as the Nordenskiöld. It is about one hundred feet wide, with an average depth of three feet. The water is clear and brownish in tint, and the current not rapid at the mouth.

The valley of the Lewes, between Rink Rapid and the Little Salmon River, is in general somewhat irregular and not very wide, and no mountains are in sight from this part of the river. Terraces rising to 200 feet are frequent, and often run back at about that level to the bases of the hills. Near the mouth of the Nordenskiöld the river is extremely crooked, and the current is everywhere swift. The southern slopes of the hills and terraces are generally in large part open and grassy, no difference such as might indicate a climate more humid than that of the region about old Fort Selkirk being met with. Several magpies were seen, for the first time, on this part of the river.

The first spot observed by us in ascending the river where

bars have been worked for gold, is situated six miles above the Nordenskiöld.

The rocks along this portion of the river, like those last described, belong to the Cretaceous series, but their attitudes are too varied to enable anything like a complete section to be gained from the isolated exposures met with. A few localities, however, show features worthy of special mention.

One of these is found five miles and a half above Rink Rapid, where a high bluff shows a series principally composed of sandstones, shales and shaly clays. This exposure includes, within sixty feet of the base of the bluff, at least three coaly beds, of which the lowest is about three feet thick. This and the other beds contain some good-looking coal, of which a thickness of about a foot sometimes occurs, but the greater part of the material is so sandy and impure as to be useless.

The condition of all the beds in this vicinity is remarkably unaltered, as compared with those seen lower down the river, and would appear to show that if (as assumed) they form a connected series, these represent its upper part.

The thin coal-seams here actually seen cannot be considered as of economic value, but are important as indicating the existence of a coal-bearing horizon which may prove to contain thicker beds elsewhere, and might become an important point in connection with the navigation of the river. The coal has been examined by Mr. G. C. Hoffmann, who describes it as a lignite-coal, with the following composition :—

Hygroscopic water	6·03
Volatile combustible matter	36·92
Fixed Carbon	49·03
Ash	8·02
	100·00

From the Little Salmon to the mouth of the Big Salmon River or D'Abbadie, the general bearing of the Lewes is about east-south-east, and the sinuosities of the river are not nearly so great as in the portion last described. The distance by the stream between these tributaries is thirty-four miles. A considerable portion of this part of the river is not so swift as

usual, and for eight or ten miles, midway between the Little and Big Salmon Rivers, both the river and its valley are more than usually narrowed. Beyond this, the valley begins to widen rapidly, and, for some miles before the mouth of the Big Salmon is reached, is notably wide between the bases of the limiting hills. At the mouth of the Big Salmon, the Lewes turns abruptly to the south, while the main valley is continued in a south-easterly direction, becoming there the valley of the Big Salmon. From the confluence of the rivers, the main valley can be seen running on for a distance of about fifteen miles, bordered by low hills to the northward, and by higher hills to the south. These last are the Seminow Mountains of Schwatka. The Lewes cuts through this range, which is continued also for some miles westward, forming the south-west side of the Lewes valley. The hills are rounded in form and wooded, and rise to heights of 1500 to 2000 feet above the river.

Several bars which had been worked on for gold were seen along the Lewes, below the confluence of the Big Salmon.

The Big Salmon[1] has been re-named by Schwatka the D'Abbadie River, a name which has the merit of being more distinctive than that previously in use, but the miners, who (with the exception of the Indians) alone travel through the country, refuse to know it by any but the old name. It is much more important than any of the tributaries joining the Lewes further down, being 347 feet wide, with a depth of five feet for about one-third of its width, and a current of about two miles an hour. The water is clear and of a bluer tint than that of the Little Salmon, and the discharge was estimated at 2726 cubic feet per second, when probably rather below its mean stage. It might, no doubt, be navigated by a small stern-wheel steamer for many miles.

I was afterward so fortunate as to meet a party of four miners who had spent a part of the summer of 1887 in prospecting this stream, and from one of them, Mr. John McCormack, obtained some particulars respecting it, together with a sketch of its course. Thirty-two miles from the Lewes, the Big Salmon is said to be joined by a smaller stream, which McCormack calls the North Fork. For about a mile and a half

[1] Ta-tlin-hi-ni of the Tagish.

below and a short distance above the mouth of this branch the river is very rocky and rapid. Half a mile above it there is an Indian salmon fishing place. For some distance beyond this the river is sluggish, and at sixty-six miles from the Lewes the South Fork branches off. This fork occupies a wide valley and comes from the south-eastward. Above it the water is swifter and the valley of the river is narrow, with high mountains on both sides, but particularly on the north. Granite and mica-schist were seen along this part of the river. At a supposed distance of one hundred and five miles from the Lewes, another stream joins from the south-east, and this also occupies an important valley, though not so wide as that of the South Fork. Above this point the river turns to a northerly bearing for about fifteen miles, the current being, in general, slack. It then reverts to an easterly bearing, and after passing a rapid, at one place, Island Lake is reached at 190 miles from the Lewes. This lake is four miles long, and has two arms at its upper end, from the southern of which a river leads, in eight miles, to a second lake two miles and a half long. A stretch of river, a mile and a half long, joins this to the highest lake, which McCormack named Quiet Lake, and whose length he estimates at twenty-four miles. At the outlet of the lake is an Indian fishing place. The country to the south of these lakes is mountainous, granite being a common rock, and several streams run from these mountains into Quiet Lake. The north-east side of the lake is bordered by lower ridges, and from its head, McCormack travelled about eight miles, through a low country, to the bank of the Tes-lin-too, which he found here flowing from north to south.

These miners found "fine" gold all along the river, but no good paying bars. They were in search of "coarse" gold, but did not discover any. A small specimen of pyrites and quartz, from veins met with on one of the streams flowing into Quiet Lake, given to me by Mr. McCormack, was found by Mr. Hoffmann to contain very distinct traces of gold with a trace of silver.

According to the Indians, the salmon run up this river to its source, and the same is reported of the Little Salmon and the Tes-lin-too.

CHAPTER X.

General bearing of the Lewes at the mouth of the Big Salmon River—The confluence of the Tes-lin-too and Lewes—Auriferous gold bars—Cassiar Bar the richest on the river—Valley of the Tes-lin-too—Composition of the Seminow Hills—The river unexplored—Notes from Mr. T. Boswell's description and Indian sketches—General trend of the Tes-lin-too—Estimated length to the great lake—Its continuation—Navigation fairly good—The great lake, represented as the largest known to the Indians—The Indian trail—Distance covered by the trail—Indian salmon fishing stations above Tes-lin Lake—Fine gold found by Mr. Boswell all along the Tes-lin-too—The Lewes from the mouth of the Tes-lin-too to Lake Labarge—Length and formation of Lake Labarge—Country surrounding the lake—Ogilvie Valley—Richtofen Island—Hills and mountains along the lake—Miner's Range—The Lewes beyond the head of Lake Labarge—Tahkheena River—Its principal sources—The river employed by Indians to reach the interior—White Horse Rapid and Miles Cañon—The valley occupied by Lake Labarge—Its climate—Bennett Lake—Lake Marsh—Country in its vicinity—Tagish Lake—Jubilee Mountain—Navigation by steamers—Lake Marsh portion of a system of still water navigation—Probable utility of this system in opening up and developing the mineral resources of the country—Main continuation of the Lewes—Lake Nares—The lake system—Lake Lindeman—Trail over the Coast Mountains—Dates of opening and closing of the rivers throughout the region—Entrance to the Yukon district by the Chilkoot Pass and Lewes River—Sheep Camp—Mr. J. Healey—Mountain portage from Lake Lindeman to Healey's house—The trail across the summit of Chilkoot Pass—The "Stone house"—Formation of rocks on the Chilkoot Pass—Its vegetation—White Pass—Altitude of its summit—Another route to the interior—Map of the Chilkoot and Chilkat Passes and their vicinity—Earliest reference to the discovery of gold in the Yukon waters.

THE bearing of the Lewes becomes nearly due south, at the mouth of the Big Salmon. Though crooked in detail, it preserves this general bearing to the mouth of the Tes-lin-too, a distance by the river of thirty-one miles. The actual width of the river, at a point nine miles below the mouth of the Tes-lin-too, was ascertained to be 483 feet, the current being at the rate of 4·84 miles per hour. A short distance south of this point, the river again begins to widen and to resume its usual aspect. The hills bounding the valley on the south of the Seminow Range seldom exceed a height of 800 feet till the vicinity of the confluence of the Tes-lin-too and Lewes is reached, when they gradually increase to 1000 or 1500 feet.

A number of auriferous gravel-bars have been worked along this part of the Lewes, including Cassiar Bar, which has so far proved the richest on the river. Limited areas of the river-flats have also been worked over, where the alluvial cover is not too deep.

The valley near the mouth of the Tes-lin-too is again narrower than usual, singularly so for the point of confluence of two important rivers. The valley of the Tes-lin-too is evidently the main orographic depression which continues that occupied by the Lewes below the confluence. The Lewes flows in through a narrow gap, closely bordered by high hills and nearly at right angles to the lower course of the river.

The water of the Lewes has a blue, slightly opalescent colour, much resembling that of the Rhone where it issues from the Lake of Geneva, while that of the Tes-lin-too is brownish and somewhat turbid. A considerable part of the water of the former stream must be derived from the glaciers and snows of the Coast Ranges, but the existence of large lakes on both streams doubtless accounts for their proximate equality in temperature.

From the few exposures on that part of the Lewes which cuts across the Seminow Hills, the range would appear to be composed of greenish, altered volcanic rocks, probably diabase, interbedded with grey or whitish marble.

The Teslin-too River is named the Newberry or Tess-el-heena[1] on Schwatka's map, and is evidently the same which is sketched on the U.S. Coast Survey map of Alaska, etc. (1884), as the Nas-a-thane. By the miners who pass along the Lewes, it is known as the Hootalinkwa or Hotalinqu, in consequence, as it proves, of a misapprehension. The Hotilinqu, which has appeared on the maps for many years, was traversed in its upper part by Byrnes in the course of his exploration. I have ascertained that one or more of the miners who first descended the Lewes knew Byrnes, and were familiar with his work;

[1] This is doubtless a version of Tes-lin-hī-nī, *hīn* (or in combination *hī-nī*), being Tagish for river. Tes-lin-too is the name given to me by the Tagish Indians, the termination being the Tinné equivalent for *hīn*. This is, however, not the only case of such use of Tinné words by the Tagish. Nas-a-thane is doubtless Nī-sutlīn or Nī-sutlīn-hī-nī, the name of the river above the great lake. Krause names this river, on an Indian sketch attached to his map, Tis-lin-hin.

they naturally enough, on finding the river, jumped to the conclusion that it was the Hotalinqu of which he had told them.

This river still remains to be explored and mapped, and as it drains a country with a rather dry climate, the area of its basin is probably very considerable. It has been prospected to some extent by a few miners, but it is difficult, from the accounts which they are able to give, to ascertain much of a definite character respecting it. At the mouth of the river we met Mr. T. Boswell and two other miners who had spent most of the summer on it, and from Boswell's description, together with sketches subsequently obtained from Indians, the following notes are drawn up.

The general trend of the Tes-lin-too appears to be south-eastward, and Boswell estimates its length, to the great lake, at one hundred miles. There are no rapids or falls in this distance, but the water for sixty or seventy miles from the mouth is moderately swift, the remaining distance to the lake being quite slack. The lake is represented as being at least one hundred miles in length, but accounts differ as to the existence of a large tributary river at its head, some affirming that there is merely a small unimportant stream. Be that as it may, the main continuation of the Tes-lin-too is found at the head of an arm ten or twelve miles long, on the east side of the lake. This river, known to the Tagish Indians as Ni-sutlin-hī-nī, must come from a north-easterly direction in the first instance, and it is represented as circling completely round the head of the Big Salmon River and rising between that River and the Upper Pelly. At a distance variously estimated at from eighty to one hundred and twenty miles from its mouth (and said by the Indians to be two days' travel down stream), the river forks, the west fork being the larger and that of which the course has just been described. The east fork is swift and full of rapids; it rises in a mountainous country, which no doubt represents a portion of the northern continuation of the Cassiar Range. The Indians travel several days up this fork and then cross mountains to tributaries of the Upper Liard and descend by these to the little trading post at the confluence of the Liard and Dease. Between the mouth of the main river and the forks above mentioned, the navigation is fairly good and no heavy rapids occur.

The great lake above mentioned, into which the Ni-sutlīn-hī-nī discharges, is said by the Indians to be the largest known to them. It is named Tes-lin by the Tagish Indians, and is bordered to the westward, at a distance of several miles, by a high range of mountains, while a similar range, but of inferior height, runs along its east side and separates the Tes-lin-too from the Big Salmon further north. Near the head of the lake is an Indian trail by which, it is said, the head of canoe navigation on the Taku River may be reached in two long days' packing. Inquiry seems to show that the distance from point to point by this trail is about sixty miles, and that it crosses a range of mountains, but not at such a height as to pass entirely out of the timber. It is stated that a miner named Mike Powers, with eight or nine other men, crossed from the Taku to the lake in 1876 or 1877. These men built three boats on the lake, but do not appear to have done much prospecting, and came out by the same route by which they had entered.

There are two Indian salmon-fishing stations on the Ni-sutlīn-hī-nī above Tes-lin Lake. Mr. Boswell and his partners found fine gold all along the Tes-lin-too and also on the Ni-sutlīn-hī-nī. They worked in different places along the river and appear to have done fairly well.

From the mouth of the Tes-lin-too or Newberry to the lower end of Lake Labarge the distance by the Lewes is twenty-seven miles and a half. The river is very crooked, and for the first six or seven miles very rapid, averaging probably six miles an hour. Large boulders occur in its bed in some places, but it is believed that a stern-wheel steamer of good power might ascend without difficulty. The current becomes slack three or four miles before reaching the lake. The river does not follow any well marked or important valley, but an irregular depression among lumpy inconsequent hills, probably none rising over 1000 feet above it.

This lake, through which the Lewes River flows, is undoubtedly that named for Lake Labarge on the older maps, though Schwatka names it Kluk-tas-si, which is no doubt an attempt at its Tagish Indian name Tloo-tat-sai'. Krause calls it Tahiniwūd, which is evidently the name given to me as that of the Lewes River.

The lake is a little over thirty-one miles in length. It lies nearly north-and-south, but is somewhat irregular in outline and does not present the parallel-sided form and constant width of most of the mountain lakes. It is bordered nearly everywhere by hilly or mountainous country, but two important valleys require special mention. The first of these evidently forms the continuation of the hollow occupied by the lake itself, and runs on from its north or lower end in a north-westward direction, while the river, where it leaves the lake, turns to the north-east and breaks through the range of hills on that side. The greater part of this valley, which I propose to name the *Ogilvie Valley*, appears to drain from the lake in a north-westerly direction and probably to White River, as it is seen to be blocked by terrace-flats about 200 feet above the lake, at a distance of a few miles from it. The second valley begins in a tract of low land to the west of Richtofen Island, and runs parallel to the first, being, like it, one of the main orographic valleys of the region. A small river appears to enter the lake from this valley. The mountains on the south-west side form a well characterized range, but appear scarcely to exceed 2500 feet in height above the lake. They carried, however, some patches of old snow, the first seen by us since leaving the upper part of the Pelly River.

The hills along the lower part of the lake on the east side are remarkable in their abrupt forms and have white limestone summits. They rise from 300 to 1000 feet above the lake, and no higher mountains were seen behind them. Further up the lake, on the same side, similar limestone mountains attain a height of about 2000 feet at a short distance back, but are not so remarkable in form. On the west side of the lake, north of the Richtofen valley, the hills slope gradually back from the shore and in a few places reach a height of probably 2000 feet above it, at some miles inland. The outlines of these hills are monotonous and they are wooded nearly to the summits. South of the Richtofen valley the *Miner's Range*[1] approaches the lake at an oblique angle, but decreasing in altitude. The mountains that form this range are more varied in form than those just described.

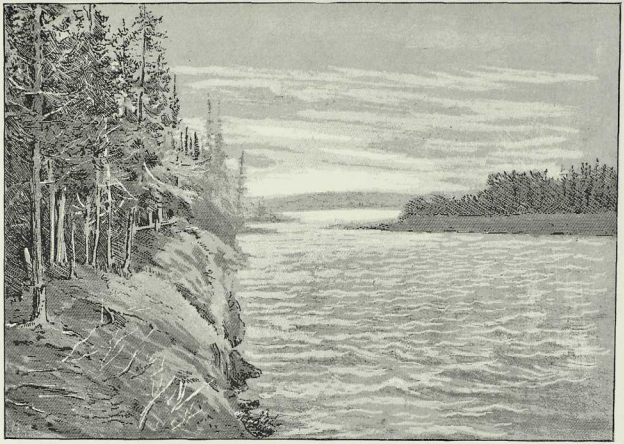
[1] I name this for the miners met by us along the river, good fellows all of them.

Though local tokens of a more humid climate were noted on the Lewes near the Seminow Hills, these are soon lost after passing that range, and along Lake Labarge, southern slopes of terraces and hills are often grassy and open. *Anemone patens* was noted as abundant in many places.

No definite indication of the mode of origin of the lake was obtained. Observation shows that the valley through which it now discharges existed in glacial times, but it may probably have been of less importance, and it is not impossible that before the glacial period the river flowed out by the Ogilvie valley, which may since have become blocked by morainic or other drift deposits.

Beyond the head of Lake Labarge, the valley of the Lewes continues equally wide, and runs in a general southward direction like that of the lake. At the head of the lake, the valley is occupied by swampy flats nearly at the water-level and by low terrace-flats, which, where cut in the river banks, are seen to be composed of stratified fine sands, which are often iron-stained, and a few miles up the river are found to rest upon the white silts, showing that they are valley deposits of post-glacial date. The limestone range which has bordered the east side of Lake Labarge, runs on in a southward direction, forming the east side of the wide valley. Eleven miles and a half from the head of the lake the Tahk-heena River flows in from the west, making a right angle with the main river, and at thirteen miles further (still measuring along the river) the foot of White Horse Rapid is reached. The current of the Lewes is rather slack for eleven miles from the lake, and the bed and banks are clayey or sandy. Above this point, the river becomes swift, averaging about four miles an hour, and gravel banks and bars reappear. For about two miles below the White Horse Rapid the current is very swift, and though the latter may be designated as the head of possible steamer navigation, it would scarcely pay to endeavour to force a steamer up to the very foot of the rapid. No rock exposures whatever were seen along this part of the Lewes, the scarped banks, which are often a hundred feet in height, consisting almost entirely of white silts with a widely undulated bedding.

The Tahk-heena River is named the Tukon at its outflow from



WHITE HORSE RAPIDS.

"west Kussooā Lake" at its head, on Krause's map. The orthography of the published maps is retained here. The name would probably be more correctly rendered Ta-hī-nī. It is a considerable stream and is wide and slack at its confluence with the Lewes. At about 200 yards from the Lewes, where it has attained its normal size, it was ascertained to be 237 feet wide, with a depth of ten feet for about one-third of this width, and a current estimated at two miles an hour. The hills which border the south side of this river at its mouth, rise to high rugged mountains at about fifteen miles to the west, and these have the appearance of being largely composed of granite. The water of this river is very turbid as compared with that of the Lewes.

The principal sources of the Tahk-heena are shown by Dr. A. Krause's exploration to be at a distance of forty to fifty miles from the head of the west branch of Lynn Canal, and the river was formerly much employed by the Chilkat Indians, whose chief place is on that arm, as a means of reaching the interior. It is not used by the miners, and is now used to only a small extent by the Indians themselves, on account of the long and difficult carriage from the sea to its head; but the lake at the head of the river once reached, the voyage down stream is reported to be easier than that by the main river, the rapids being less serious.

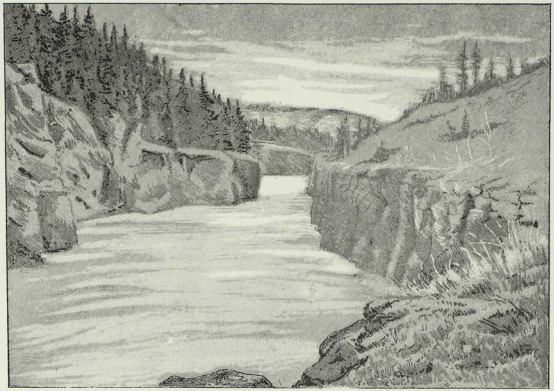
The White Horse Rapid and Miles Cañon form together the most formidable obstacle to the use of the Lewes as a route into the interior, constituting an interruption to navigation of two and three-quarter miles in total length. White Horse Rapid is three-eighths of a mile long.[1] The worst rapid is at the lower end of the White Horse, where the river scarcely exceeds a hundred feet in width, with low basaltic banks, and the force of the water is very great. In the upper part of the White Horse, the water flows between low basalt cliffs scarcely exceeding twenty feet in height, but sufficient to render tracking precarious and difficult, while the numerous rocks in mid-channel make the rapid dangerous to run. The portage is on the west bank, and it is usual to carry both boats and cargo over it.

[1] The distances here given are those measured by Mr. Ogilvie.

Between the White Horse and the foot of the cañon the river is very swift, and at one place, a mile above the former and three-quarters of a mile below the latter, the set of the stream is so strong round a rocky point as to render it advisable to make an additional short portage of 130 feet. A third portage of five-eighths of a mile is necessary at Miles Cañon. This portage is on the east bank, and at the lower end a very steep ascent has first to be overcome. Here a sort of extemporized windlass has been rigged up by the miners for the purpose of hauling up their boats. The cañon is cut through a nearly horizontal flow of basalt and is not more than a hundred feet in width, with vertical cliffs averaging about fifty feet, and never exceeding one hundred feet, at the sides. It opens out into a basin in the middle, but the river is elsewhere inaccessible from the banks. Terraced hills rise above the basalt walls on each side of the valley, but are particularly abrupt on the west bank. The river flows through the cañon with great velocity, but is unimpeded in its course, and it is therefore not very risky to run with a good boat. The White Horse Rapid is, however, much more dangerous, and though some of the miners have run through it—generally accidentally—it should not be attempted.

The great structural valley which is occupied by Lake Labarge and by the river above it up to this point, runs on above the cañon as a wide, important depression, bearing nearly due south, and appears to be uninterrupted till it joins the lower end of Bennett Lake, thirty-two miles distant. The course of the river, however, diverges to the south-east, in which direction also a wide valley runs, and in twenty-three miles (following the stream) the lower end of Lake Marsh is reached. This valley, though extensive between its limiting slopes, is not regularly bounded by parallel ranges, like that first mentioned.

The climate is dry, the black pine (*Pinus Murrayana*) is now very abundant, much more so than on the lower river, and it was here observed that this tree began to assume a more branching and less rigid form than it has to the north. Large numbers of salmon were found dead or dying along the banks for a few miles above the cañon, and the grass along the



MILES CAÑON.

shores was trodden down by bears attracted here by this circumstance. No salmon were found so far up as Lake Marsh, and the Indians consider this is the limit of the fish. It would appear that after their long journey from the sea, those which get so far, exhaust their last remaining strength in ascending the cañon.

Lake Marsh, so named by Schwatka, in honour of Prof. O. C. Marsh, is known to the miners as "Mud Lake." It is twenty miles in length, with an average width of about two miles, pretty uniformly maintained. The valley of which whose centre the lake occupies, is notably wide, and the country in the immediate vicinity of the lake is quite low, consisting of terrace-flats, or low rounded or wooded hills and ridges. Conspicuous mountain summits, however, occur at a distance of some miles inland on both sides of the lake. A moderately well-defined range, of which Michie Mountain[1] 5540 feet in height is the most elevated point, bounds the view on the east side of the lake. To the west is an irregular and broken mass of mountains in which several notable gaps occur, and which occupy the country between Lake Marsh and the Watson valley, previously referred to. The highest points of these, *Mounts Lorne* and *Lansdowne*, were ascertained to have approximate elevations of 6400 and 6140 feet respectively. The diversified forms of the mountains in view from this lake render it particularly picturesque, and at the time of our visit the autumn tints of the aspens and other deciduous trees and shrubs, mingled with the sombre greens of the spruces and pines, added to its beauty.

The upper end of Lake Marsh is connected with Tagish Lake by a wide tranquil reach of river five miles in length. The current is here very slack, and the depth, according to Ogilvie, from six to twelve feet. The river is bordered by low terraces, which are particularly wide on the west side, and are covered with open woods, chiefly consisting of white spruce and cottonwood. To the east, the long irregular ridges and slopes which culminate in Jubilee Mountain begin to rise a short distance back from the river. A mile above Lake Marsh, on the east bank of the river, are two roughly built houses

[1] So named by Schwatka.

belonging to the Tagish Indians. These are the only permanent houses seen along the whole course of the Lewes, and here the Tagish people, who roam over this part of the country, reside during the winter months.

From the description just given, it will be seen that the navigation, by steamers, from the head of the cañon through Lake Marsh and to Tagish Lake would offer no difficulties, while the tranquil character of the connecting river between the two lakes last mentioned, is such as practically to render Lake Marsh the lower portion of an extensive system of still-water navigation which includes not only Tagish Lake, but also Lake Nares, Lake Bennett, and possibly other connected waters, and which will prove of the greatest utility at no distant date in facilitating the opening up and development of the mineral resources of the tract of country in their vicinity.

Taken as a whole, these lakes constitute a singularly picturesque region, abounding in striking points of view and in landscapes pleasing in their variety, or grand and impressive in their combination of rugged mountain forms.

The inner or north-eastern edge of the Coast Ranges is not here very well defined, but Tagish and Bennett Lakes, with their several arms, may be described as lying upon this border and as in part penetrating the outskirts of the range. The lower part of Tagish Lake occupies the continuation of the same wide valley in which Lake Marsh lies, and the valley of the Tako Arm may also be included as a part of the same depression. To the west of this, the upper part of Tagish Lake and Bennett Lake must be considered as lying among the mountains of the Coast Ranges, and the height as well as the abrupt and rugged character of the mountains increase in that direction, their slopes and summits holding large areas of permanent snow, even late in the summer.

In consequence of the position of this country, in the lee of the higher crests of the Coast Ranges, and notwithstanding its considerable altitude, the climate appears to be equally dry with that about the site of old Fort Selkirk, and no very striking difference exists in the character of the vegetation. The southward facing slopes of some of the mountains, to a height of a thousand feet or more above the lake, are grassy

and open, a circumstance particularly observable on the north side of the west part of Tagish Lake and on Lake Nares.

This is the main continuation of the Lewes, and is reported to be a tranquil stream of no great length, resembling that between Marsh and Tagish lakes. It flows out of the west side of another very long lake which lies nearly parallel to Tahko Arm. This lake, near the south end, receives several feeders, one of which, entering at its extremity, I suppose to be the Hotalinqu River of the Telegraph Survey, though the Tagish Indians informed me they named it Yil-hī-nī.

The Indian name of the lake here named Tagish Lake, is Ta-gish-ai (Tagīschā of Krause). It is commonly known by the miners as Tako Lake, and Schwatka adopts this name on his map. It appears, however, admissible to revert to the proper Indian pronunciation of the name. I am obliged, by the facts of the case, to include Bove Lake, of Schwatka, as part of Tagish Lake, but, in order to preserve the name, propose to attach it to the large island in the mouth of Windy Arm. Lake Nares is known to the miners as "Moose Lake," Lake Bennett as "Boat Lake."

A glance at the map will show that the lakes of this system occupy a portion only of a still more extensive system of wide valleys, which are probably of great antiquity. The pre-glacial direction of drainage in some of these can only be conjectured. All those valleys are now, to a great extent, filled with detrital deposits, probably due for the most part to the glacial period. No appreciable deepening of drainage levels is going on, and the action at present in progress is constantly tending toward the filling up of the lake basins. It may be presumed, here as elsewhere, that the lakes of this region now occupy the place of the last tongues of the great glacier, which in the end disappeared so rapidly that their beds had not time to become filled with detritus.

Lake Lindeman occupies the continuation of the same valley in which Lake Bennett lies, but is separated from that lake by a small rapid stream, three-quarters of a mile in length. This stream falls about twenty feet between the two lakes, and is rough and rocky. The portage is on the east side, and after carrying the greater part of our stuff overland, we experienced

no difficulty in bringing the boat up the rapids. Lake Lindeman (Ti-tshoo-tah-minī of the Tagish Indians Schütlüchroä Lake of Krause) is five miles in total length, with an average width of about half a mile. It is the extreme head of navigation in this direction. The lower end is shallow, and the occurrence there of many large boulders may show that it is moraine-dammed. Its shores are rough and rocky along both sides, high rough mountains rising on its north bank, while lower country, consisting of rocky hills, extends to the southeastward, as far as the White Pass. A stream joins the head of the lake from the west, in which direction the main valley runs, but bifurcates at a distance of about three miles, the branches running off among high granite mountains. A second stream of some size, which evidently becomes a formidable torrent at certain seasons, flows into the lake about a mile from its head, on the south side. It is the valley of this stream which is followed by the trail by which the Coast Mountains are crossed. The scenery about this lake is wild and fine, though solitary and alpine in the extreme. The rocks everywhere about the lake are granites of the kind just described.

As a number of miners had preceded us, on their way to the coast, we found several boats drawn up on the shore at the mouth of the stream above mentioned. We were also so fortunate as to find a small party of Tagish Indians camped there, but most of the men had already gone over the portage with some of the miners, and we were obliged to wait two days for their return, before we could obtain the requisite assistance to carry over our stuff.

The total length of the route by the Lewes River from "the Landing" on Lake Lindeman to the site of Fort Selkirk is 357 miles. From the outlet of Lake Labarge to the same point is a distance of 200 miles, in which the total descent is 595 feet, or at the rate of 2·97 feet to the mile.

The information obtained respecting the dates of opening and closing of the river in spring and autumn is very fragmentary. It would appear, however, that the rivers generally throughout the region open early in May, while they may be expected to freeze over, in slack-water reaches, any time after the middle of October, on the occurrence of a few consecutive days of hard

frost. Loose ice sometimes begins to run in the rivers as early as September 20th, but this generally precedes the actual closing of the rivers by a couple of weeks. In some seasons the rivers do not freeze over till well on in November. The ice, however, remains much longer unbroken upon the lakes, the lakes on the course of the Lewes thus generally preventing the descent of that river by boats till June.

Miners entering the Yukon district by the Chilkoot Pass and Lewes River, frequently leave the head of Lynn Canal in April, and after crossing the pass—for this fine weather is essential—continue on down the lakes on the ice, and then, if necessary, wait at some convenient point for the opening of navigation, and build their boats.

In ascending the river, much depends on the build of the boat employed and skill of the men in poling, as well as on the occurrence, or otherwise, of head-winds on the lakes. The whole distance from Forty-mile Creek to Lake Lindeman has been made once or twice in so short a time as thirty days, and I believe that even this record has been surpassed by a couple of days on one occasion, but under very exceptional circumstances.

Much, however, depends on the stage of water in the river, as when it is unusually high, the current is not only stronger, but many of the bars and beaches are covered, and the poling and tracking is much more laborious.

Timber suitable for building boats can scarcely be found in the vicinity of Lake Lindeman, but no difficulty is met with in obtaining trees of fair size on Bennett and Tagish Lakes. Below these lakes the country is generally wooded, and there is an abundance of spruce of fair quality, growing tall and straight in sheltered localities, but seldom attaining a diameter of two feet.

On the 19th of September, 1887, we set out with four Indian packers, crossed the summit, and reached a point in the valley of the west slope near what is known as Sheep Camp, the same evening. On the evening of the 20th, we arrived at the head of tide-water on Taiya Inlet, and were hospitably received by Mr. J. Healey, who has established himself at that point for purposes of trade with the Indians and miners. We had at

this time just completed our fourth month of arduous and incessant travel from Wrangell, at the mouth of the Stikine River, by the rivers, lakes and portages of the interior described in the foregoing pages, the total distance traversed being about 1322 miles. It was not the least pleasing moment of the entire journey when, from a distance of some miles, we first caught sight of the sea shining like a plate of beaten bronze under the rays of the evening sun.

The length of the mountain portage from Lake Lindeman to Healey's house is twenty-three miles and a half, the summit of the pass being at a distance of eight miles and a half from Lake Lindeman, with an elevation of 3502 feet.

The valley on the north or inland side of the summit contains several little lakes which are evidently true rock-basins, with lumpy bottoms and irregular contours. The trail is rough and crooked, and entirely without attempt at improvement of any kind. It follows the stream in one place, for about a mile, through a narrow rocky defile, which has evidently been cut out since the glacial period. Where it crosses wide areas of shattered rocks, the closest attention is required to follow it, and this can only be done, in the absence of guides, by noting the slightly soiled appearance of the grey stones from one to another of which the Indians step. Some of the valleys to the north of the summit, and near it, are deeply filled with perennial snow, over which the trail runs by preference, to avoid the rocky slopes. The small lakes highest in the pass were, at the time we crossed, about two-thirds covered with new ice ; this showed little sign of melting, even under the bright sun that prevailed. Hard frosts were evidently occurring here in the mountains every night at this season.

From seven to eight miles of the highest part of the pass is entirely destitute of timber, even of a stunted growth such as might be used for firewood. The nature of the ground is, however, so rocky that it does not afford a proper criterion of the normal height of the timber-line.

At the actual summit, the trail leads through a narrow, rocky gap, and the whole scene is one of complete desolation, the naked granite rocks rising steeply to partly snow-clad mountains on either side. The slope of the pass on the north side is

gradual, and the total ascent from the lake not very great, being but 1334 feet. To the south, on the contrary, it is at first abrupt and even precipitous, being accomplished over huge masses of fallen rock, which alternate here and there with steep slippery surfaces of rock in places; but the travelling here is after all not so bad as that met with lower down the valley, where the trail goes through the woods along the steep, rocky and often boggy hillside, leading up and down the sides of several deep, narrow gullies. Two small detached glaciers occupy hollows in the slope of the mountains on the west side of this valley, and from these a considerable part of the water of the stream is derived. The "Stone house," or stone houses, and "Sheep camp" are points noted in this part of the pass, the first consisting of several natural though inconvenient shelters, beneath great masses of rock which have rolled down from the mountain, where the Indians often stop over night; the second being the point where arboreal vegetation of fair growth begins.

At six miles from the head of the inlet, the stream followed down from the summit is joined by another which has been dignified by the name of the Nourse River. A short distance up the valley of the latter are somewhat extensive glaciers and high snow-covered mountains. Both the valley of this stream and that coming from the pass are narrow and **V**-shaped, but from their point of junction a wide flat-bottomed valley runs due south between high mountain walls and is continued further on in that occupied by the inlet itself. This valley is largely floored by gravel-flats and is evidently subjected at times to heavy floods. The little river formed by the confluence of these streams may be ascended with difficulty by canoes, for some miles, when the water is not low, but at the time we passed this was scarcely practicable. It is, however, easy to walk along the gravel-flats, the only discomfort being the necessity of fording the ice-cold and very swift water several times *en route*.

The rocks met with on the Chilkoot Pass are practically all granites, generally hornblendic and grey, though varying in coarseness of grain, and often porphyritic with pink orthoclase. Below the Forks, on the east side of the valley, the summits of several mountains show rocks evidently stratified, dipping at

high angles. These are probably gneiss or schist, like those seen in the valley of the pass.

Scrubby hemlock (*Tsuga Pattoniana*) in a prostrate form occurs not far below the actual summit on both slopes. Below the "Stone house" this tree becomes arboreal, and a few miles further down the valley grows tall and straight, forming entire groves. Menzies spruce (*Abies Sitchensis*) also appears, a short distance below "Sheep camp," together with cottonwood (probably *Populus balsamifera*). Here also elder and birch were first seen on the south slope. The devil's club (*Fatsia horrida*) comes in about a mile above "Sheep camp." *Pinus contorta* was not seen till the Forks was reached.

The "Stone house" is named Te-hīt by the Indians. The Indian name of the Taiya River of the maps, is Daī-ē'. Nourse River is named Kīt-li-koo-goo-ā', the stream followed southward from the summit of the pass Sī-tik'. These rivers are named Katlakúchra and Ssidrajīk on the map of Dr. A. Krause.

Having heard reports of the existence of a second pass from Taiya Inlet to the lakes on the head-waters of the Lewes, Mr. Ogilvie sent Capt. W. Moore to make an examination of it, with instructions to rejoin the party to the east of the mountains. This pass Mr. Ogilvie has named White Pass in honour of the late Minister of the Interior. It leaves the coast at the mouth of the Shkagway River[1] five miles south of the head of Taiya Inlet, and runs parallel to Chilkoot Pass at no great distance from it. The distance from the coast to the summit is stated as seventeen miles; the first five miles are of level bottom-land, thickly timbered. The next nine miles is in a cañon-like valley where heavy work would be encountered in constructing a trail. The remaining distance of three miles, to the summit, is comparatively easy. The altitude of the summit is roughly estimated at 2600 feet. Beyond the summit a wide valley is entered, and the descent to the first little lake is said to be not more than one hundred feet. The mountains rapidly decrease in height and abruptness after the summit is passed, and the valley bifurcates, one branch leading to the head of Windy Arm of Tagish Lake, the other (down which the water drains) going to Tako Arm of the same lake.

[1] So named on chart in U.S. Coast Pilot, Schkague River of Krause.

There is still another route into the interior, which the Indians occasionally employ in winter when the travelling is good over the snow. This leaves the Nourse or west branch of the Taiya, and runs west of the Chilkoot Pass to the head of Lake Lindeman.

The first map of the Chilkoot and Chilkat Passes and their vicinity is due, as mentioned further on, to Dr. A. Krause. The passes connecting the coast with the interior country, from the heads of Lynn Canal to the upper waters of the Lewes, were always jealously guarded by the Chilkat and Chilkoot Indians of the coast, who carried on a lucrative trade with the interior or "Stick" Indians, and held these people in a species of subjection. Though the existence of these routes to the interior was known to the traders and prospectors, the hostility of the Chilkats and Chilkoots to the passage of whites long prevented their exploration.

I have not been able to find any reference to the discovery of gold in the Yukon waters earlier than that given by Mr. F. Whymper, who writes in 1869: "It is worthy of mention that minute specks of gold have been found by some of the Hudson Bay Company's men in the Yukon, but not in quantities to warrant a 'rush' to the locality."[1]

[1] Travels in Alaska and on the Yukon. London, 1869, p. 227.

CHAPTER XI.

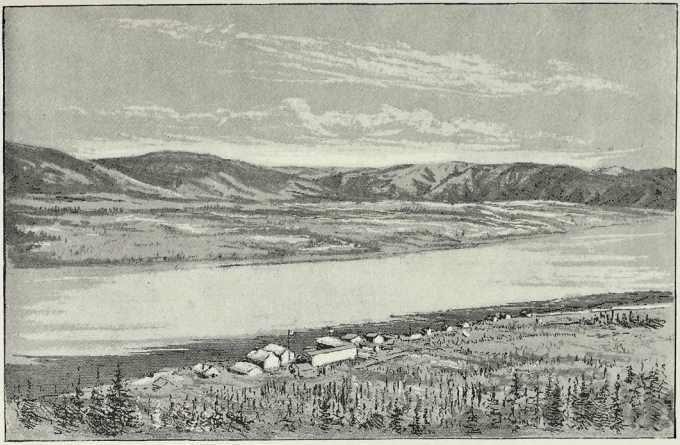
George Holt the first white man to cross—Date of Holt's journey—By the Chilkoot or White Pass to the head of the Lewes—The river followed down to Lake Marsh—Over the Indian trail to the Tes-lin-too—Return to the coast by the same route—Holt reported the discovery of "coarse gold"—His statement unconfirmed by subsequent prospectors—Prospecting party organized at Sitka in 1880—Chilkoot Pass crossed to Lake Lindeman—The Tes-lin-too ascended and prospected—No encouraging "prospects" met with—The Chilkoot Pass again crossed in 1881—First discovery of paying placers in the Big Salmon district—Entry of the Yukon country by the Chilkoot Pass in 1882—Exploration of the Chilkoot and Chilkat Passes by Dr. Arthur Krause—Progress of mining during 1883, 1884, and 1885—Discovery of Cassiar Bar in 1886—"Coarse gold" found on Forty Mile Creek—General view of the gold discoveries in the Upper Yukon country—Number of miners in 1887—Extent of country over which gold has been found—Promising prospect for the utilization of this great mining field—Difficulties and hardships to be overcome by miners now entering the country—Long and severe winters—Short season for working on river bars—Frozen ground—Capability of country to support a considerable mining population.

THE first white man who crossed from the coast to the head-waters of the Lewes was probably one George Holt,[1] who did so with the object of prospecting the country.[2]

The date of Holt's journey was, I believe, 1878. He was accompanied by one or more Indians, and crossed by the Chilkoot or by the White Pass to the head of the Lewes. He followed the river down to the lower end of Lake Marsh, and walked over the Indian trail thence to the Tes-lin-too, returning to the coast again by the same route. On his return, he reported the discovery of "coarse gold," but none of the miners who afterwards prospected the region mentioned have been able to confirm his statement in this particular. In the Alaska Coast Pilot the date of Holt's journey is given as 1875, and in

[1] Afterwards murdered by Indians at Cook's Inlet in 1885. Shores and Alps of Alaska, H. W. Seton Karr, London, 1887.

[2] U.S. Coast Pilot, Alaska, 1883. pp. 200, 278.



JUNCTION OF FORTY MILE AND YUKON RIVERS (LEFT-HAND VIEW).

the addendum to the same work as 1872,[1] in Mrs. Scidmore's book, already quoted, as "1872 or 1884." The date and route above assigned to Holt are, however, probably correct, being the result of inquiry among miners who knew him, followed his route through the country, and came in contact with the Indians whom he had met.

Some years later, in 1880, a prospecting party of nineteen men was organized at Sitka under the leadership of one Edward Bean. Amicable relations were established with the Chilkats and Chilkoots through the kind offices of Captain Beardslee, U.S.N., and the Chilkoot Pass was crossed to Lake Lindeman. The party had, by this time, increased to twenty-five in number.[2] Boats were built on Lake Lindeman, and on the 4th of July the prospectors set out down stream. The Tes-lin-too was reached and was then, for the first time (and as it proves, erroneously) recognized as the Hotalinqu. Before returning, the Tes-lin too was ascended and prospected for some distance. From George Langtry, who was a member of the original party, and R. Steel, who joined in later, the facts, as above given, are derived.[3] No encouraging "prospects" were met with at this time, though Steel states that he found bars yielding at the rate of $2·50 a day in a small stream which joins the Lewes fifteen miles above the cañon.

This large party was closely followed by two miners known as Johnny Mackenzie and "Slim Jim," who reached Lake Lindeman on July 3rd. It is possible that other parties as well entered the country in that year; but if so, I have been unable to trace them.

[1] Other extraordinary journeys assigned to Holt in Mrs. Scidmore's book are, according to the miners, altogether incorrect. Holt appears to have been a romancer with considerable inventive powers, but it is possible that he made more than one journey. In May, 1878, Messrs. Rath Brothers, of Victoria, and Mr. Bean, of California, set out to cross by the Chilkoot Pass for the purpose of prospecting, but were not allowed to go inland by the Indians. Morris, Report upon the Customs District, etc., of Alaska, 1879, p. 97.

[2] It had increased to twenty shortly after leaving Sitka. See Report by Captain Beardslee, 47th Congress, 1st Session, Senate, Ex. Doc. No. 71, p. 65. In the same report, the names of the nineteen original members of the party are given and some account of its organization, etc.

[3] The account of the further wanderings of the party given in the U.S. Coast Pilot, Alaska (1883), p. 278, is incorrect.

In 1881, a party of four miners, including G. Langtry and P. McGlinchey, again crossed the Chilkoot Pass. These men got as far as the Big Salmon River, which they called the Iyon, by which name it is marked on the U.S. Coast Survey map of 1884. They ascended the Big Salmon, according to their estimate, about 200 miles, finding a little gold all along its course and meeting with some remunerative river-bars. This may be characterized as the first discovery of paying placers in the district.

In 1882, a number of miners entered the Yukon country by the Chilkoot Pass, and probably during this season, but certainly not before,[1] two prospecting parties ascended the Pelly to Hoole Cañon, and some of the men appear to have even gone some distance further up.[2]

Dr. Arthur Krause, engaged in an expedition on behalf of the Bremen Geographical Society, in May and June, 1882, made an exploration of the Chilkoot and Chilkat Passes, reaching Lake Lindeman and the sources of the Tahk-heena River respectively. His work is embodied in maps published by the Bremen and Berlin Geographical Societies, and it is worthy of special note on account of its conscientious accuracy.[3]

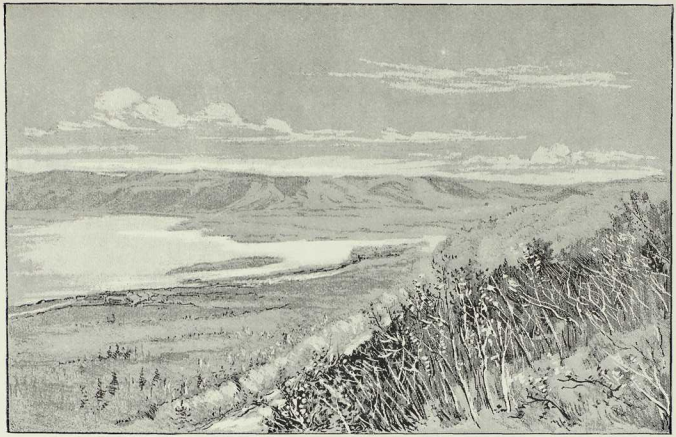
In 1883, some mining was again in progress, but details respecting it have not been obtained. It was in this year that Lieut. Schwatka crossed the Chilkoot Pass and descended the Lewes and Yukon to the sea.[4] In 1884 a little mining was done on the Pelly and on the Tes-lin-too, and possibly also on the Lewes. In 1885, mining was begun along the Stewart

[1] According to miners who were in the country at the time, the statements which have been published of earlier prospecting along the Upper Pelly are erroneous.

[2] Through the kindness of Mr. François Mercier, I have obtained from Mr. D. Bertrand, who was a member of one of the parties above referred to, the names of the men composing both, as follows:—Thomas Boswell, John Dougan, Robert Robertson, D. Bertrand, Frank Densmore, John Riley, P. Cloudman, Robert Fox, Thomas Curney. The date as above given is from Mr. Bertrand. Mr. Boswell, whom we met on the Lewes in 1887, was understood to say that he had been prospecting up the Pelly in 1884 or 1885, but this statement probably referred to a subsequent expedition.

[3] Deutsche Geographische Blätter Bd. v. Heft. 4, 1882. Zeitschr. des Ges für Erdk. zu Berlin Bd. xviii., 1883.

[4] See Science, vol. iii., 1884, also Report of a Military Reconnaissance in Alaska, Washington Government, 1885. Along Alaska's Great River, New York, 1885.



JUNCTION OF FORTY MILE AND YUKON RIVERS (RIGHT-HAND VIEW).

River, and in the following year, the greater part of the mining population was engaged on that river. Cassiar Bar, on the Lewes, twenty-seven miles below the Tes-lin-too, was discovered in the spring of 1886, and actively worked during the same summer.

Late in the autumn of 1886, "coarse gold" was found on Forty-mile Creek still further down the main river than the Stewart, and the announcement drew off nearly all the mining population to that place in 1887. In the attempt to bring out the news of this discovery, a miner named Williams was frozen to death on the Chilkoot Pass in January, 1887.

Taking a general view of the gold discoveries so far as made in the Upper Yukon country, we find that, though some small bars have been worked on the upper part of the Lewes, and "prospects" have been obtained even in the stream flowing into Bennett Lake, paying bars have been found on this river only below the mouth of the Tes-lin-too. The best of these are within about seventy miles below this confluence, and the richest so far has been Cassiar Bar. This is reported to have yielded, in some cases, at the rate of $30 a day to the hand, and gold to the value of many thousand dollars has been obtained from it, chiefly in 1886. In 1887 only three or four men worked here. All along the Lewes below the Tes-lin-too, many bars occur which, according to the reports of prospectors, yield as much as $10 a day, and the same is true of the Tes-lin-too itself, both below and above Tes-lin Lake.

Gold has also been found for a long distance up the Big Salmon River, and on the Upper Pelly so far as it has been prospected. The Tes-lin-too, Big Salmon and Pelly have each already afforded some good paying ground, but in consequence of the rush to Forty-mile Creek only about thirteen miners remained in 1887 on the first-named river, four on the second, and two on the Pelly. On the Stewart River, as much as $100 a day to the hand was obtained in 1885 and 1886, and probably over $100,000 worth of gold has already been obtained along this stream. It has been prospected for a distance of 100 to 200 miles from its mouth (according to varying statements), and the gold found furthest up is said to be somewhat "coarser" than that of the lower part.

Forty Mile Creek is reported to be a river of some size, but more rapid than most of those in the district. It has, according to miners, been prospected for about a hundred miles from its mouth, gold being found almost everywhere along it as well as in tributary gulches. The gold varies much in character, but is quite often coarse and nuggety, and very large amounts have been taken out in favourable places by individual miners. Few of the men mining here in 1887 were content with ground yielding less than $14 a day, and several had taken out nearly $100 a day for a short time. The amount obtained from this stream in 1887 is reckoned by some as high as $120,000, but I believe it would be safe to put the entire output of the Upper Yukon region for the year at a minimum of $75,000, of which the greatest part was derived from this stream.

The number of miners in the whole Upper Yukon country in 1887 may be stated at about 250; of these, 200 were on Forty Mile Creek, and it was estimated that at least 100 would winter on the creek to be ready for work in the spring.

Forty Mile Creek is what the miners term a "bed-rock creek," i.e. one in which there is no great depth of drift or detrital deposits below the level of the actual stream. It is so far the only locality which has been found to yield "coarse gold," but from the extremely wide distribution of "fine gold" it may safely be predicted that many more like it remain to be discovered.

Mining can scarcely be said to have begun in the region more than five years ago, and the extent of country over which gold has been found in greater or less quantity is already very great. Most of the prospecting has been confined to the banks and bars of the larger rivers, and it is only when their innumerable tributary streams begin to be closely searched, that "gulch diggings" like those of Dease, McDame and other streams in the Cassiar district, and possibly even on a par with Williams and Lightning Creeks in Caribou, will be found and worked. The general result so far has been to prove that six large and long rivers, the Lewes, Tes-lin-too, Big Salmon, Pelly, Stewart and White, yield "fine gold" along hundreds of miles of their lower courses. With the exception of the Lewes, no part of the headwaters of any of these have yet been prospected or even reached

by the miners, and scarcely any of their innumerable tributaries have been examined. The developments up to this time are sufficient to show that when means of access are improved, important bar-mining will take place along all these main rivers, and there is every reason to anticipate that the result of the examination in detail of the smaller streams will be the discovery of much richer auriferous alluviums. When these have been found and worked, quartz mining will doubtless follow, and the prospects for the utilization of this great mining field in the near future appear to be very promising.

I must not, however, omit to state that great difficulties and hardships have to be overcome by the miners who now enter this country. The winter in the country is long and severe, and the season of low water suitable for working on river-bars is short. It is also found that beneath its mossy covering, the ground is often frozen, presenting difficulties of another character, which have prevented the working of many promising flats and benches. This, however, is likely to be remedied by the general burning off of the woods and moss in the mining camps. Frozen ground was found in the same way in the early days of the Cassiar mines, but the destruction of the timber has now allowed the summer heat to penetrate to the lower layers of the soil almost everywhere. It is not likely that this great inland country will long be without some easy means of connection between the coast and its great length of navigable lake and river waters, and when this is afforded, there is every reason to believe that it will support a considerable mining population.

END OF PART II.

PART III.

EXTRACTS FROM THE REPORT

OF

AN EXPLORATION MADE IN 1896-1897

BY

WM. OGILVIE, D.L.S., F.R.G.S.

MR. WM. OGILVIE'S EXPLORATION, 1896-1897.

Fort Cudahy, Yukon River, N.W.T.
4th Sept., 1895.

I ARRIVED here on the evening of the 30th ult., after a tedious journey through much bad weather which delayed me fully ten days. I leave for the boundary in a day, and will commence marking it at once. With reference to the applications for land at Selkirk, I may say I have not seen the applicants as yet, as they are away. It appears to me, however, from what I have learned, that the best policy is to sell the applicants the land they ask for. They have all occupied and cultivated part of it, for several years, raising in their gardens such roots and vegetables as the climate will permit, on which I will report more fully later on. There is no great prospect of any town of importance ever being either at Cudahy or Forty Mile. There are many mining camps now in the country, and besides, the miners find it pays well, to what they call "drift," that is quarry out the frozen gravel during the winter, pile it up, and wash it during the spring and summer. This keeps scores of them on their claims all the winter, so that there is not that demand for town residences during the winter that existed formerly, and, consequently, town lots are somewhat at a discount. Coarse gold and excellent prospects have been found on the Hootalinqua (Teslin), and there will likely be a rush there next spring. I will report more fully on that in future.

I propose, if I can close my operations here early enough next spring, to make a survey and examination of the Hootalinqua rivers and basins on my way out to Yunean. I think this is desirable in view of the prospects of that region.

Fort Cudahy, N.W.T.
8th Jan., 1896.

I HAVE already sent out a short report from that place, being fortunate enough to catch the boat here when I came down. In that report I made some remarks on the town sites in our territories; since then I have learned nothing of importance in that connection, the most noteworthy fact being that gold-bearing quartz has been found in Cone Hill, which stands midway in the valley of the Forty Mile River, a couple of miles above the junction with the Yukon. The quantity in sight rivals that of the Treadwell mine on the coast, and the quality is better, so much so that it is thought it will pay well to work it, even under the conditions existing here.

Application has been made to purchase it, and an expert is now engaged in putting in a tunnel to test the extent. Indications in sight point to the conclusion that the whole hill is composed of this metalliferous rock. If the tests corroborate this, a stamp mill will be erected next season, which will have an important bearing on the future of this country. If this venture succeeds (as it doubtless will, for it is in the hands of parties who are able to push it) it will give permanent employment to a good many men, who with their families will form quite a community.

Apart from this I cannot see very much of a chance for speculation for buying or selling town sites; and my opinion is confirmed by the present condition of Forty Mile, which now contains very few people, the great majority of the miners remaining on their claims all winter, coming in only once or twice for supplies. Even in the case of the mine at Cone Hill being worked, only a village would be formed around it.

Outside of all such considerations, the present applicants for "Forty Mile" and "Cudahy" town sites have either directly or indirectly occupied the present sites for years and spent thousands of dollars improving and building on them. One house erected in "Forty Mile" last summer is said to have cost $10,000. It would cost between two and three thousand in Ottawa. Those improvements cover so much ground that even if it were decided to lay out the town site and convey it in

lots, the applicants would have a claim to most of the ground they ask for.

. . . . . .

A couple of coal claims have been staked and applied for, which I will survey in the spring, and at the same time make an examination of the coal area where they are. I may anticipate this to a certain extent by saying that a few days after I reported to you last fall, I went up Coal Creek to search for this coal, to which I referred in my report of 1887 and 1888. I found it about seven miles up the creek overlying a coarse sandstone, and under drift clay and gravel.

The seam is about twelve feet six inches thick. It seems to me to be a good quality of lignite. I have packed thirty or forty pounds of the best specimens I found a few feet in, and will send them out to you in the spring, that a test may be made. That exposure has now been staked and applied for to the agent here. I judge from the position of these coal claims that we have quite an area of coal here. Both exposures furnished, as far as exterior features show, the same character of coal, and are about the same level, so that it is fair to assume they are in the same seam. I will make a search in the intervening distance to determine this, when I make a survey of the claims. Coal is reported in the drift on Chandinduh, about thirty miles up the river from here, which would go to show that there is another area or continuation of this one here.

On my way down the river I saw the copper-bearing vein near Ton-dac Creek above Fort Reliance. It does not appear to be extensive, but there are several small veins in the vicinity, and it may be that a commercially valuable deposit may be found; about twenty-five miles further down I found a small vein which indicates that this copper deposit is extensive.

I found a small seam of rather poor asbestos a short distance from Fort Cudahy, and, as there is quite an extensive area of serpentine around here, asbestos may yet be found of commercial value.

Very rich placer diggings are now being worked on the creeks flowing into Sixty Mile, part of which are supposed to

be in Canada. I shall be able to say definitely, when I produce the line that far, where they are and how much we have of them.

Last season good placer mines were found on the Hootalinqua—Teslin of Dawson—with coarse gold in them, and there will probably be a lot of claims worked there next season. Several miners were wintering there to commence operations early in the spring. A great deal of improvement has been introduced into the working of placer diggings, which has much increased the output. The miner, instead of spending the winter months in the towns and saloons, remains on his claim all winter, cutting wood in the earlier months, with which he builds fires and thaws the frozen gravel, piling it up to be washed as soon as the flow of water in the spring will permit. In this way, the work is more than doubled, but as the supply of wood is very limited, except on the main river, this cannot always be done.

. . . . . .

The timber fit for building and lumber is fast disappearing along the river, and in a few years there will be none left near here. There is a portable saw-mill at Fort Ogilvie—100 miles above this—and one here, which yearly cut a good deal of lumber. Were all this utilized in Canada, nothing might be said of it, but some of it goes down the river into American territory, in addition to which a good deal of wood and logs is cut on our side and floated into Alaska, where it is sold. Some men make a business of this, and on this at least the department might collect dues. There is very little good timber on the American side of the line, hence the demand for our timber.

. . . . . .

The police have, so far, made a very favourable impression, and the general policy of the Government in connection with this district is admired.

The merchants are well satisfied with the establishment of a court of justice, and look for the early addition of some sort of a court of record where transfers and claims can be recorded, so that the collection of debts can be undertaken with some degree of certainty. As it is now—A transfers to B, who keeps the record as long as it pays him to do so, but if he is dishonest

and A absent or dishonest too, he may destroy it, and repudiate payment of his debts. This has occurred already, and as a good deal of transferring and counter-transferring is indulged in, it may occur more frequently in the future, unless some court of record is created.

It is probable the boundaries of the police jurisdiction may have to be extended in the near future, for a good deal of trading is done on the head-waters of the river by parties who cross the summit of the coast-passes with goods from Yunean. Also the miners on the head-waters and on the Hootalinqua bring their supplies from Yunean. Now one of the traders here—Harper—has a small steamboat named the *Beaver*, which he got last season for the express purpose of reaching the upper parts of the river and its affluents with supplies, and having paid duty on all his foreign goods, expects to be protected against smuggled goods. Should the Hootalinqua turn out as expected, and promised, a police force will be required there. Harper will try hard to get up with supplies to it and Teslin Lake. I fancy he can lay down most things there as cheaply as they can be brought over the pass. It costs $14 to $15, sometimes more, per hundred pounds to transport from Taiya to the lakes, which makes flour $16 to $17 per hundred at the lake, while it costs, or is sold here for $8. Things here are sold so low now, that were I ever coming in from the Pacific again, I would bring nothing in quantity but bacon, on which I might save a dollar or two a hundred, it being sold here from $30 to $35 per hundred.

. . . . . .

I have produced the boundary line about five miles north of where it crosses the Yukon River, which is as far as I thought needful at present. I have also produced it about seven miles south, and about the end of February will resume work, and run it as far as Sixty Mile Creek. In connection with this I have occupied six photograph stations and developed all the plates exposed, which have turned out satisfactorily. I have made a cross section measurement of the Yukon River where the boundary crosses it.

In order to determine the exact position of the boundary as referred to the longitude of my observatory of 1887-88, I made a careful triangulation and transverse survey from the obser-

vatory westward, which located it 109 feet west of the spot I marked in 1888 as the boundary, this being established by micrometer measurements—the distance is three miles. In the vicinity of the river, I have opened out a wide line in the woods which will remain visible for several years, but I erected nothing permanent on it. In the valley of the river the distances are chained; elsewhere they are deducted from micrometer measurements.

During the November-December lunation I got several lunar culminations, of which I have only had time to completely reduce one, and the result differs from the mean of my 1887-88 determinations by only 0·13 seconds. I hope to get some more in the January-February lunation.

On the way in, the system of thirteen wires in the transit got so damp that they bent into a useless mass of lines, some in, some out of focus; of course I did not open the box until I arrived at my winter quarters. I repeatedly dried them, thinking I might make them serve, but, after a few hours in the cold damp atmosphere, they were as bad as ever. Finally, one of them became detached at one end, fell across the others and rendered them completely useless, there being a lump of glue attached to the loose end. A diligent search for several days discovered no spider lines that could be used to replace them, and I was hopeless of doing anything with the transit this winter, until one day I discovered that a solution of indiarubber I had, might, with careful manipulation, furnish what I wanted. I tried it, and after several attempts succeeded in getting five fair threads on in the place of the original five—ten seconds apart. These wires possess the virtue of always being taut by reason of the elasticity of the rubber, so temperature does not affect their positions, but they stick together like gum if they touch, so that I could not use a micrometer wire, and consequently cannot get latitudes with the zenith telescope bubble.

Up to date, our lowest temperature has been 63° below zero. The winter has been unusually windy. Coming up here we had to face a strong wind when 52° below zero, and frozen noses were the rule of the day.

No mail from outside since September.

Fort Cudahy, N.W.T.
10th June, 1896.

AFTER sending my last report, I left Cudahy on the 12th January, reaching the boundary on the 13th, when I immediately set to work reducing the observations I had taken of lunar culminations up to that date, six in number, on one of which both limbs of the moon were observed, making several determinations of the longitude.

After my return there was some fine clear weather in January, but it was exceedingly cold and more than 60° below zero, one night 68° 5', and as I had both my ears pretty badly frozen I could not go out in such cold without having them covered, so that I could not hear the chronometer beat, I could not observe until the end of the month, when we had two fine nights—29th and 30th—mild enough for me to work. On the 29th I again observed both limbs, the moon on both these occasions being suitably full at transit here. This makes in all ten different determinations of the longitude to be summed with my work of 1887-88, and as most of my observations were then on the first limb, and most of these on the second, the total result is better balanced.

Having reduced all my observations, and the days having attained a reasonable length, I went into camp on the line on 20th February, resuming work on the 22nd. But as the hill-tops are all bare, and from two to three thousand feet above the river, we lost many days through the fierce winds.

Our progress was necessarily slow for this reason, and also from the fact that I photographed from several stations, which took some time. As there were no important creeks between Yukon and Forty Mile Rivers, I did not cut the line out continuously, but left it so that any one wishing to can place himself on or very near to the line. The distance from Yukon to Forty Mile River is a little over twenty-five miles. In the valleys along the line the timber was thick with much underbrush, but very little of it is of much value. Curiously enough the line kept generally in the valleys or on the sides of them, and very little of it was in the open. Going from point to point, we had to follow as much as possible the hill-tops and ridges. I reached Forty Mile with this survey on the 13th of March. From this point southwards there are many streams cut by the line, all

of which are more or less gold-bearing, and all have been more or less prospected. This necessitated my cutting out the line continuously from Forty Mile River onwards, which increased our work very much. The valleys traversed are generally upwards of 1000 feet deep, and often very steep, so that our work was exceedingly laborious.

Transporting our outfit from camp to camp was often a very hard task, as the hills were so steep everything had to be packed up them, which, in the deep soft snow, was anything but easy. I reached a point within two miles of Sixty Mile River on the 14th April, and as I had passed all the creeks of any note, and many of them were already running water, and our way lay down them, I thought it well to quit work on the line and return to Forty Mile and Cudahy, and attend to the local surveys there. The weather was fine and warm, and so much water ran in the creeks by which we had to return, that we could only travel a few hours in the early morning and forenoon. Had the season been more favourable, I would have visited Glacier and Miller Creeks, which were generally supposed to be in Alaska, but are found to run in Canada for some distance. They are the two richest creeks yet found on the Yukon, and are both tributaries of Sixty Mile River. Both creeks are fully located and worked, each claim being 500 feet along the creek and the width of the valley or creek bed. There are nearly 100 claims, all of which pay well. One on Miller Creek I understand will yield seventy-five to eighty thousand dollars this season, and the owner will net, it is said, between forty and fifty thousand dollars. He took out, it is reported, nearly half that sum last year off the same claim, and expects to do equally well next year. This is much the richest claim yet found, but all on those creeks do well. There are many other creeks in this vicinity yet to be prospected, and some will, I have no doubt, pay well. Gold is found all along the valley of Sixty Mile River, and under more favourable conditions, both mercantile and climatic, it would yield good results to large enterprises. The mercantile conditions will improve. The climate is a serious difficulty, but will be surmounted in time, I believe. Along the last ten or twelve miles of the line I ran, the mountains consist principally of quartz and schists, which no doubt originally held the gold

found in the valleys, and doubtless hold some yet. Several men have taken to quartz prospecting, and from indications which I will dwell on later, I believe we are on the eve of some magnificent discoveries.

The miners on all the creeks referred to have quietly accepted my line as the boundary *pro tem.*, and as far as I can learn at present, the general feeling is satisfaction that one can now know where he is. Even if the line is not final, no one doubts its being very near the final position. The line as far as run is marked by cairns of stones, wherever it was possible to procure them with reasonable time and labour, and is cut through the woods and blazed, so that no one who wants to find it can mistake it. Another source of satisfaction to all is that they know distances and directions. Many miners remark to me, "We know where we are going, we can see where south is." In this high latitude in the summer months, it is impossible to tell when the sun is near the meridian because its change in altitude is so little for eight or nine hours, consequently any point between east and west was called somewhere near south. This helps to explain much of the variance in the direction of points as given by miners and others who have no compass or are unacquainted with the use of one and the application of the declination.

On my arrival at Fort Cudahy I rented two cabins from the N. A. T. and T. Co., to house my men and self, as I would be around here probably until I started up the river. I did this because there are no convenient camping places in the vicinity, and in the spring all the flats are like lakes along the river until well into the month of June.

After a couple of days' rest for the party, who had worked very hard, and after I had developed all my photographs, I began to attend to the local surveys, first surveying the coal claims on Coal Creek and making a chain transverse survey of the creek from the claims down to the Yukon. I mail you a plot of this and the claim on a scale of forty chains to the inch. I also mail you a sketch map of my survey of the boundary line on a scale of twenty miles to the foot, and have pencilled in an idea of the topography; it is made on the best paper I could get here as I brought none with me. I next made a survey of the

Cone Hill quartz-mining claim and a chain transverse survey of the Forty Mile River from the claim down to the Yukon. I then went to work on the Forty Mile town site and the Cudahy town site. The last I was asked to block out, which I have done. The manager, Mr. C. H. Hamilton, objected to streets sixty-six feet wide on such a small plot of ground (there are only about fifty acres). I read him my instructions and wrote him an official letter on the subject, but he insisted on streets only fifty feet wide, and assumed all responsibility, so I did as he desired. I made him a plot of the work done on the ground, and he understands that he will have to pay the department for the service rendered in blocking as well as the original survey, and wishes a plan of it, which of course can only be prepared when I go out.

I made a complete survey of Forty Mile, locating and taking the dimensions of every house in it, and it is the worst jumble I ever saw. I had to do this, though it entailed a great deal of work, for there were so many claimholders, and there appeared to be a general distrust in the vicinity; every man wants himself on record in evidence as to his claim. I have taken some, but I have several days' work yet. I made a survey of the island for the Anglican mission, and of another island for a man named Gibson. This is the delta of Forty Mile Creek, and he intends to make a market garden for the growth of such vegetables as the country will produce. In my final report I will deal as fully as my experiences here will permit with that phase of the country's character. Many here have small gardens and are fairly successful with ordinary vegetables. I have advised many to correspond with the experimental farm at Ottawa, with a view to learning the best sort of vegetables for growth in this climate. There is an application in, and the purchase money and cost of survey paid, for eighty acres just west of Cudahy town site, which I will survey in a few days. There is also an application in for forty acres, containing a hay swamp, on the east side of the river, about two miles below here, which I will survey before starting out. There are many other applications in, but I shall not have time to attend to them, nor have the parties asked for a survey. I think these applications are simply intended to hold the ground until the

future of this region is forecasted; it certainly looks promising now. I would respectfully call the attention of the department to the fact that the services of a surveyor are urgently needed in here, and will be for some years to come, and I would suggest that one be appointed to look after and take charge of all the land interests in the district. He will find plenty to do, and any work outside of departmental which he might be asked to do (and there is much of it, and will be more in the way of engineering) would help materially to pay his salary, which would, of course, in here have to be liberal.

Another inconvenience is the want of a trade medium; there is very little coin, nearly all business being transacted in gold dust, which passes current at $17 per ounce troy, but as most of it will not assay that, there is some hardship to those taking it out, though there may be no actual loss. If enough money were sent in to pay the North-West Mounted Police for some time, it would help for a period at least, and would emphasize the existence of Canada. What coin and bills are here are largely American.

Another important question is the treatment of the liquor business which cannot be ignored much longer; there are several saloons in Forty Mile and one in Cudahy, yet there is no law recognizing them nor regulating them in any way. It would be almost impossible, and very unpopular, were any attempt made to close them. Liquor could not be kept out of the country if the whole North-West Mounted Police were scattered around the river.

Another subject which I have mentioned before is that of the timber. Large quantities of timber are being and have been cut in our territory, and floated down the river to American territory where it is used, and Canada derives no benefit. Were it used to develop our country it would matter less, in fact I would encourage such use, but to see our timber taken out without any sort of benefit to the country is, I think, worthy of some sort of attention. There is very little useful timber in the country, and much of what does exist is cut into fuel, while more of it goes beyond the boundary. In the near future we shall feel the want of it. I have spoken to the agent about it, but he has no authority to act, and, if he had, is disinclined to

run up and down the river looking after it, unless he has a steamer.

A word or two on the steamer question. He labours under the delusion that a small steam launch is all he requires. Now the best of them can only make five to seven miles per hour in dead water, and here we have a river with a current of six to eight miles per hour the greater part of the summer; even in low water it is five to six generally. To get up at all his launch would have to keep inshore, and even then she would not make more miles per day than the same number of men would with a good canoe or boat, tracking or poling, with the advantage to canoe or boat of not having to stop for fuel. The only boat suitable for this river is a stern-wheeler, and one of the most suitable size for police purposes would cost ten to twenty thousand dollars, and require experienced men to run her.

Some sort of court for the collection of debts is required here now, and whether or not the agent could act in that capacity is a question to be decided.

The merchants here who pay duty are naturally dissatisfied at the smuggling done on the upper river, and ask for some sort of protection. It might be advisable to have a squad of police and an officer somewhere on the lake to look after that. I am thoroughly convinced that a road from the coast to some point on the head-waters of the river, preferably by the Taku, if at all practicable, would convert all our part of the river into a hive of industry. It may be said there is no competition, and anyway, in the present condition of trade, things cannot be sold much cheaper at a fair rate of profit. Once let a railroad get from some point on the coast to some point on the river, so that we can have quick, cheap and certain entrance and exit, and the whole Yukon basin will be worked. At present the long haul makes the expense of mining machinery practically prohibitive, for the cost of transport is often more than the first cost of the machine.

Assays of Cone Hill quartz are very satisfactory, and the quantity good for generations of work; were it on the coast, the Treadwell Mine would be diminutive beside it. Five tons of rock from it are being sent out for a mill test, and should they prove as satisfactory as the test of a ton sent out last year,

I understand the parties owning it will proceed to develop it. If it starts and proves reasonably successful, there are scores of other places in the country that may yield as well. An expert here who prospects for the N. A. T. and T. Company, found a ledge last spring on the Chandindu River of Schwatka (known as Twelve Mile Creek here) and located two full claims on it. He told me the assay he made of many specimens of it was much more satisfactory than that of Cone Hill, and this ledge, he claims, is where a commencement should be made in quartz milling in this country, and there would be no fear of the result. He appeared to be pretty well versed in mining lore, is a practical assayer—that is his profession—and he says he never saw or read of anything like it for extent in the world. He informed me there were extensive deposits of coal about twenty miles up the creek, and this ledge was about four miles up. He had no doubt but that the copper about Fort Reliance will with better facilities yet be a valuable feature in the country. He showed me a lump of native copper some Indians said they found at the head of White River, but could not or would not specify where. Speaking of White River reminds me that it and Sixty Mile are very close together in the vicinity of the boundary. I was told it was only a short walk from the creeks of one to the creeks of the other, but how far from stream to stream is uncertain.

This expert is an American who has spent many years of his life in the best mining districts of the United States, and he assures me this country promises better than any he ever saw before, and as an evidence of his satisfaction with it he is going to spend the rest of his life here.

Great anxiety is felt here about a mail route and regular mail. Last winter three mails left the coast, one by the Taku route, one by the White Pass, and one *viâ* Taiya: the first two got here in good time, the last (ours by the way) did not, nor is likely to arrive, for some time—may be, never. The man in charge was badly frozen on the summit, and had to turn back, leaving the mail behind him, and it is now probably buried in fathoms of snow. An Indian brought the mail in by the Taku, and took the Slocoh branch of it to Atlin Lake. From what I learnt of this route while up there, it may be

found to afford an easier way than by Teslin Lake, but it has the disadvantage of landing on the head of the Lewes instead of the Hootalinqua or Teslin, and so takes in the cañon and White Horse Rapids.

Last winter many of the miners and residents here talked to me about the mails, and what the government intended in this direction; of course I could tell them nothing, but suggested they should make their views known by getting up a petition to the Minister of the Interior, which I understand they did.

The Alaska Commercial Company are putting a new and powerful steamer on the river, which will make four; the *Arctic*, *Alice*, and *Emma*, large, and the *Bedon*, small. There is some talk of the N. A. T. and T. Company putting on a sister boat to the *Partus B. Weare*. All are stern-wheeled boats.

From my camera stations on the boundary I saw many high mountains, some of them not less than 8000 feet, some I believe 10,000. Some of the prominent ones I have named after the pioneers of this country, notably one Mount Campbell after the late Mr. Robert Campbell, who established Fort Selkirk. It is about sixty miles due east of here, and is a noteworthy peak, in that it stands on the top of an extensive, well-defined range, rising like a lofty pillar about 1000 feet above the ridge. It is, as far as seen, the most remarkable peak in the country. I have not made any computations yet, but I do not think its summit is much, if any, less than 10,000 feet above the sea; no one noticed it before for the reason that it is only about 600 feet wide, is always black, and very distant from points where it can be seen around here.

Fort Cudahy, N.W.T.
June 25th, 1896.

My experience last winter was that a party of say eight men, three on the line continuously, and four forwarding continuously, and one cook, the line could be advanced at the rate of twenty-five miles per month with no great difficulty during February, March, April and May, and part of October, November, and part of December.

Good strong toboggans and good strong large snow-shoes are required. During June, July, August and September, the same party with say five pack horses, three at camp and two forwarding from depôt of supplies, could proceed at an equal if not faster rate. There would be about two or two and a half months too dark to profitably work on the line. This, I think, would be more satisfactory than putting in a few isolated points here and there, certainly it would give us a continuous boundary and a more extended geographical knowledge of the country, as well as botanical and geographical information of importance. Horses could be laid down here for, I should say, about $250 per head—and the same animals ought to last the whole survey. Horses have been in use here, packing to the mines in summer and hauling wood in the winter, for several years, and are still serviceable, notwithstanding that they live only on the coarse grasses of the country. They pack 200 lbs. apiece from Forty Mile River at the mouth of Moore Creek to the mines on Miller Creek (about seventeen and a half or eighteen miles), and climb some very steep long hills on the way, taking two days with loads, and one day without; all they get to eat is what they find.

As a gauge of what can be done I refer you to what I did last winter. In less than two months, February 22nd to April 13th, I produced the line nearly fifty miles, cutting every bit of bush on twenty-five miles of it, and partly cutting the rest, besides spending several days on my photograph stations, and I had only six men. I am confident that a joint party consisting of say twelve altogether, could produce this line at the rate of 300 miles per year, marking it properly and permanently, and enabling a fair map of the country on both sides to be made. The cost of this you can easily estimate and add, say 25 per cent. for the establishment of provision depôts and incidentals.

My last report told you of the agent here going to Miller and Glacier Creeks, and collecting fees and making entries; as he did not go west of those creeks no complications will arise for you, as you will see by my sketch map they are within Canada. I may say here that one claim on Miller Creek has turned out about $70,000 last winter, and several others have done very well too; so far nearly all the miners have passed here going to

Circle City (about 200 miles down), and I have no doubt many of them will keep on going.

About 100 miners are reported on the Hootalinqua this summer. We shall probably soon have to extend law and order there.

Many here make gardens, using any seeds they can get, and some are going to try grasses for fodder. I would suggest the director of the central experimental farm be asked to send in seeds of the kinds of ordinary vegetables and grasses best suited to such a climate as this, to be distributed by the agent here to those who will make a proper use of them, or for sale at cost. I am quite sure it would be of much service, and if some hints on the proper care of plants were sent in, it would be more so, as most of the people in here know practically nothing of gardening or farming. Besides, it would improve the feeling among the people here towards our country and institutions, and would cost the country practically nothing.

Fort Cudahy.
August 18th, 1896.

It is now certain that coal extends along the valley of the Yukon from Coal Creek for ten or twelve miles down, and from Coal Creek up to Twelve Mile Creek which flows into the Yukon about thirty miles above here. The latter stretch is cut off from the river by several miles of hills, and is about six miles direct from the river at Coal Creek and about eighteen on Twelve Mile Creek. This is the stream named Chandindu by Schwatka. There is a seam on it about six feet thick, as reported by an expert who went in search of it. I found drift coal on the south branch of Coal Creek.

On the Cornell claim off Cliff Creek the seam is five feet four inches thick. I have sent specimens of it out. I found it necessary to refer to the different creeks, so had to name them "Shell Creek," because I found a stone with a shell impression at its mouth. "Cliff Creek," because it enters the river at the foot of a high cliff, and "Flat Creek," because it enters the river in a large flat.

Glacier Creek is turning out very well, and several good creeks have been discovered up Forty Mile in Alaska.

Fort Cudahy.
6th Sept., 1896.

I HAVE been in hourly expectation of the Canadian mail for some days now, but it has not arrived yet. The steamer *Alice* came up on the 4th inst., but brought no news for me, so that I am completely in the dark as to my movements yet, and if I am to go out, it is time I was on the way. I do not wish to remain here another winter unless it is absolutely necessary; more especially with my party and all its expenses. In case I go out I will try to accompany Mr. J. Dalton over his trail from the head of Chilkat Inlet to Selkirk on the Yukon. He has made several entries over that route with horses and packs, and speaks very highly of it. I will make a rough survey of it, and take some photographs along the route.

I have taken notes from him, but would like to see it for myself.

I am very much pleased to be able to inform you that a most important discovery of gold has been made on a creek called Bonanza Creek, an affluent of the river known here as the Klondyke. It is marked on the maps extant as Deer River, and joins the Yukon a few miles above the site of Fort Reliance.

The discovery was made by G. W. Cormack, who worked with me in 1887 on the Coast Range. The indications are that it is very rich, indeed the richest yet found, and as far as work has been carried on it realizes expectations. It is only two weeks since it was known, and already about 200 claims have been staked on it, and the creek is not yet exhausted; it, and its branches are considered good for 300 or 400 claims. Besides, there are two other creeks above it, which it is confidently expected will yield good pay; and if they do so, we shall have from 800 to 1000 claims on this river, which will require over 2000 men for their proper working. Between Deer River (or Klondyke) and Stewart River a large creek called Indian Creek flows into the Yukon, and rich prospects have been found on it, and no doubt it is in the gold-bearing country between Klondyke and Stewart Rivers, which is considered by all the old miners the best and most extensive gold country yet found. Scores of them would prospect it but for the fact that

they cannot get provisions up there, and it is too far to beat them up from here in small boats.

This new find will necessitate an upward step on the Yukon, and help the Stewart River region.

News has just arrived from Bonanza Creek that three men worked out $75 in four hours the other day, and a $12·00 nugget has been found, which assures the character of the ground, namely, coarse gold and plenty of it, as three times this can be done with sluice boxes. You can fancy the excitement here. It is claimed that from $100 to $500 per day can be made off the ground that has been prospected so far. As we have about 100 claims on Glacier and Miller, with 300 or 400 in this vicinity, next year it is imperative that a man be sent in here to look after these claims and all land matters, and it is almost imperative that the agent be a surveyor. Already on Bonanza Creek they are disputing about the size of claims.

I would have gone up and laid out the claims properly, but it would take me ten or twelve days to do so, and meantime my presence might be more urgently required elsewhere.

Another important matter is the appointment of some sort of legal machinery here. Before the police came miners' meetings administered justice, collected debts, etc.; now the magistrates here are expected to do all that, and when it is found that they do not, it causes much dissatisfaction, and there are several cases of real hardship where parties will not pay their just debts, though able to do so. If a miners' meeting were held, and judgment given against the delinquent, it would do no good, for he would and does resist payment, and were force resorted to, he would appeal to the police for protection. A continuation of this state of affairs is most undesirable in the interests of our country, for we have a reputation as a justice-administering, law-abiding people to maintain, and I would urgently press this matter on the authorities.

From the indications I have mentioned, it will be seen that this corner of the North-West is not going to be the least important part of it, more especially when we consider the fact that gold-bearing quartz has been found in it at numerous places, and much will no doubt be worked. It is apparent that

the revenue and business of the country will more than offset the expense of administration.

I cannot here enter into the reasons for it, but I unhesitatingly make the assertion that this corner of our territory from the coast strip down, and from the 141st meridian eastward, will be found to be a fairly rich and very extensive mining region.

As I have already pretty fully reported on coal, I will only add that it is reported in abundance only eight miles up the Chandinaler River, where a seam over six feet thick has been found of the same quality as that already described.

Fort Cudahy.
November 6th, 1896.

YOUR official letter informing me that negotiations for a joint survey of the 141st meridian had so far failed, and that I had better return to Ottawa for the winter, reached me here on the 11th September. As the Alaska Commercial Company's steamer *Arctic* was then hourly expected up the river on her way to Selkirk, I thought it best to wait and go up on her to that point. Day after day passed without any sign of her; wearied of waiting and hopeless of her arrival at all this year, I determined to start out on 27th September, a late date, but with fair conditions feasible. On the 25th a tremendous storm of snow set in which so chilled the river that a few days after it was choked with ice, which precluded all idea of getting up the river, and it was equally hopeless down the river.

Three parties have announced their intention of starting for the outside world about the 1st prox., and I write this contemplating its transmission by one or other of these parties. For myself, to think of going out in the winter is, I think, unwise for the following reasons. Dogs, the only means of transport, are scarce and dear, ranging from thirty or forty dollars to one hundred and twenty-five dollars apiece. Dogs' food, like all other food, is scarce by reason of the poor salmon run in the river last season; practically none were caught near here, and the result is the dog owners have to use bacon for food, which at twenty-five to forty cents per pound is expensive.

It would require a team of eight dogs to take my outfit and my

man Fawcett with our provisions and the dogs' food as far as Taiya. There, the dogs would have to be abandoned or killed, as they are worthless on the coast except to parties coming in here early in the season. Starting from here say December 1st, it would be February before I reached Ottawa, and during thirty-five or forty days of this time we would be exposed to much cold and hardship and some hazard from storms.

The journey has been made, and I would not hesitate to undertake it were things more reasonable here and dog food plentiful, but it would take at least $1000 to equip us with transport and outfit, which sum I think I can expend more in the interests of the country by remaining here and working a survey of the Klondyke of the miners—a mispronunciation of the Indian word or words "Thron-dak" or "duick," which means plenty of fish, from the fact that it is a famous salmon stream. It is marked Tondak on our maps. It joins the Yukon from the east—a few miles above the site of Fort Reliance—about fifty miles above here. As I have already intimated, rich placer mines of gold were discovered on the branches of this stream. The discovery, I believe, was due to the reports of Indians. A white man named G. W. Cormack, who worked with me in 1887, was the first to take advantage of the rumours and locate a claim on the first branch which was named by the miners Bonanza Creek. Cormack located late in August, but had to cut some logs for the mill here to get a few pounds of provisions to enable him to begin work on his claim. The fishing at Klondyke having totally failed him, he returned with a few weeks' provisions for himself, his wife and brother-in-law (Indians), and another Indian, in the last days of August, and immediately set about working the claim. As he was very short of appliances he could only put together a rather defective apparatus to wash the gravel with. The gravel itself he had to carry in a box on his back from thirty to a hundred feet; notwithstanding this, the three men working very irregularly washed out $1200 in eight days, and Cormack asserts with reason that had he proper facilities it could have been done in two days, besides having several hundred dollars more gold which was lost in the tailings through defective apparatus.

On the same creek two men rocked out $75 in about four

hours, and it is asserted that two men in the same creek took out $4008 in two days with only two lengths of sluice boxes. This last is doubted, but Mr. Ledue assures me he weighed that much gold for them, but it is not positive where they got it. They were new comers, and had not done much in the country, so the probabilities are they got it on Bonanza Creek. A branch of Bonanza named Eldorado has prospected magnificently, and another branch named Tilly Creek has prospected well; in all there are some four or five branches of Bonanza Creek which have given good prospects. There are about 170 claims staked on the main creek, and the branches are good for about as many more, aggregating say 350 claims, which will require over 1000 men to work properly.

A few miles farther up Bear Creek enters Klondyke, and it has been prospected and located on. Compared with Bonanza it is small, and will not afford more than twenty or thirty claims, it is said. About twelve miles above the mouth "Gold Bottom Creek" joins Klondyke, and on it and a branch named Hunker Creek, after the discoverer, very rich ground has been found. One man showed me $22·75 he took out in a few hours on Hunker Creek with a gold pan, prospecting his claim on the surface, taking a handful here and there as fancy suggested. On "Gold Bottom Creek" and branches there will probably be two or three hundred claims. The Indians have reported another creek much farther up, which they call "Too Much Gold Creek," on which gold is so plentiful, that, as the miners say in joke, "you have to mix gravel with it to sluice it." Up to date nothing definite has been heard from this creek.

From all this we may, I think, infer that we have a district which will give 1000 claims of 500 feet in length each. Now 1000 such claims will require at least 3000 men to work them properly, and as wages for working men in the mines are from eight to ten dollars per day without board, we have every reason to assume that this part of our territory will in a year or two contain 10,000 souls at least. For the coast an unprecedented influx is expected next spring. And this is not all, for a large creek called Indian Creek joins the Yukon about mid-way between Klondyke and Stewart Rivers, and all along this creek good pay has been found. All that has stood in the way

of working it heretofore has been the scarcity of provisions, and the difficulty of getting them up there, even when here. Indian Creek is quite a large stream, and it is probable it will yield five or six hundred claims. Farther south yet lies the head of several branches of Stewart River, on which some prospecting has been done this summer, and good indications found, but the want of provisions prevented development. Now gold has been found in several of the streams joining Pelly River, and also all along the Hootalinqua. In the line of these finds farther south is the Cassiar goldfield in British Columbia; so the presumption is, that we have in our territory along the easterly watershed of the Yukon a gold-bearing belt of indefinite width, and upwards of 300 miles long, exclusive of the British Columbia part of it. On the westerly side of the Yukon prospecting has been done on a creek a short distance above Selkirk with a fair amount of success, and on a large creek some thirty or forty miles below Selkirk fair prospects have been found, but as has been before remarked, the difficulty of getting supplies up here prevents any extensive or extended prospecting.

Dalton informed me he had found good prospects on a small creek nearly mid-way between the Coast Range and Selkirk in his route. His man showed me some coarse gold, about a dollar's worth, he found on the head of a branch of the Altsek River, near the head of Chilkat Inlet, which is inside the summit of the Coast Range, and, of course, in our territory. From this you will gather that we have a very large area all more or less gold-bearing, and which will all yet be worked.

Gold quartz has been found in places just across the line on Davis Creek (see my map of the 141st sent you), but, of what is unknown, as it is in the bed of the creek and covered with gravel. Good quartz is also reported on the hills around Bonanza Creek, but of this I will be able to speak more fully after my proposed survey. It is pretty certain from information I have got from prospectors that all or nearly all of the northerly branch of White River is on our side of the line, and copper is found on it, but more abundantly on the southerly branch, of which a great portion is in our territory also; so it is probable we have that metal too. I have seen here several lumps of native copper brought by the natives

from " White River," but just from what part is uncertain. I have also seen a specimen of silver ore said to have been picked up in a creek flowing into Bennett Lake, about fourteen miles down it on the east side.

I think this is enough to show that we may look forward with confidence to a fairly bright future for this part of the territory.

When it was fairly established that Bonanza Creek was rich in gold, which took a few days, for Klondyke had been prospected several times with no encouraging result, there was a great rush from all over the country adjacent to Forty Mile. The town was almost deserted; men who had been in a chronic state of drunkenness for weeks were pitched into boats as ballast and taken up to stake themselves a claim, and claims were staked by men for their friends who were not in the country at the time. All this gave rise to much conflict and confusion, there being no one present to take charge of matters, the agent being unable to go up and attend to the thing, and myself not yet knowing what to do, so that the miners held a meeting and appointed one of themselves to measure off and stake the claims, and record the owner's name in connection therewith, for which he got a fee of $2·00, it being of course understood that each claim-holder would have to record his claim with the Dominion agent and pay his fee of $15·00.

At the same meeting they discussed our law on mining, and discovered, as they thought, that it was very defective. They appointed a committee to wait on the agent and ask him to ratify their course in appointing the surveyor and recorder to act *pro tem.* on the creek, and to forward their views on the law to the department at Ottawa. Now it appears to me that a good deal of fault of the law as they found it lay in the fact that they did not read it in all its proper connection; and because the printed law did not start out from a given point and detail consecutively what was to be done under every possible contingency that might arise, under that reading they thought it defective. I believe this to be the case, because I have never had any difficulty in explaining any case that has been submitted to me for an opinion, and there have been a good many.

The miners, as a rule, are dissatisfied with the claims laid out for them by their own surveyor, appointed as I have already intimated, and many of them are claiming for a remeasurement now that they know I am going to make a survey of the creeks. In fact many of them thought that a survey of the creeks necessarily meant a survey and adjustment of the claims, and it took me some time to correct that impression. I made them understand that as the claims had been laid out by their own act, and had been approved of by the agent, I could not interfere without the consent and approval of all the original parties to the act, and that they would have to meet and discuss the questions and determine whether they would have them adjusted or not. If they decide to have it done, I made them understand they would have to assist me at work as I passed along. If they do not require it, I will take the necessary steps to enable me to plot very closely where every claim is. I may yet make a good deal of the survey by photograph as I have about ten dozen good plates yet. In any case, I will occupy several photo stations to enable me to give some idea of the mountain ranges around—if any—and supplement my views from the boundary last winter. As soon as this is done my men will take their discharge, Adam Fawcett going into the service of the Alaska Commercial Company, and all the rest mining.

If you want any further surveys made in here, men will have to be sent to do it, for men cannot be had here for less than $5·00 to $10·00 per day. Any man sent in for survey purposes will require to bring a good canoe with him, say nineteen feet long and forty-four inches wide, and eighteen to two and a half deep. Such a canoe will bring in five or six men, and their stock of provisions for the trip. By the time they would arrive here provisions will be plentiful, for the boats will then be up from Circle City, where two of them are probably wintering. A party crossing the summit early in June would just about find the lakes open for the run down. You might warn any such party that they had better run no risk at the cañon, White Horse and Five Fingers. The cañon is not dangerous, but there is a good portage past it. The rapids between it and White Horse are rough in high water, but with care

are safe. A great many large boats run the White Horse, but most of them take more or less water; many fill altogether and the owners are often drowned; in any case they lose all their effects if they do escape. A careful estimate of those drowned in 1895 places the number at thirteen, a large percentage, I think, of those who tried it. The Five Fingers are at certain stages of the water uncertain. Last time I came down I found it very nice on the left side—no danger at all, while boats passing the right side took in water. In every case the party in charge will do well to carefully examine beforehand all the points named. Should you deem it advisable for myself to return early in the summer, I will have to make my way around by the mouth, as I will have no men to help me up stream, and no one will be ascending the river until near September, and indeed very few do it at all now. Any party coming in would reasonably be expected in before I started down, and I could confer with them on the work to be done, should you deem it advisable to do so.

In the course of a year I believe coal will supersede wood for fuel, which will relieve the demand as far as towns and villages are concerned, but mining interests will require a lot of fuel where coal cannot be taken.

The traffic in liquor will have to be taken hold of and regulated at once; it is here now and cannot be kept out by any reasonably practical means. The majority—the great majority of miners—will have it, and all the more will their predilection be if it is attempted to stop the entry of it.

In my opinion it is imperative that this business be brought under control at once, or it may develop phases that will be at least annoying in the near future.

I have in previous reports intimated that some sort of legal machinery is absolutely necessary for the trial of cases of contract, collection of debts, and generally the judicial interests of the country. There are several cases of hardship now for the want of a proper court.

If some sort of court, to satisfy the necessities of the people in business here, is not at once established, serious inconvenience will result. The officer appointed will require to be a hale, vigorous person, for it is probable he will have to make

journeys of considerable length across unoccupied country in the discharge of his duty.

There have been several applications for land in the vicinity of the mouth of the Klondyke, and Inspector Constantine has selected a reserve for government purposes at the confluence of that stream with the Yukon, forty acres in extent.

A court or office of record in real estate transactions will require to be opened here at once. A recorder was appointed in Forty Mile, and a plot made in 1894. In anticipation of my going out this fall I got a meeting held of the property owners, and had them hand the records over to me for the information of the department. They are in my possession yet, and I will take them out with me when I go. They are rather crude in form, and require an initiale to understand them. I act as recorder *pro tem.*

. . . . . .

Before closing I may say that every report that comes from Bonanza Creek is more encouraging than the last. Prospecting has only begun, and up to date of mailing, November 22nd, very rich prospects have been found on the few claims prospected on; from one dollar to the pan of dirt up to twelve dollars are reported, and no bed rock found yet. This means from $1000 to $12,000 per day per man sluicing.

The excitement is intense, but at this season of the year it is naturally very local.

I expect a mail will be starting from here in January, and I will try to send out a short report by it embracing events up-to-date.

Fort Cudahy.
9th Dec., 1896.

A MAIL left here for the outside on the 27th ult. by which I sent you an interim report, which will probably reach you in January. From it you will learn how I came to be caught in the country, and why I have not attempted to get out in winter. As you are as likely to get that report as you are this one, I refrain from repeating more here than to say that should it be necessary for me to go out before summer, I will try and get out by dog team, starting in the last days of February or

early in March, when the days are long and the weather mild, getting out, say early in May.

Since my last the prospects on Bonanza Creek and tributaries are increasing in richness and extent, until now it is certain that millions will be taken out of the district in the next few years.

On some of the claims prospected the pay dirt is of great extent and very rich. One man told me yesterday that he washed out a single pan of dirt on one of the claims on Bonanza and found $14·25 in it. Of course, that may be an exceptionally rich pan, but $5 to $7 per pan is the average on that claim it is reported, with five feet of pay dirt and the width yet undetermined, but it is known to be thirty feet even at that; figure the result at nine or ten pans to the cubic foot, and 500 feet long: nearly $4,000,000, at $5 per pan—one fourth of this would be enormous.

Another claim has been prospected to such an extent that it is known there is about five feet of pay dirt, averaging $2 per pan, and width not less than thirty feet. Enough prospecting has been done to show that there are at least fifteen miles of this extraordinary richness, and the indications are that we will have three or four that extent, if not all equal to the above at least very rich.

It appears a great deal of staking for absentees has been done, some of whom have turned up, and some have not. This has caused confusion, and leads to a good deal of what might be called fraud, for it is easy for a few in the inner circle to know what claims have been recorded in accordance with the law, and what have not. They can for themselves, directly or through the intervention of a friend, have the latter jumped for their whole or partial interest. It appears this has been done in several instances.

I think the department should get large posters printed, on which shall be shown the sections of the law governing the location and recording of quartz and placer mines, the extent of each, the duties of miners in both cases, and the rulings of the department on the questions I have submitted, with the penalties attached to offences against the law. Some of these should be printed on stout paper or parchment capable of

standing exposure to the weather, and posted at every important point in the country, so that there may be no excuse hereafter for ignorance.

A large number of copies of the mining act, land act, and timber and hay land regulations should also be sent in.

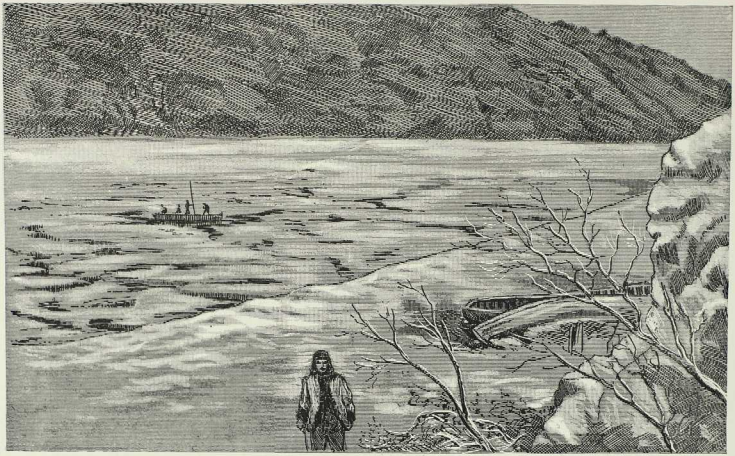
As to the extent of mining districts, they should, I think, be made large, and section 21 amended to enable a man who has located a claim which does not pay a reasonable return on the outlay the first season after his claim has been prospected, to make a second location in the same locality or district, provided he can find one in it. The agent would have to determine whether or not he had expended the proper amount of labour on his claim to get reasonable returns; this I know opens the door for a lot of trouble and, maybe, fraud, but on the other hand a great many worthy men suffer from the want of some such regulation, and as very few would be in a position to take advantage of such a provision until after their second season, there would hardly be anything left for them to take. Enterprising men who would work almost continuously might get some benefit—probably would—but no others, so such a regulation could not do very much harm, and might help some deserving people. As it is now, men stake claims on nearly every new find, some having several claims in the Klondyke locality. They know, I believe, that they will not be able to hold them, but, as the localities are not yet clearly defined, they can hold on to them for a while, and finally by collusion with others acquire an interest in them.

The miners here are, I understand, getting up a petition to the Minister of the Interior, asking for aid in opening a way to the south and building along it a shelter for winter travellers, with suitable supplies scattered along.

As it is now, a winter trip out from here is, on account of the long haul and want of shelter, tedious and hazardous, and their representations are worthy of consideration.

Fort Cudahy,
11th Jan., 1897.

The reports from Klondyke region are still very encouraging; so much so, that all the other creeks around are practically



THE FROZEN YUKON, FROM DAWSON CITY.

abandoned, especially those on the head of Forty Mile in American territory, and nearly 100 men have made their way up from Circle City, many of them hauling their sleds themselves. Those who cannot get claims are buying in those already located. Men cannot be got to work for love or money, and development is consequently slow; one and a half dollars per hour is the wages paid the few men who have to work for hire, and work as many hours as they like.

Some of the claims are so rich that every night a few pans of dirt suffices to pay the hired help where there is any; as high as $204·00 has been reported to a single pan, but this is not generally credited. Claim-owners are now very reticent about what they get, so you can hardly credit anything you hear; but one thing is certain, we have one of the richest mining areas ever found, with a fair prospect that we have not yet discovered its limits.

Miller and Glacier Creeks, on the head of Sixty Mile River, which my survey of the 141st meridian determined to be in Canada, were thought to be very rich, but they are both poor in quality and quantity compared with Klondyke.

Chicken Creek, on the head of Forty Mile in Alaska, discovered a year ago and rated very high, is to-day practically abandoned.

. . . . . .

Some quartz prospecting has been done in the Klondyke region, and it is probable that some good veins will be found there. Coal is found on the upper part of Klondyke, so that the facilities for working it if found are good and convenient.

[Mr. Ogilvie has subsequently (in November, 1897) given the following account of the discovery of gold on the Klondyke.]

The discovery of the gold on the Klondyke, as it is called—the proper name of the creek is an Indian one, Throndа—was made by three men, Robert Henderson, Frank Swanson, and another one named Munson, who in July, 1896, were prospecting on Indian Creek. They proceeded up the creek without finding

sufficient to satisfy them until they reached Dominion Creek, and after prospecting there they crossed over the divide and found Gold Bottom, got good prospects, and went to work.

Provisions running short, they decided to make their way to Sixty Mile to obtain a fresh supply, and went up Indian Creek to the Yukon to Sixty Mile, where Harper had established a trading post. Striking upwards on Forty Mile they came across a man, a Californian, who was fishing in company with two Indians. The Indians were Canadian Indians, or King George men, as they proudly called themselves. Now, one of the articles of the miner's code of procedure is that when he makes a discovery he shall lose no time in proclaiming it, and the man felt bound to make the prospectors acquainted with the information that there was a rich pay to be got in Gold Bottom. The two Indians showed a route to this creek, and from there they crossed over the high ridge to Bonanza.

From there to El Dorado is three miles, and they climbed up over the ridge between it and Bonanza, and reaching between Klondyke and Indian Creeks, they went down into Gold Bottom. Here they did half a day's prospecting, and came back, striking into Bonanza about ten miles beyond, where they took out from a little nook a pan which encouraged them to try further. In a few moments more they had taken out $12·75. A discovery claim was located, and also one above and below for the two Indians.

In August, 1896, the leader, generally known as Siwash George, because he lived with the Indians, went down to Forty Mile to get provisions. He met several miners on his way and told them of his find, showing the $12·75 which he had put in an old Winchester cartridge. They would not believe him, his reputation for truth being somewhat below par. The miners said that he was the greatest liar this side of —a great many places.

They came to me finally and asked me my opinion, and I pointed out to them that there was no question about his having the $12·75 in gold; the only question was, therefore, where he had got it. He had not been up Miller or Glacier Creek, nor Forty Mile. Then followed the excitement. Boat load after boat load of men went up at once. Men who had

been drunk for weeks and weeks, in fact, were tumbled into the boats and taken up without being conscious that they were travelling.

One man who went up was so drunk that he did not wake up to realization that he was being taken by boat until a third of the journey had been accomplished, and he owns one of the very best claims on the Klondyke to-day. The whole creek, a distance of about twenty miles, giving in the neighbourhood of two hundred claims, was staked in a few weeks. El Dorado Creek, seven and a half or eight miles long, providing eighty claims, was staked in about the same length of time.

Boulder, Adams, and other gulches were prospected, and gave good surface showings, gold being found in the gravel in the creeks. Good surface prospects may be taken as an indication of the existence of very fair bed-rock. It was in December that the character of the diggings was established. Twenty-one above discovery on Bonanza was the one which first proved the value of the district. The owner of this claim was in the habit of cleaning up a couple of tubfuls every night, and paying his workmen at the rate of a dollar and a half an hour. Claim No. 5, Eldorado, was the next notable one, and here the pan of $112 was taken out. That was great. There was then a pan of even greater amount on No. 6, and they continued to run up every day.

The news went down to Circle City, which emptied itself at once and came up to Dawson. The miners came up any way they could, at all hours of the day and night, with provisions and without supplies. On their arrival they found that the whole creeks had been staked months before. A good many Canadians, who were in their talk out-and-out Americans, came up to Canadian territory with a certain expectation of realizing something out of this rich ground by reason of their nationality. One of them, particularly, on finding that he was too late, cursed his luck, and said that it was awfully strange that a man could not get a footing in his own country.

Another of these men who arrived too late was an Irishman, when he found he could not get a claim he went up and down the creek, trying to bully the owners into selling, boasting that he had a pull at Ottawa, and threatening to have the claims

cut down from 500 to 250 feet. He came along one day and offered to wager $2000 that before August 1st they would be reduced to 250 feet. One of the men to whom he had made this offer came and asked me about it. I said to him, "Do you gamble?" His reply was "A little." Then I told him that he was never surer of $2000 than he would have been if he had taken that bet.

This ran to such an extent that I put up notices to the effect that the length of the claims was regulated by Act of Parliament of Canada, and that no change could be made except by that Parliament, and telling the miners to take no notice of the threats that had been made.

Jim White then adopted another dodge, locating a fraction between 36 and 37, thinking that by getting in between he could force the owners to come to his terms, forgetting that the law of this country does not allow any man to play the hog. For three or four days this state of things kept the men in an uproar. I was making my survey, and getting towards 36 and 37; when I got near, I delayed my operations and went up to 36, finding there would be no fraction, or at least an insignificant one of inches.

I took my time, and in the meantime the owner of 36 became very uneasy, and White also. I set in a stake down in the hollow until I saw how much fraction there was. I found only a few inches. I was very tedious with this portion of the work, and the man who was with me seemed to have quite a difficulty in fixing the stake. Then I went down with the remark that I would do that myself. I had made it a rule never to tell anyone whether there was a fraction until it was marked on the post.

While I was standing by the post, Jim White came up to me. He had a long way to go down the creek, he said—and he did not want to wait any longer than was necessary. "Well," I said, "I can't tell you just yet exactly how much of a fraction it will be—but something about three inches." That is how Jim comes to be known as "Three Inch White."

Bonanza and El Dorado Creeks afford between them 278 claims; the several affluences will yield as many more, and all of these claims are good. I have no hesitation in saying that

about a hundred of those on Bonanza will yield upwards of $30,000,000. Claim 30 below, on El Dorado, will yield a million in itself, and ten others will yield from a hundred thousand dollars up. These two creeks will, I am quite confident, turn out from $60,000,000 to $75,000,000, and I can safely say that there is no other region in the world of the same extent that has afforded in the same length of time so many homestakes—fortunes enabling the owners to go home and enjoy the remainder of their days—considering that the work has had to be done with very limited facilities, the scarcity of provisions and of labour, and that the crudest appliances only are as yet available. When I tell you that to properly work each claim ten or twelve men are required, and only 200 were available that season, it will give you an idea of the difficulties which had to be contended with.

On Bear Creek, about seven or eight miles above that, good claims have been found, and on Gold Bottom, Hunker, Last Chance, and Cripple Creeks. On Gold Bottom, as high as $15 to the pan has been taken, and on Hunker Creek the same, and although we cannot say that they are as rich as El Dorado or Bonanza, they are richer than any other creeks known in that country. Then, thirty-five miles higher up the Klondyke, Too-Much-Gold Creek was found. It obtained its name from the fact that the Indians who discovered it saw mica glistening at the bottom, and, thinking it was gold, said there was "too much gold—more gold than gravel."

A fact I am now going to state to you, and one that is easily demonstrated, is that from Telegraph Creek northward to the boundary line we have in the Dominion and in this province an area of from 550 to 600 miles in length, and from 100 to 150 miles in width, over the whole of which rich prospects have been found. We must have from 90,000 to 100,000 square miles, which, with proper care, judicious handling, and better facilities for the transportation of food and utensils, will be the largest, as it is the richest, goldfield the world has ever known.

Stewart and Pelly, in the gold-bearing zone, also give promising indications. Everywhere good pay has been found on the bars, and there is no reason why, when good pay is

obtained on the bars, the results should not be richer in the creeks. The Klondyke was prospected for forty miles up in 1887 without anything being found, and again in 1893 with a similar lack of result, but the difference is seen when the right course is taken, and this was led up to by Robert Henderson. This man is a born prospector, and you could not persuade him to stay on even the richest claim on Bonanza. He started up in a small boat to spend this summer and winter on Stewart River, prospecting. That is the stuff the true prospector is made of, and I am proud to say that he is a Canadian.

In regard to quartz claims, seven have already been located in the vicinity of Forty Mile and Dawson, and there is also a mountain of gold-bearing ore in the neighbourhood yielding $5 to $7 a ton. The question to be considered is whether with that return it will pay to work under the peculiar conditions which exist, and the enormous freight rates charged for transportation for anything of that kind.

About forty miles further up the river two large claims have been located by a mining expert hailing from the United States, and who has had considerable experience in Montana and other mineral States, and he assured me that the extent of the lode is such that these two claims are greater than any proposition in the world, going from $3 to $11 a ton. On Bear Creek a quartz claim was located last winter, and I drew up the papers for the owner. He had to swear that he had found gold; he swore that he did, and he told me the amount, which, if true, will make it one of the most valuable properties that exists in the country.

On Gold Bottom another claim has been located, and I made a test of the ore. I had no sieve, and had to employ a hand mortar, which you who know anything of the work will understand would not give best results. The poorest result obtained was, however, $100 to the ton, while the richest was $1000. Of course, I do not know what the extent of the claim is, but the man who found it said that from the rock exposed the deposit must be considerable in extent. He didn't know whether the exposure was the result of a slide, but said that it would be an easy matter to find the lode.

About thirty miles up the Klondyke another claim was

located, and the man swore that it was rich, although he wouldn't say how rich.

On El Dorado and Bonanza, the gold obtained on the different benches has about the same value, that is, it has about the same degree of fineness, and is worth about $16 per oz., and as you go down the creek this value decreases to about $15·25. From that point, however, it increases again, and from this the inference appears to be plain that the same lode runs right across the region that these creeks cut through, which is proved still more surely by the fact that the value increases as you strike Hunker, and in the other direction Miller and Glacier. The nuggets found in El Dorado and Bonanza show no evidence of having travelled any great distance, and some I have are as rough as though they had been hammered out of the mother lode.

That mother lode is yet to be found in the ridges between the creeks, and when it is found it may be discovered to consist of several large lodes, or a succession of small ones that may not pay to work.

On Stewart and Pelly Rivers, some prospecting has been done and gold found, and on the Hootalinqua in 1895 good pay was discovered, and the richness of the gold increases as work is continued further down. Some men, working fifteen feet down, found coarse gold, when the water drove them out, and they had to abandon the work and come out, determined to return; but they did not go back, as in the meantime the Klondyke excitement knocked that place out.

Gold has been found at the head of Lake Labarge, on the stream flowing into the lake at this point. In fact, there is gold everywhere in this zone, which is 500 miles long by 150 wide. Prospects, too, are to be found on the Dalton Trail, on the other side of the Yukon River. A man, riding along the Altsek Trail, was thrown from his horse, and, in falling, caught at the branch of a tree. As he drew himself up, he saw something shining on the rock which fixed his attention at once. He picked it up and found that it was gold. Other excellent prospects have also been found along the same creek. From these circumstances and discoveries it may be assumed that in all this country there is gold, while in this particular zone it is

especially abundant. This zone lies outside of the Rocky Mountains, and distant from them about 150 miles.

Another product of the country that demands attention is copper. It is doubtless to be found somewhere in that district in great abundance, although the location of the main deposit has yet to be discovered. Mr. Harper was shown a large piece of pure copper in the possession of the Indians—indeed I have seen it myself. It comes from the vicinity of the White River somewhere—just where has yet to be disclosed. Silver has also been found, and lead, while to work our precious metals we have coal in abundance. It is to be found in the Rocky Mountains, or, rather, the ridge of high mountains running parallel to them in the interior. A deposit of coal in this range runs right through our territory. At two points, near Forty Mile, it also crops out, in one place only about forty feet from the River Yukon. Further up the Yukon, on one of its many smaller feeders, at Fifteen Mile Creek and on the head of the Thronda, there are also out-croppings of coal. On the branches of the Stewart and on some of the Five Fingers of the Yukon coal is also exposed. In fact, there is any amount of coal in the country with which to work our minerals when we can get in the necessary facilities.

Regarding the surface of the country and the difficulties of prospecting: Passing down the river in a boat one sees a succession of trees, ten, twelve, fourteen and sixteen inches in diameter, and he naturally comes to the conclusion that it is a well-timbered country. And so it is, along the margin of the river. But let him land and go inland, and he will find the ground covered with what is locally known as "nigger grass." This is a coarse grass which each year is killed and falls, tangling in such a way as to make pedestrian progress all but impossible, tripping one up every few feet. It is, as might be imagined, a most difficult thing to walk through this grass, great areas of which are found all through the district. And where these areas are found the miners avoid them as they would the plague.

For the rest of the country the rocks are covered by one foot to two of moss—and underneath, the everlasting ice. On this a scrubby growth of trees is found, extending up the mountains.

It is this which appears to those passing down the river in boats to be a continuation of the good timber seen along the banks. Timber that is fit for anything is scarce, and we should husband it carefully. Our timber has built Circle City. Our timber has served all the purposes of the Upper Yukon country. A large amount of timber is required, and what we have we should keep for our own use, particularly as the ground has to be burned to be worked.

Above the timber line you come to the bare rocks—the crests bare save where clothed with a growth of lichen on which the caribou feed. There is no timber in the way here—no moss and no brush. The miners in travelling consequently keep as much as possible to the top of the ridge.

Bedrock prospecting necessarily has to be reserved for the winter. First the moss has to be cleared away, and then the muck—or decayed rubbish and vegetable matter. The fire is applied to burn down to bedrock. The frost in the ground gives way before the fire, ten, twelve, or perhaps sixteen inches in a day. The next day the fire has to be again applied, and so the work proceeds until gravel is reached. It may be twenty feet or so below the surface, in which case it is usually reached in about twenty days. Prospecting is now commenced—that is, a pan or two of dirt is washed to determine whether it is worth keeping or not—the refuse is thrown on one side of the hole, and the paying dirt on the other. Near to and on bedrock the pay is found, which is generally not more than two or three feet deep. Having burned down to the bedrock and found the paystreak, you start drifting in the direction of the best pay. The distance this process can be conducted depends on the thickness of the crust on top. If this is soft, you may drift thirty feet with safety, when a new hole or shaft must be sunk and the drifting continued. Very few people have the good fortune to succeed with one shaft; prospecting holes as many as twenty or thirty must be dug until you cut the whole valley across before you find pay. The next man may strike it at the first hole. To give you an instance: One man put down eleven holes, and didn't find anything, and yet other men had confidence enough in the claim to pay $2500 for a half interest in it, knowing that the owner had put in eleven holes and found

nothing, a fact which will go to prove the character of the country.

After you have worked until April or May the water begins to run, and the trouble is that the water accumulates and you cannot work, as it puts out the fires which have been used to thaw out and soften the ground. Then the dams are built, timber prepared, and the sluice-boxes put in to wash the dump.

In one clean-up eighty pounds avoirdupois of gold was taken out, or a total value of about $16,000. The dump from which this partial return was obtained contained in all $110,000, the result of the united efforts of five or six men, at $1·50 per hour, for upwards of six months, not including the labour of sluicing. You can understand, therefore, that although the pay is very rich, it is not exactly all profit.

One man, who owns a claim on El Dorado and one on Bonanza, has sold out, so it is said, for a million dollars. He went into the country a poor man, with the intention of raising sufficient money to pay off the mortgage on his place. He has, I believe, not only done so, but paid off those of all his neighbours.

Although these creeks are rich—and, as I have told you, more men have made homestakes (fortunes) there than anywhere else in the world—I do not wish you to look only on the bright side of the picture. An American from Seattle came in June, 1896, to the Forty Mile, with his wife, with the intention of bettering his condition. They went out again last July with $52,000. I was well acquainted with this man, a very decent, intelligent man. He told me one day that if he could remain in this country from three to five years, and go out with $5000, he would consider himself in luck. He has gone out with $52,000, and after the prospecting he has done, a little in the middle and at one end of the claim, he believes that he has $1,500,000 there.

On the other hand, however, a Scotchman named Marks has been in there for eleven years. I have known him well, and once last fall when he was sick, I asked him how long he had been mining. His reply was forty-two years—in all parts of the world, except in Australia. In reply to the question as to

whether he had ever made his stake, he told me he had never yet made more than a living, and very often that was a scanty one. This, of course, is the opposite extreme. I could quote scores of cases similar to that, so that I would not have you look too much on the bright side.

There are men in that country who are poor, and who will remain so. It has not been their "luck," as they call it, to strike it rich. But I may say that that country offers to men of great fortitude and some intelligence and steadiness an opportunity to make more money in a given time than they possibly could make anywhere else. You have, of course, a good deal to contend with; your patience will be sorely tried, for the conditions are so unique that they have surprised many who have gone in, and they have left in disgust.

We have there a vast region comprising from 90,000 to 100,000 square miles of untold possibilities. Rich deposits we know to exist, and all may be as rich. We know now that there is sufficient to supply a population of a hundred thousand people, and I look forward to seeing that number of people in that country within the next ten years. It is a vast inheritance. Let us use it as becomes Canadians—intelligently, liberally, and in the way to advance our country—Canada. Let us use it as it becomes the offspring of the Mother of Nations!

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