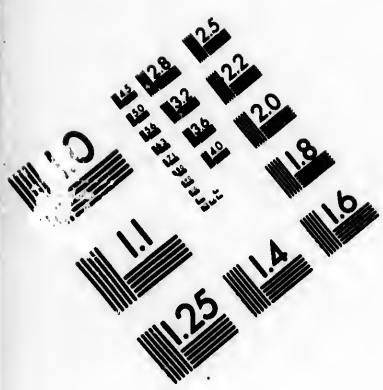

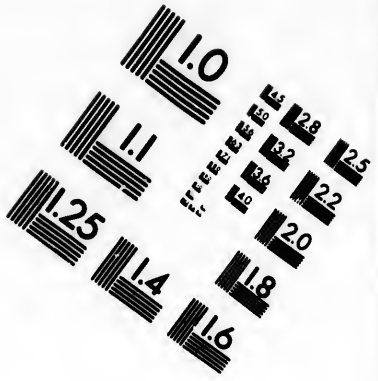

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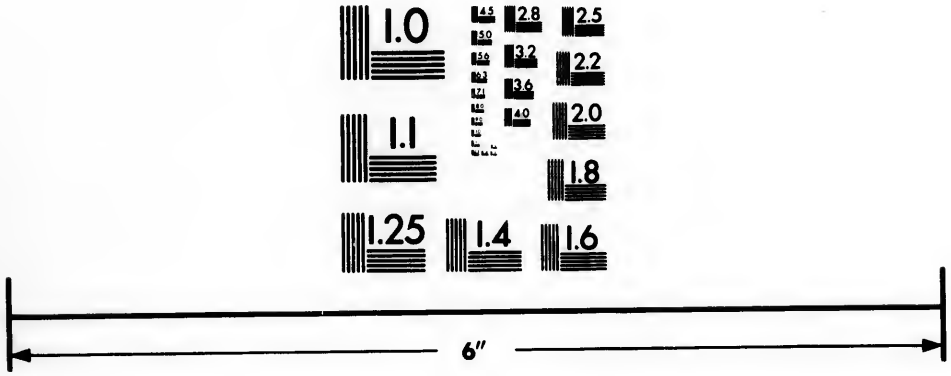

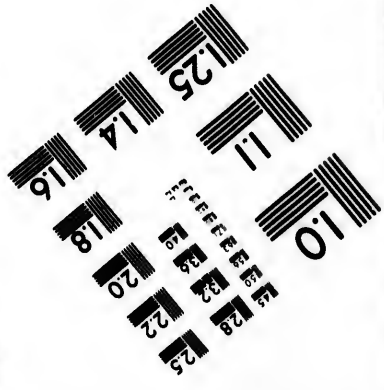

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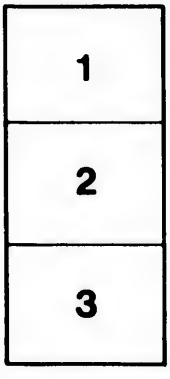

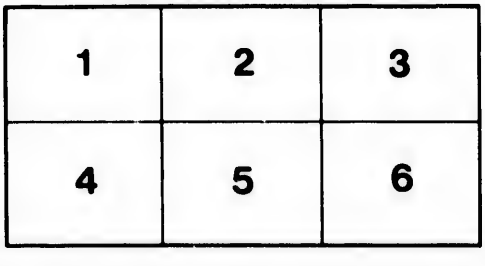

CLIMBING THE MOUNTAINS OVER CHILKOOT PASS.

GOLD FIELDS

OF THE

KLONDIKE

AND THE

WONDERS OF ALASKA

A masterly and fascinating description of the newly-discovered Gold Mines. How they were found. How worked. What fortunes have been made. The extent and richness of the Gold Fields. How to get there. Outfit required. Climate. The natives. Other vast riches of Alaska. Other great Gold Mines of the world. The great Seal Fisheries, etc., etc., etc.

CAREFULLY PREPARED BY

ERNEST INGERSOLL,

Well known as a traveler throughout the Rocky Mountain Ranges, and author of "Knocking Round the Rockies," "Crest of the Continent," "The Ice Queen," "The Silver Caves," etc., etc.

WITH AN INTRODUCTION BY

HON. HENRY W. ELLIOTT,

Agent of the United States Government for many years in Alaska.

PROFUSELY ILLUSTRATED

EARLE PUBLISHING HOUSE,

ST. JOHN, N. B.

INTRODUCTION.

When one of Baronov's Slavonian hunters stood before him in the privacy of a special meeting at Sitka, in 1804, and took out from his pocket a handful of golden nuggets and scales, saying as he did so that he knew where there was "plenty more," the old Russian Governor chilled him with a fierce gesture of disgust, then said to him: "Ivan, I forbid you to go farther in this undertaking; not a word about this, or we are all undone; let the Americans and the Englishmen know that we have gold in these mountains, then we are ruined; they will rush in on us by thousands, and crowd us to the wall—to the death."

Baronov was right as a Russian fur-trader; he knew that word of Ivan's discovery, if given voice, would bring that scourge of fur-bearing districts, the miner, into the very depths of Russian America instantly, and so he suppressed the news; he and his successor also, suppressed it well.

But the successors of Baronov were not his equal in money-making as fur-traders and managers; they ran into debt, and these debts of the Russian American Company induced the Imperial Government to part with Alaska to the United States of America in 1867. The Russian authorities turned Alaska over to us with a good word for its furs and fisheries, and nothing else.

Thousands of our people went up to investigate the natural resources of Alaska in 1867-70; they found the fisheries and the fur seals very quickly, but they were disappointed in the profitable search then for precious metals and coal; the timber and growing of useful crops were disappointments too.

Matters quieted down to a common understanding that there was no particular mineral wealth in Alaska until the great Treadwell mine was opened late in the "seventies," and the mining camp and town of Juneau became firmly established early in the "eighties;" since then the opening of one mining camp after another has steadily progressed until to-day hardy men are busy digging for gold throughout the length and breadth of Alaska.

The man who "prospects" for gold in Alaska has an infinitely more difficult task than he has in California or any of the mining districts of the Rocky Mountain States. In the Alaskan country moss, or "sphagnum," and lichens rankly grow all over the earth and rocks of the great interior, so as to completely conceal the character of it, while the strange, luxuriant growths of shrubs and ferns, grasses and vines completely cover, up to the mountain snows, the entire surface outcrop of rocks and soil of the Alaskan coast line between our foot of the "30-mile strip" at Fort Simpson, up to the confines of Cook's Inlet.

Searching, therefore, for indications of valuable "mineral" in Alaska is tedious, and success is purely accidental—necessarily so, for every foot of new territory must be uncovered before the least indication of what it really is can be secured.

No ranches or farms up there where the tired and hungry prospector can refit with food at any season of the year, as he can in the States; he encounters there a climate that chains him to

one place, wherever he may be, when inland, from November till the next June following.

But man possesses an elastic physical organization, and there is nothing in the country of Alaska, or in its weather, that will successfully bar him out from thoroughly developing its mineral wealth wherever it is found within the broad area of that region. Life in its borders, and especially in the great interior, is disagreeable when contrasted with existence on the gold fields of California; but that will count for nothing in the minds of men, who, seeking for gold, find it in Alaska: because, rough and unpleasant as country and climate on the Yukon and its tributaries make the life of a miner, yet it is a healthy air he breathes, and he is not troubled with sickness of any unusual form. Mosquitoes in the summer, of venomous energy, and intense dry cold of the winter within the Yukon interior do not destroy him, though they do annoy and retard his progress.

Broadly speaking, yet entirely correct, Alaska possesses three distinct zones, the Sitkan and Cook's Inlet district, the Aleutian Island and Peninsular district, and the Great Interior or Yukon region. Gold has been found in all of them, but chiefly in the first and last named districts; it is the climate peculiar to these districts that separates and defines them sharply, not the land as viewed with regard to itself, but rather the lay of the land with reference to the ocean. The Sitkan and Aleutian regions get the warmer influence of ocean currents setting north in the great Pacific, so as to greatly modify those degrees of cold in winter and heat in summer that prevail in the Yukon region. But this modification in climate does not give those regions any agricultural or pastoral possibilities even—not an acre of the cereals ever

ripened in Alaska or ever will, as climatic conditions prevail.

So, it is a country in its length and breadth which I described in detail, twenty years ago, using the following summary:

"In view of the foregoing what shall we say of the resources of Alaska viewed as regards its agricultural or horticultural capabilities?

"It would seem undeniable that owing to the unfavorable climatic conditions which prevail on the coast and interior, the gloomy fogs and dampness of the former, and the intense protracted severity of the winters, characteristic of the latter, unfit the Territory for the proper support of any considerable civilization.

"Men may, and undoubtedly will, soon live here in comparative comfort, as they labor in mining camps, lumber and ship timber mills and salmon factories, but they will bring with them everything they want, except fish and game, and when they leave the country it will be as desolate as they found it.

"Can a country be permanently and prosperously settled that will not in its whole extent allow the successful growth and ripening of a single crop of corn, wheat, or potatoes, and where the most needful of any domestic animals cannot be kept by poor people?

"We may with pride refer to the rugged work of settlement so successfully made by our ancestors in New England, but it is idle to talk of the subjugation of Alaska as a task simply requiring a similar expedition of persistence, energy, and ability. In Massachusetts our forefathers had a land in which all the necessaries of life, and many of the luxuries, could be produced from the soil

with certainty from year to year; in Alaska their lot would have been quite the reverse, and they could have maintained themselves there with no better success than the present inhabitants. Attention should be directed to the development of its mineral wealth, which I have reason to think will yet prove to be considerable, and efforts should be made to stimulate and protect the present available industries of the fur trade, the canning of salmon, etc."*

Twenty years of intelligent and active investigation by thousands of our people since the publication of this analysis has confirmed its truth beyond cavil or doubt. But the development of Alaskan mines and mining, and its salmon canneries, has practically ruined the fur trade—these industries cannot thrive side by side.

Alaskan mining for the precious metals is in its infancy: not one thousandth part of the mineral-bearing surface rock and soil of that region has yet been examined; that work is slow and tedious in so rugged a country, even for the hardiest and best-conditioned prospectors, and the success and the failure of these men will from this time forward be constantly in our sight.

HENRY W. ELLIOTT.

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* *A Report on the Condition of Affairs in the Territory of Alaska*, by Henry W. Elliott, Washington, 1875; pages 18 and 19.

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LIST OF ILLUSTRATIONS.

CHAPTER I.

THE DISCOVERY OF THE KLONDIKE DIGGINGS.

The first news from the Klondike—Excitement in San Francisco on the arrival of the "Excelsior"—The glad news carried around the world—"On to the Klondike!"—Scenes along the wharves of Seattle—The golden treasures of the returned Argonauts—Some of the first citizens of Dawson City—The women of Bonanza and El Dorado Creeks—Some good claims and those who own them—"Pay dirt," and where it is to be found.

THROUGH the Golden Gate and into the beautiful waters of San Francisco Bay steamed the modest little craft "Excelsior" on the morning of July 14, 1897. No salvos of artillery marked her arrival, not a whistle in the harbor blew a "Welcome Home!" no dipping pennants indicated that a few hours later her name would be carried around the world and be on the lips of millions of people. As had happened many times before, the good ship made slowly to her wharf and ten minutes after she had made her hawsers fast the glad news of the gold-finds on the Yukon and the Klondike had been spread broadcast over the land, from ocean to ocean, from Texas to Maine, and before long had crossed the seas to other lands.

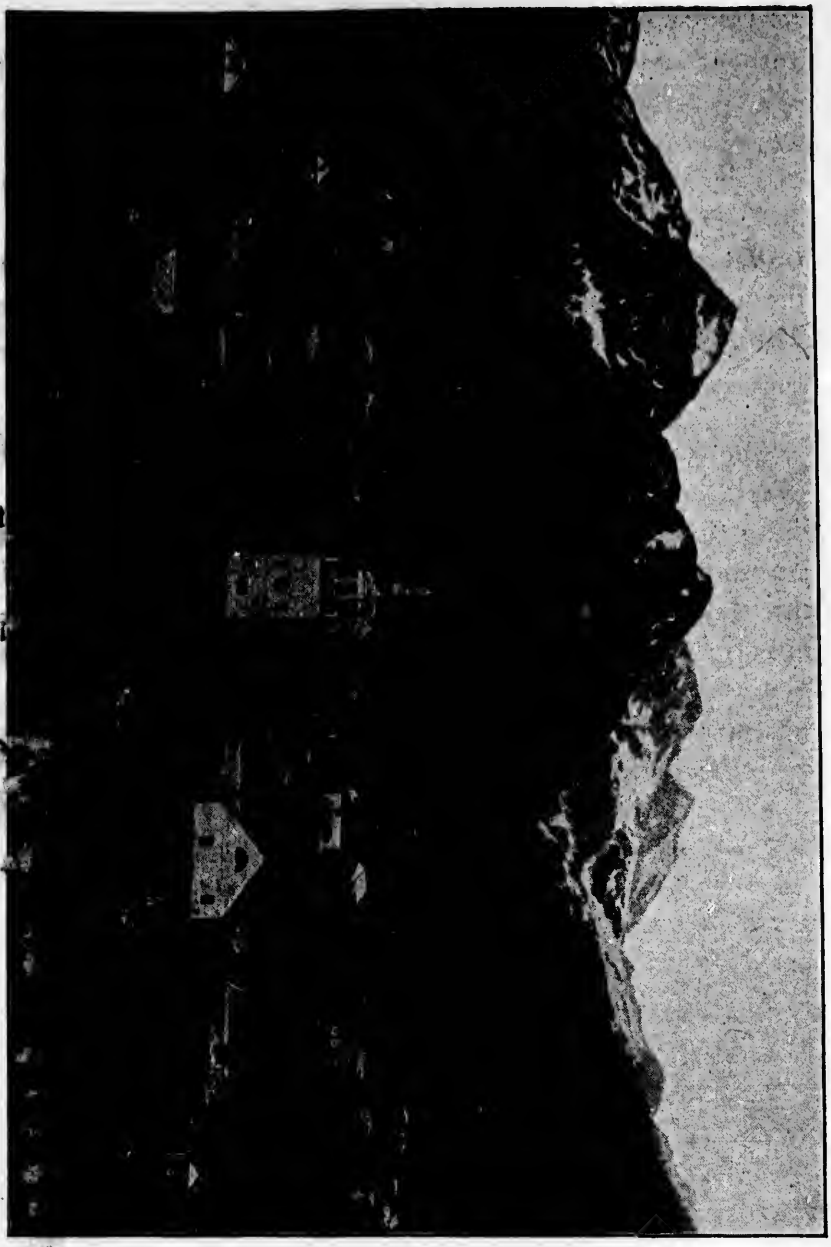
Such was the arrival in San Francisco of the forty hardy spirits who months, and some even years before, had gone out to the frozen lands of Alaska in the attempt to wrest fortune from the hands of fate, and who now returned triumphant, bearing with them their pots of precious gold. The stories they told, many of them well

authenticated, of fortunes made in a night, of nuggets of pure gold worth twenty double eagles, of single "pans" worth from $500 to $1000, of cities but a few months old, of rivers and lakes unknown to geography, of hardship and terrible sufferings and of the princely claims on the Bonanza and El Dorado—these and other stories like them flew over the land like fire over a parched prairie. The gold craze of the year of our Lord 1897 was begun!

HALF A MILLION IN GOLD.

This vanguard of fortune finders brought with them over a half million of dollars worth of gold. Not one of them carried less than $5000 and from this figure the amounts secured ran up to almost $90,000. Some of this wealth was in the shape of nuggets the size of hazel nuts and from this went down through various sizes to the proverbial dust. It was carried loose in pockets, in tin cans, in canvas bags, in wooden boxes and some of it wrapped up in paper.

Three days after the arrival of the "Excelsior," the country was again stirred up by the announcement that the "Portland," another ship engaged in the Alaskan trade, had put into Seattle fourteen days out from St. Michaels with another band of successful miners from the Klondike country. There were sixty in this party and they carried with them in native gold about $700,000. If the hamlets and cities of the United States were looking for confirmation of the stories flashed over the world earlier in the week, the arrival of the "Portland" afforded it. Immediately men, and some few women, of all sorts



SITKA—CHIEF CITY OF ALASKA.

SITKA—CHIEF CITY OF ALASKA.

and conditions, representing every trade and profession, from every State in the Union, those who had thriving businesses of their own and those who had none, high and low, rich and poor, weak and strong, venturesome and timid, those who had seen service in other mining countries and those absolutely without experience, began the rush toward Alaska and the rivers of promise. The scenes during the past weeks along the wharves of Seattle, San Francisco and other Pacific ports baffle description. So great at times has been the struggle for positions on boats going to the northern ports, that the passengers on the down trip have left the boats with difficulty on account of the press due to those seeking to take their places. The rush shows no sign of abatement and is likely to assume even greater proportions along toward the end of the next spring, when the passage to the gold fields by way of the Yukon River opens up.

FIRST WHITE WOMAN THERE.

Among the most fortunate of them who have thus far returned to this country bearing gold with them is Prof. J. S. Lippey, who was formerly connected with the Y. M. C. A. of Seattle, as its secretary. He brought down with him about $85,000 in bullion. His wife accompanied him all the while he was in Alaska, having been the first white woman to cross the great divide, and at the time she left she had the further distinction of being the only woman in camp. The Lippeys went to the Klondike from Forty Mile Creek, where there were quite a number of women. Mrs. Lippey is a small, brown-

haired, brown-eyed woman, tanned until her face is as brown as her hair and her eyes. She has this to say about her experiences in Alaska:

"The country is beautiful, and quite warm in summer. It is different, you know, in winter. Still, even in the coldest weather, I went out every day, though not very far. I was the first white woman to reach Klondike Creek, and was the only one in our camp. Mrs. Berry was the only white woman I had to speak to while I was there. She was with her husband in the next camp, a mile away.

"How did we live?" repeated Mrs. Lippey, in answer to a question. "Well, at first we lived in a tent. It was twelve feet by eighteen, eight logs high, with mud and moss roof, and moss between the chinks, and had a door and window. Mr. Lippey made the furniture—a rough bed, table, and some stools. We had a stove—there are plenty of stoves in that country—and that was all we needed. The cabin was cosy and warm. I looked after the housekeeping and Mr. Lippey after the mining."

"As to eating," continued Mrs. Lippey, "well, we had no fresh meat, no fresh milk, no fresh fruit, no eggs; it was all canned food, but still we kept in good health."

RETURN OF THE FORTUNATE.

William Stanley, formerly a blacksmith in Seattle, went to Alaska two years ago, and was among those who returned on the "Portland." He had with him $115,000 worth of gold, found on Bonanza Creek, about five miles above Dawson City.

Henry Anderson, a Swede, who is well known in Seattle, came back with a good supply of gold dust and $45,000 he had received for half his claim on the Klondike.

Frank Keller, of Los Angeles, Cal., went to Alaska last year, and returned with $35,000 received for his claim.

William Sloat, a former dry goods merchant of Nainamo, B. C., has $52,000 received for his claim.

A fellow resident of Nainamo, named Wilkinson, sold his claim for $40,000.

Jack Horne, a professional pugilist of Tacoma, was among the few who might be called unlucky. He brought back only $6000 worth of dust.

Frank Phiscator, of Baroda, Mich., has $96,000 worth of dust and nuggets. He was one of the first to go to the Klondike.

MILLIONS IN NUGGETS.

Joseph Ladue, who originally came from the rural districts in the vicinity of Binghamton, N. Y., and spent most of his life working about the farms of the neighborhood, was fortunate enough to have staked off the claim upon which most of the present city of Dawson is located. He had been in Alaska for five years, having spent most of his time, until the gold fever struck him, running a sawmill, out of which he claims to have made money, notwithstanding that labor was scarce at $15.

The luck of Clarence J. Berry, formerly a fruit raiser in Southern California, is the greatest thus far on record. He made a trip to the country around Forty Mile Creek

a couple of years ago, but through lack of funds was unsuccessful. He returned to California and after marrying decided to return to the gold fields with his newly-wedded wife, and it was a fortunate move for him. In five months he succeeded in removing $130,000 from one of his claims, of which sum he paid out about $20,000 in wages to his men. In the meantime, his wife worked a little claim of her own at odd moments and made about $10,000 out of it. The couple have returned to San Francisco, where Berry has received an offer of $2,000,000 for his Alaskan holding.

Robert Kooks brought back $14,000 in gold dust and $12,000 he received for his half interest in a claim. He has an interest in another claim, and intends to return after he has had rest and enjoyment.

J. B. Hollingshed, after two years spent in the diggings, can show $25,000 worth of dust, and still possesses a claim, to which he intends to return.

M. S. Norcross was one of those who were looked upon as unfortunate. He selected a claim but became ill and could not work it, so he was compelled to sell out for $10,000.

Thomas Flack has only $6000 worth of dust, but he has a claim at Klondike for which he has been offered $50,000. He intends to return to work it himself.

Con Stamatin returned with a third share of $33,000 worth of dust taken out in forty-five days' work.

PLENTY OF GOLD IN ALASKA.

"I brought down just 1000 ounces of dust and sold it to the smelting works," said William Kulju. "I sold my

claim for $25,000. When I went to Klondike last summer I had only a few dollars and a pack. Now I am going home to Finland, but I am coming back next year."

John Marks, another of those who came down on the "Portland," had with him $11,500 in dust. In a conversation recently, he said:—"There is plenty of gold in Alaska, more, I believe, than the most sanguine imagine, but it cannot be obtained without great effort and endurance. The first thing for a poor man to do when he reaches the country is to begin prospecting. As snow is from two to five feet deep, prospecting is not easy. Snow must first be shoveled away, and then a fire built on the ground to melt the ice. As the ground thaws the shaft must be sunk until bed rock is reached. The average prospector has to sink a great many shafts before he reaches anything worth his while. If gold is found in sufficient quantities to pay for working, he may begin drifting from the shaft, and continue to do so as long as he finds enough gold to pay."

Frederick Lendsseen returned with $13,000 worth of gold after two years spent in Alaska. He sums up his opinion as follows:—"I have had considerable experience in mining, and say, without hesitation, that Alaska is the richest country I have ever seen. I have an interest in a claim near Dawson and am going back in the spring."

Greg Stewart brought back $45,000 received from his claim and a good quantity of dust he had taken out before selling.

Hollingshed and Stewart who worked as partners had $25,000 worth of dust.

Mrs. Eli Gage, daughter-in-law of Secretary Lyman J. Gage, and daughter of Portus B. Weare, Manager of the North American Trading and Transportation Company, returned to Chicago on July 27th from a trip to the Yukon country. Her husband represents the company at Dawson, and she has been with him three months. She has returned to Dawson to spend the winter, sailing in August for the far northland, where wealth is now to be obtained with such comparative ease. Mrs. Gage is enthusiastic about the country she has visited. She investigated its resources, had every opportunity to see aright what the real situation there is, and declares that none of the reports regarding the richness of the Alaskan land for the gold-seekers has been exaggerated, though about other matters in the Klondike region many false reports have reached the United States.

Mrs. Gage says there is an immense amount of gold in the Yukon district. Any man who has pocket money and about $500 for "grub-staking" a claim can safely go to the Klondike region and expect to reap a liberal reward for his efforts. If he goes poorly equipped and supplied, he may be compelled to suffer for his lack of wisdom, but he will not find himself among hard-hearted people. He will be helped if he deserves assistance.

On her way home, Mrs. Gage was compelled to hide in a drawing-room on the cars when it became known that she had just come from the Klondike country. Everybody was anxious to learn about the gold discov-

eries. Mrs. Gage says the stories of probable starvation have little foundation, the supplies taken from Seattle and San Francisco by the two trading companies being sufficient to prevent suffering during the coming winter.

Here are some of the interesting things this wide-awake American woman finds to say about her future home and her experiences there:

"We waited several days at St. Michael's for the river steamer for Dawson City. When the boat arrived it was loaded with the gold-hunters and their spoils. The gold was carried in bags, bottles, and sacks, and one man had his fortune in an old boot. They came tumbling on the deck of the 'Portland' in all sorts of outlandish costumes.

"No one would say how much he had himself, but he very willingly made a guess at what his neighbor had. Their talk would excite the coolest head. There was nothing but gold in the Klondike. I absorbed the prevailing excitement and listened to the wonderful stories with a thrilling pulse.

"We sailed from St. Michael's July 3d. It is wonderful how fascinating the life on the frontier becomes. The man or woman who gets a taste of it and succeeds and thrives by it rarely gets to like anything else.

"It was most interesting to study the men and women who had taken the desperate chance and had won. Some of them had gone into the region with barely enough to keep body and soul together. They had only made the attempt as a last resort. Having failed to make a suc-

cess at home, they had resolved to make one plunge and die or come out rich.

"The most pathetic story of this kind was that of Mr. and Mrs. Berry. They went into the Klondike without even a grub stake. They were on their wedding tour, and when they left they told their friends they might never get back to Fresno alive.

"This pair sat on the deck of the 'Portland' fifteen months after their departure, and their plans embraced bigger things than scheming to find a man who would loan them $60 while they risked their lives trying to get over the mountains and into the placer district. They were like two children—Mr. Berry planning to buy the farm upon which he has been unable to make living wages, and Mrs. Berry getting ideas on the newest things in diamond rings. She had been forced to omit this feature of the ceremony when they started for Alaska, but, like all women, she was pleased that the ring could now be bought.

"The abandoned claims will make many a man, not yet on the scene, rich. There are many claims along the best known creeks that have been abandoned. The prospectors would be digging on them contentedly earning big money every day. There would them come a report from some neighboring place of fabulously rich finds, and there would follow at once a wild rush. In this way claims that had paid moderately were passed in search of others that would banish poverty in a month."

William Stanley, one of the argonauts who returned on the "Portland," was formerly a resident of Seattle, and lived on Taylor Street, four blocks below Jackson. His story runs as follows:

"My son and myself and two partners, whom we picked up on the way to Juneau, had been wandering through the Yukon districts for several months with little or no success, when, in the latter part of last September, we heard of the Klondike discoveries. At this time we were *en route* along the Stewart River, being bound for Forty-Mile, and were at Sixty-Mile when the news of the strike first reached us. We hastened to the Klondike, stopping first at the mouth of the stream. The day following our arrival the little steamer 'Ellis,' with 150 wildly excited miners, who had also heard of the news, arrived. There was a rush and a mad run for the new discoveries along Bonanza and El Dorado Creeks. We brought up first on El Dorado Creek, locating claims Nos. 25, 26, 53, and 54. That was about the first of October. We prospected 25 and 26 until we satisfied ourselves that we had good pay dirt in each. Tnen we set about making permanent improvements for the winter, such as building cabins. This done, we set to work sinking prospect holes in different parts of the gulch. We had no blankets. Good pay dirt was taken from every hole, and at the end of three months' work we cleaned up $112,000. In getting this much gold we did not drift over 200 feet altogether up and down the stream. Nor did we cross-cut the pay streak. We

calculate that these two, and also 53 and 54, will run upwards of $1,000 to the lineal foot, and I figure that we have fully $2,000,000 in sight in the four claims. There is little or no difference in the 55 and 56 claims on El Dorado. In fact, there are no spotted claims on the creek. It is a case of all gold and yards wide and yards deep. Anywhere you run a hole down you find the pay streak.

"Our pans will average $3 throughout all of the El Dorado claims. Many go as high as $150, and some still better. I took out $750 in five pans, and did not pick the pans, either. I took the pan against my breast and simply scooped it in off the bedrock.

"To make a long story short, I think El Dorado Creek is the greatest placer proposition in the world. There has never been anything discovered on the face of the globe like it.

"In my opinion, there will be a number of them, too. Bear Gulch is almost another El Dorado. There is a double bedrock in Bear Gulch, though but very few know it. The bedrocks are three feet apart. The gold in the lower bedrock is as black as your shoe, and in the top bedrock it is as bright as that found in the El Dorado.

"We own No. 10 claim below discovery on Bear Gulch, and also 20 and 21 on Last Chance Gulch above discovery. We prospected for three miles on Last Chance, and could not tell the best place to locate discovery claim. The man making discovery of a creek is

entitled by law to stake a claim and take also an adjoining one, or, in other words, two claims, so you see he wants to get in a good locality on the creek or gulch.

"Hunker Gulch is highly looked to. I think it will prove another great district, and some good strikes have also been made on Dominion Creek. Indian Creek is also becoming famous.

"What are we doing with all the money we take out? Well, we paid $45,000 spot cash for a half-interest in claim No. 32 El Dorado. We have also loaned $5,000 each to four parties on El Dorado Creek, taking mortgages on their claims, so you see we are well secured. No; I don't want any better security for my money than El Dorado claims, thank you. I only wish I had a mortgage on the whole creek.

"We had a great deal of trouble securing labor in the prospecting of our properties. Old miners would not work at any price. We could occasionally rope in a greenhorn and get him to work for a few days at $15 a day. Six or eight miners worked on shares for us for about six weeks, and when we settled it developed that they had earned in that length of time $5,300 each. That was pretty good pay, wasn't it? We paid one old miner $12 for three hours' work, and offered to continue him at that rate, but he would not have it, and went out to hunt a claim of his own. I am going back to the Yukon in the spring, but not to work. When I threw down my shovel and pick it was for the last time."

CHAPTER II.

THE YUKON RIVER, ITS PLACER FIELDS AND THEIR DISCOVERY.

Crater Lake—The Yukon, Alaska's gigantic inland highway—The great rivers of the world—River craft—The rival trading companies—Hudson Bay officials the first explorers—Gold bars on the Big Salmon—The first big strikes—The tented banks of the El Dorado and Bonanza—McCormick the original Klondiker—A buckskin bag and its story—The arms of the Yukon—Thawing and freezing at the diggings.

ALMOST at the foot of Chilkoot Pass in the Kotusk Mountains there lies a little body of water known as Crater Lake. From this diminutive inland sea there stretches away a continuous water-course to Bering Sea, a distance of almost 2,000 miles. Such is the extent of the mighty Yukon and its headwaters. What the Amazon and La Plata are to South America, what the Mississippi is to the central portion of the United States, and what the Kongo and Niger are to Central Africa, this and more is the Yukon to Alaska. It is the great natural inland highway without which the opening up of the vast interior to civilization and trade would have been arduous and to a great extent impossible. The Yukon River proper extends from Fort Selkirk, at the confluence of the Lewes and Pelly Rivers, in the Northwest Territory, in a northwesterly direction 400 miles to the Arctic Circle, and then to the southward 1,350 miles to the sea, its total length to Fort Selkirk being 1,750. Of this distance 1,500 miles lies in United States territory. The 360 miles of waterway from Crater Lake to Fort Selkirk are made up of a succession of lakes con-

nected by streams of varying length, passing finally into the Lewes River. Pelly River, which unites with the Lewes to form the Yukon, lies to the northward of the latter, and is about 275 miles in length.

The first accurate description of the Yukon River was furnished by Dr. W. H. Dall, of the Smithsonian Institution. He was a member of the expedition sent out in 1865 by the Western Union Telegraph Company to make the preliminary surveys for a telegraph line to join the old world with the new, the same to be carried over Bering Strait into Siberian Russia. While the party was at work in Alaska the Atlantic Cable was put into successful operation and the expedition was recalled.

The territory drained by the Yukon and its tributaries has been approximately estimated at 331,000 square miles. Its size may be judged better by comparison with the other great rivers of the world which are estimated as follows:

Names.	Length in miles.	Area drained in sq. miles.
Mackenzie,	2,400	440,000
Missouri-Mississippi,	4,200	1,250,000
Amazon,	4,000	2,500,000
La Plata,	2,300	1,250,000
Hoang-Ho,	2,700	540,000
Lena,	2,550	600,000
Yang-tsi,	3,300	500,000
Kongo,	3,300	1,500,000
Niger,	4,000	1,400,000

The Yukon varies in width during the lower part of its course from one to ten miles, and its delta spreads out to a width of sixty miles. As it falls away to the

sea from the Arctic Circle its channel is cut up by thousands of islands. The current in places is strong and it is reported that at certain seasons the waters of Bering Sea are fresh fully fifteen miles from the mouth of the Yukon. For the better part of its distance the river is shallow, and only navigable to light-draught boats, under four or five hundred tons burden. The stern-wheel type is the only craft used on the river, and even during the high-water season extreme caution has to be used in threading the channels. It is believed that a powerful light-draught boat of not more than one hundred and fifty tons would be able to pass Five-Finger Rapids and go three hundred miles further through Hootalinqua River to the head of Teslin Lake. Among tributaries of the Yukon reported navigable for light craft are the Andreafski for 50 miles, the Shagluk for 50 miles, Innoko for 50 miles, Tanana for 300 miles, Klanarchargut for 25 miles, Beaver Creek for 100 miles, Birch Creek for 150 miles, Koyukuk River for 300 miles, Porcupine for 100 miles, Stewart for 150 miles, Pelly for 250 miles, and the McMillan for 200 miles; but these estimates are largely guesswork.

Traffic on the Yukon River is largely controlled by the Alaska Commercial Company and the North American Transportation & Trading Company, both companies having stations on St. Michael's Island and at various points along the river. The former company has two vessels, one of two hundred tons and the other of three hundred; the latter has a fleet of six boats, the "Weare,"

the "Cudahy," the "Hamilton," the "Healy," the "Power," and the "Klondike." All these steamers carry both freight and passengers.

Except during ten, or, at the most, twelve, weeks during the summer the Yukon is ice-bound from its mouth to the headwaters. Some years it opens up about June 1st, but usually it is nearer the middle of the month before the boats begin their trips. About September 1st traffic ceases, and severe weather is experienced.

The history of the development of the Yukon gold mines extends back a great many years; in fact, long before the northwestern territory came into the possession of the United States. As has been the case in other fields, the earliest discoverers of the yellow metal in the country deserve little credit, inasmuch as they failed to follow up their findings, and hence the discoveries have had little or no influence on the progress of the country and absolutely none on the more recent developments around the head-waters and along the valley of the gigantic Yukon.

This country was originally explored by the agents of the Hudson Bay Company, in 1840, and as early as 1860 it was reported that gold in small quantities had been unearthed by these officials, but little was heard of it. George Holt, who, in 1878, made the trip from Lake Lindeman to the Hootalinqua River, which runs into Lewes River, probably deserves the credit for opening up the Yukon gold fields. Returning by the same route, he reported having

made finds along the Hootalinqua, which is the miners' name (due to a mistake) of the Teslintoo River, which flows down from Teslin Lake, on the British Columbia border. He never went back to the interior, but the news he furnished of the country caused Edward Bean to lead a goodly train up over Chilkoot Pass and down the chain of lakes which lead to the Yukon, during the early 80's. Bean came from Sitka, and was one of the original owners of the Treadwell mine property. The party met with indifferent success, finding the coveted treasure, but not in sufficient quantities to encourage them in further effort. The opening was made, however, and miners and prospectors began going over the Chilkoot Pass in large numbers. These parties did their work for the most part on Canadian soil and principally along the Lewes River and its tributaries. They ascended the Big Salmon and found the precious metal on all its bars. The finds on Canadian soil, however, until quite recently, were none of them sufficiently alluring to cause a stampede towards them.

FINDS IN THE YUKON DISTRICT.

Up to 1886, the finds in the Yukon district were confined almost entirely to territory traversed by its head-waters, embracing the White, Stewart, Pelly, Lewes and Hootalinqua Rivers. In that year, what may be called the middle division of the Yukon, extending from Fort Selkirk to the mouth of the Tanana River, was first opened up by the discovery, on Forty Mile Creek, of gold in goodly quantities. This caused a general cessation of operations along the head-waters, and the largely-

STEAMER "QUEEN" AND MUIR GLACIER.

increased working force due to this source caused claims on Sixty Mile, Miller, Glacier, Birch and Koyukuk Rivers to open up in rapid succession. Forty Mile and Sixty Mile Creeks rise in the Ratzel Mountains, which divide the Tanana from the Yukon valley, and flow into the Yukon from the west. They receive their names from the fact that they were considered respectively forty and sixty miles from the trading-post, Fort Reliance, which, up to 1896, was the commercial centre for this section of the Yukon country. The real distances are somewhat greater, measured as are all these distances along the windings of the river, which is the highway of travel.

STEAMER "QUEEN" AND MUIR GLACIER.

UPBUILDING OF CIRCLE CITY.

The first good strike on Birch Creek was made in 1893, and this gave rise to the upbuilding of Circle City. This remained the most important mining camp in this part of Alaska until December, 1896, when it was almost wiped off the map by the exodus to the Klondike, where Dawson City speedily arose at the junction of the Klondike and Yukon Rivers. J. O. Hestwood, of Seattle, who has recently returned from the gold fields, has told how gold was first found on the Klondike.

"The discovery," he said, "was made by an old hunter named George McCormick, a former resident of Illinois, who is called "Siwash George," and has been on the Yukon for eight years. He is married to a squaw and has several half-breed children. McCormick went up in the spring of 1896 to the mouth of the Klondike

to fish, as salmon weighing ninety pounds are caught where this stream meets the Yukon. The salmon didn't run as usual and McCormick, hearing from the Indians of rich places nearby, where gold could be washed out in a frying pan, started out to prospect.

"Near what is now Dawson City, on July 9th, he struck very rich pay dirt in a side hill. As soon as news of his discovery spread, men from Circle City and Forty-Mile rushed in. The richest claims are in Bonanza Creek, which empties into the Klondike from the south, three miles above Dawson City. There are three claims in that district, each 500 feet long, extending clear across the creek on which it is located. No one can file an additional claim until he has recorded his abandonment of his old claim, according to Canadian law, and it must not be forgotten that this river is far within the Canadian boundaries.

"In the adjoining Hunker district there are 200 claims. The two districts have been well prospected, but further up the Klondike is much territory which has never been even traveled over.

"Old miners declared that the north side of the Yukon was worthless, so no prospecting was done until McCormick started in. There is no claim-jumping, as the Canadian laws are rigid and well enforced by the presence of the Mounted Police.

THE RUSH FOR KLONDIKE.

"There was a rush for Klondike as soon as the discovery was made known and I was among the first to

get there. I had poor luck at first and after a few days started to leave, but I had only got a short distance down the river when my boat got stuck in the ice and I went back to Dawson City. I bought a claim and it proved one of the richest in the district.

"In the region now worked there are a score of creeks, each rich in gold deposits. The creeks comprising the bonanza districts are Bonanza, El Dorado, Victoria, Adams, McCormick, Reddy Bullion, Nugget Gulch, Bear, Baker and Chee-Chaw-Ka. In the Hunker district are the Main Fork, Hunker and Gold Bottom Creeks.

CREEKS RICH IN GOLD DEPOSITS.

The banks of these streams are dotted with white tents of miners, and a prettier sight it would be hard to find. Over on Dominion Creek gold has been found, and 300 miners started for that place the day we started for San Francisco. The surface prospects are quite as favorable as on the Bonanza."

McCormick was not allowed to be the sole proprietor of the Klondike for a very long period. About the middle of August his supplies ran low and he dispatched two Indian assistants to a settlement on the Yukon, half way between Forty-Mile and Sixty-Mile Creeks, to replenish the larder. The "P. B. Weare," of the North American Transportation and Trading Company, happened to be stopping at the settlement at the time the Indians arrived and their tales of the rich finds on the Klondike caused the entire crew of the vessel to desert and hasten away to the new El Dorado. After getting

a native crew together, the "Weare" pushed on down the river and spread broadcast through the mining camps the news which since has electrified the world.

Among the romances which will be forever associated with the history of the Yukon none savors so strongly of the rough and ready country through which it wends its way than does the story of the founding of the North American Transportation & Trading Company. In the winter of 1892 rteus B. Weare, of Chicago, and Captain John J. Healy met in Chicago after a separation of years.

They had been companions in the fur trade with the Indians at old Fort Benton, on the Missouri River, in 1865. Mr. Weare had returned to civilization and taken up his residence in Chicago, but Captain Healy had penetrated to the head of Chilkoot inlet, established the trading post at Ty-a (now known as Dyea), which bears his name, and continued his traffic with the Indians until he became known as "Chief of the Blackfeet."

In the course of their reminiscent talk Healy drew from his pocket a buckskin bag and displayed to his old comrade of the camp and trading post the yellow contents of the crude purse. Then he told the tragic tale of how the gold had come into his possession. The substance of his narrative was this:

One fearfully cold day in the latter part of December, 1891, two or three Indians entered the post and offered for barter the bag containing several hundred dollars' worth of dust. Healy eagerly inquired where

and how they secured the gold. Their answer was that it had been obtained from Tom Williams, a trapper, who had made the long pilgrimage from the interior, along the Yukon, but had died before reaching the post.

The Indians were able to give the trader a general description of the locality which the dying trapper had described to them as the spot where he discovered what he believed would prove to be a rich gold field.

As Mr. Weare knew his friend to be a practical miner, his faith in the sagacity and the judgment of the latter was strong. The story also awakened in him the latent longing to taste once more the pleasures of frontier adventure. The result was the organization of a company which sent steamers to the headwaters of the Yukon and opened up the country. Captain Healy has been in Alaska fifteen years, and is one of the best known men in the country.

The territory around the mouth of the Yukon is very low. In fact, the reason for the chief trading station for this section of Alaska being placed on an island sixty miles above the usual entrance to the river is that the delta for miles around is entirely covered in the late spring or early summer by freshets due to the ice melting in the river. Owing to the way in which the Yukon spreads out as it passes into Bering Sea the water is very shallow and eight feet is about the maximum depth reached in any of the numerous channels.

The two most interesting arms of the Yukon are the Lewes and Pelly Rivers, which unite to form it. The

former is all-important on account of the part it plays in the overland route from Juneau to the gold fields. Its chief tributary, the Hootalinqua, is the stream over which the Canadians expect to see carried the bulk of the inland travel. The Pelly River rises in Pelly Lakes, near the crest of the Rocky Mountains which there form the divide between the basins of the Yukon and MacKenzie Rivers. These lakes are precisely where the 129th meridian crosses the 62d parallel of latitude; and thence the river flows northwesterly over 500 miles before reaching Fort Selkirk. The country through which it passes is mountainous and wild, and has been explored but a very slight extent. The Yukon, after passing Fort Selkirk, varies from one-half to three-quarters of a mile in width. On the northern side it is bounded by an almost continuous wall of rock of volcanic origin, and on the south the bank is low and sandy. After passing the White River the course is almost due north through a mountainous country. The scenery is wild and most picturesque. On both sides great granite cliffs rise hundreds of feet above the bed of the river, which, receiving the waters of the Stewart from the north, flows on toward Dawson City with great rapidity, sometimes as high as seven miles an hour. At just about the centre of the present mining district the Yukon changes its course to the northwest and continues in this direction for about 300 miles, or to a point near where the Porcupine River crosses the Arctic Circle, and empties into the parent stream. The width on the

Alaskan side of the boundary line averages about one mile, but as it approaches the Circle it spreads out among islands at the mouth of the Porcupine, till it is several miles from shore to shore. A good deal of difficulty is experienced in navigating the Yukon at this point on account of the shallowness of the water and the sandy formation of the bed, which causes the channel to shift from month to month and season to season.

There is never a complete thaw of the soil which makes up the country through which the Yukon flows. In some places during the summer months the ground is soft to a depth of three or four feet, but in less favored places eighteen inches is a maximum. This layer of frozen soil extends down six or eight feet, and below that ice is rarely encountered. Various explanations of this phenomena have been advanced, but it is generally believed to be due to poor drainage and to the dense layer of moss which covers the entire country, and which acts as a blanket, preventing the intense heat of the midsummer sun from penetrating far below the surface, and also keeping in the cold.

CHAPTER III.

ROUTES TO THE ALASKAN INTERIOR.

Dyea the base of supply for overland travel—The Chilkoot Pass and Lake Lindeman trail—The Stick Indian packers—Boat-building on the lakes—Shooting Miles Cañon, White Horse and Five-Finger or Rink Rapids—Stacking supplies by the way—The White and Chilkat Passes—Taku Inlet and Fort Macpherson routes—All the way to the Klondike by water—Proposed railways to pierce the gold fields.

THE miner or tourist who proposes penetrating the Alaskan country to the placer diggings of the upper Yukon Basin has, broadly speaking, the choice of two routes. The one which has been most generally used, up to within a very recent time, is all the way by water. Leaving Puget Sound, or San Francisco Bay, the steamer sails out to the northwest across the Pacific Ocean to the Aleutian Islands, between which a channel leads into Bering Sea. Safe in these latter waters the steamer is put on a direct northerly course to Fort Get There, on St. Michael Island, which lies on the far western coast of Alaska, about sixty-five miles above the mouth of the Yukon River. There a transfer is made to a light-draft river boat, and in this the rest of the voyage to Circle City, Fort Cudahy, or Dawson is made. It takes between four and five weeks to make the trip in this way, under the most favorable circumstances, and owing to the fact that the Yukon is frozen hard and fast during eight months of the year, this route is only open from about June 1st to the middle of September.

The other route, and the one which is being taken by thousands of miners and others at the present time, is part of the way overland. Having arrived in Juneau by water from Seattle, the traveler goes up Lynn Canal to Dyea, or Taiya, as the Canadians call it. This town is at the head of Chilkoot Inlet, which runs parallel to and to the east of Chilcat Inlet, the latter also emptying into Lynn Canal. At Dyea the overland journey begins, and just beyond its gates the rise to the Chilkoot Pass, 3,500 feet above the sea, commences. Lake Lindeman, twenty-seven miles from Dyea, is the first piece of water met with after making the pass. This is the first of a series of lakes, which, with their connecting streams, must be traversed before the Thirty-Mile, Lewes, and finally Yukon Rivers are reached. This, in brief, is the route to Dawson City, over which the great bulk of Alaskan gold-field travel is now making its way.

There are numerous conditions which must necessarily affect a decision as to choice of routes. Perhaps the main argument in favor of the overland route as opposed to the all-water one is the difference in time required for the two journeys. The distance from Seattle to Dawson City *via* Juneau and the lake country is 1,459 miles, while to take the ocean course requires that a circuit of 4,200 miles must be made. The time actually required to cover the two routes is not governed altogether by the number of miles they measure. The season of the year, the size and make-up of the party, the state of the weather, the amount of baggage, and a dozen other

items, including luck, enter in to make the nicest calculations go wide of the mark.

Inasmuch as the Yukon route is out of the question until next summer's sun shall have thawed out its ice-bound channel, the greatest interest at the present time attaches to the overland route outlined above and the manifold variations to which it is subject. Both San Francisco and Seattle have been used as points of departure. The regular lines of vessels plying between these ports and Juneau, the metropolis of Alaska, have been largely supplemented. Craft of every description capable of living on the high seas have been drafted into the service. Barges, tugs, side-wheelers, and merchantmen, large and small, have been brought out of retirement and made to do valiant service in speeding the bands of gold-seekers on to the newly-found El Dorado. The excitement along the wharves where Alaskan-bound vessels have been moored has been intense. As a usual thing, long before the vessels were ready to heave anchor the docks have been so packed that it became almost impossible for a person to wedge his way through the mass of people so as to get a look at the steamship.

These crowds were not drawn altogether by personal interest or friendship for those who were about to take the long, tiresome, and dangerous journey into the Yukon gold fields, although many that were present doubtless were influenced by those motives. The main actuating sentiment, however, was the feverish excitement which

seems to prevail throughout all classes of the community in regard to the Klondike.

To those who could not go there was some undefined satisfaction in looking upon the more lucky ones, who were more favored by fortune, and who might possibly be the future millionaires of the Coast.

The first stages of the Klondiker's journey have been more or less familiar to the American tourist for years. Leaving the terraced slopes of Seattle in the background, the good ship plies her way down Admiralty Inlet, past the city of Everett, and into Port Townsend, the United States port of entry for Puget Sound. Clearing from this port, the course lies directly across the Straits of Juan de Fuca northward to Victoria, B. C. This city, the capital of the province, occupies a commanding site at the southern extremity of Vancouver Island. Thence the course runs to the eastward of Vancouver Island into the Gulf of Georgia, and threads its way through narrow channels and past islands, named and nameless, until, passing out of Chatham Sound, the vessel once more enters American waters and ties up for a short while at the Mary Island wharf for freight. The next stop made is at Fort Wrangel, which is reached on the morning of the fourth day out. Here the first real insight into Alaskan life is gained. The wharf swarms with Indians who expose for sale all manner of wares, while the crew busies itself with the adjustment of the cargo. The next stop is Juneau. This is a seaport and mining town, and before the gold

excitement began its population ranged from 2,000 to 3,000 souls. It has schools and churches, three newspapers, electric light plant, water-works, two excellent wharves, mercantile establishments of generous proportions, good hotels, theatres, paved streets, and a well-organized fire department.

The fare from Seattle to Juneau is $32, first-class, and $17 second-class. From the same port direct to Dyea a tariff of $40 is asked for first-class and $25 for second-class passengers. These tickets allow for 150 pounds of baggage. Anything over this up to 1,200 pounds will be carried at the rate of 10 cents per pound. Having been landed in Juneau, it is possible to take any one of a large number of small boats and continue the journey to Dyea, 96 miles further up the Lynn Canal. The fare on these boats is $10. The average time from landing to landing is about twenty-four hours. The docking facilities at the northern port are not of a very high order, and when the waters of Dyea Inlet, which is a fresh-water branch of Chilkoot Inlet, are rough, considerable difficulty is experienced in transferring passengers and freight from the boats to the shore. The present bustling town was originally an Indian village and trading post, and lies about a mile from the mouth of the inlet, in a beautiful level valley one mile wide. The traffic of the place has increased so rapidly during the past few months that the warehouse facilities are entirely inadequate to meet the demand, and by far the largest part of the freight destined for

the Klondike country has to be stacked on the low-rolling beach preparatory to its being carted further up the trail toward Chilkoot Pass.

Dyea Inlet is open for canoe navigation for six miles above the town, but as the packing into boats hardly pays for the short run, it is the general practice either to pack it on horses or bring small carts in use for the trip to Sheep Camp. About half this distance is through a comparatively level valley, the surface of which is composed of loose glacial rocks of all sizes, which afford a very uncertain footing for either man or beast.

There is so little soil in the valley after the first mile or two above Dyea that the trees and vegetation are of sparse and stunted growth. Along the sides of the mountains, however, the timber is heavy. The latter half of this pack-trail is shelved along the side of a cañon several hundred feet above the stream until the last mile, when it zigzags down to the valley again.

In winter it is possible to use pack horses to within a half-mile of the summit of the Pass. The distance from Dyea to Sheep Camp is twelve miles, and the rough trail crosses Dyea Inlet six or seven times in that distance. The waters of this stream spring from two giant glaciers, one on either side of Chilkoot Pass. The fords constitute at times a dangerous feature of the trip, as men have been drowned crossing this furious icy torrent. Sheep Camp is a point just at the timber line where the streams from the two glaciers unite and form

the Dyea. Here travelers often have to wait many days for fair weather to cross the range.

It is at this point of the journey that the Indian packer is brought into service. For the actual crossing of the Pass he is absolutely indispensable. From long experience in crossing and recrossing this dangerous defile he knows its every nook and cranny, and can make the ascent and descent loaded down with provisions for his employer with considerably more ease than that same employer can without the embarrassments of a pack.

The average load for the men is 120 pounds, but thirty or forty pounds more is not uncommon, and as an example which may be taken as about the limit, one of these men of burden has been known to carry an organ weighing 220 pounds over the Pass. Not as many squaws as men are at work, and their loads average a little lighter. Generally every member of the family—and this may be understood to include the dogs—carries a pack. Every Indian wants flour or bacon, because they constitute the most compact and easily adjusted load to carry; but those who cannot get flour, having no special "pull" with the boss packer, have to be contented with camp-stoves, guns, shovels, rope, and other awkward things to carry. The dogs are loaded with from fifteen to fifty pounds, but it is necessary in some places for them to have assistance, and so their master puts down his pack and carries the dog and his load through some of the more difficult or narrow passages among the rocks or across streams.

The Indian's personal belongings that he usually takes with him are a bag of dried fish and a blanket and possibly a small bucket or a tomato can for a teapot. Dried salmon is both bread and meat to him and also to his dog, but the latter gets his share only at night. There is very little sunshine in the life of a Siwash dog. He is overworked, and it is only through a most unaccountable oversight that he ever gets enough to eat.

The rate which the Indians charge for packing is a variable quantity, largely governed by the demand for their services. For some years past the price has been comparatively stationary at 14 cents a pound, but during the last few months this has gone up to as high as $23 a hundred. And at the latter figure every packer in the district has been kept more than busy. Thousands of tons of provisions and freight are stalled at Dyea and Sheep Camp, owing to the scarcity of packers. Quite a few of the on-rushing miners have essayed the task of doing their own packing. But this involves return trips, and the work involved is very arduous to one unaccustomed to it.

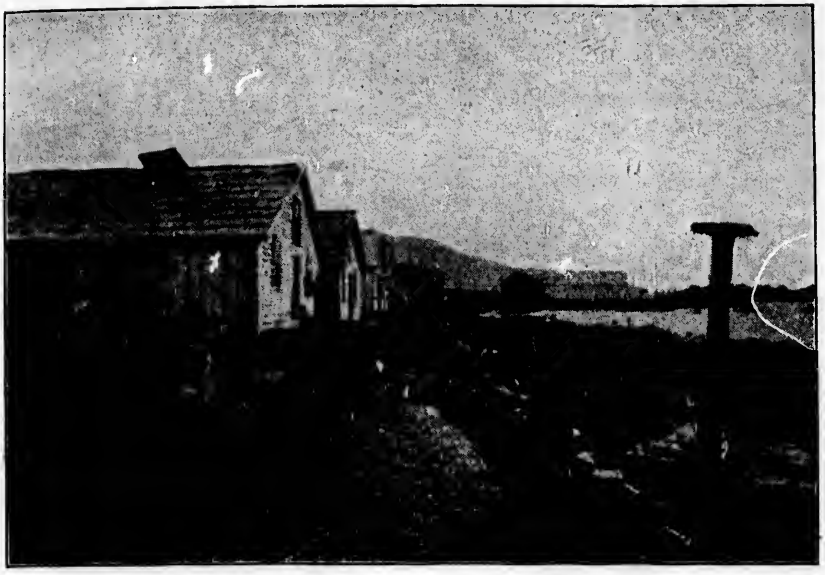
A striking custom which is worthy of note is that of cacheing supplies along the trail. Flour, bacon, blankets, or whatever it may happen to be are left at any point to suit the convenience of the owner. A miner leaves a certain portion of the food upon which his life depends and goes on hundreds of miles in serene confidence that he will find it again when he comes back in the fall. Sometimes a tent or fly of ducking is put up for a shel-

ter. If it is intended to leave the cache for several months, a platform on four posts is erected eight or ten feet above the ground to protect it from dogs and wild animals. Hungry Indians pass this food every day, and sometimes hungry white men, but it is rare indeed that a cache is maliciously violated. Of course there is a feeling of their dependence upon each other among these isolated men of the Yukon. If any one should come into the country without any supplies he would be received with poor grace, but should he come as the rest do, and by any misfortune lose his outfit, he is always welcome to a share anywhere he goes.

The trail from Sheep Camp becomes steeper and steeper as the Pass is approached. Vast snow-fields have to be traversed, great boulders of granite have to be avoided by long circular cuts, and steep ice-covered declivities scaled with a sure foot. The trip to Lake Lindeman is described as possessing all the dangers and excitement of mountain climbing among glaciers, snow, ice, and boulders.

Two miles above Sheep Camp is a very interesting glacier which has no local name. Its depletion from crumbling and melting has been faster than the onward progress of the whole mass, and consequently it has receded to a point 2,000 feet higher than the creek. The front wall or face of it is 200 or 300 feet high, and has a width of a half mile. The glacier is almost unapproachable.

The great body of ice creaks and groans almost con-



STREET SCENE IN DAWSON CITY.

INTERIOR OF MINER'S CABIN, DAWSON CITY.

tinually. At times the disturbance increases to such an extent as to make one think, at a distance of two miles away, that the whole thing was tumbling down the mountain. The color of the superficial part of the glacier is pale blue, but the fissures, with their varying depths, run from blue to the deepest indigo color. From the foot of this, which has been called Sheep Camp Glacier, may be had a very comprehensive general view of Chilkoot Pass. For two miles the course extends straight away and upward through fields of perpetual snow and seems to terminate at dark stone walls. The summit of the pass is not visible, as the defile turns to the left and then abruptly to the right through gateways of granite. In many of the depressions around the higher points of this part of the coast range there are ice caps or glaciers, but they are rarely visible from the valleys immediately below.

Chilkoot Pass is 3,500 feet above the level of the sea. The nearest settlement to the summit is Stone House, which is 2,400 feet below, and the real struggle lies between these two points. The view from the top is not an extended one. Crater Lake, 500 feet below, can be seen. It is the source of that arm of the Yukon which affords the entrance to the gold fields *via* Chilkoot Pass. Beyond the little lake, less than a mile in extent, is a low line of hills, and in the distance rises a range of bare mountains. A dim trail leads down the hill and across the frozen lake, disappearing into the cañon beyond.

The abrupt passages near the summit are better

accomplished by hauling supplies on sleds. After the summit is passed, if the journey is continued before the ice breaks up, it often happens that long distances may be made by means of sails raised on improvised masts on the sled. The sledge should be about seven feet four inches long, seven inches high, and sixteen inches wide, of strong but light timber, and the runners shod with either brass or steel, the former being preferable, because the sled will glide over the snow more smoothly in intensely cold weather, while steel is inclined to grind and lug very much, as if it were being hauled over sand. When the weather is cold, if water is taken into the mouth and held a moment, then blown over the runner, a coating will immediately form, and if this process is repeated when it becomes a little worn off, one will be surprised to find how much smoother and easier the sled will draw. It is preferable to use the Eskimo mode of making sledges for Yukon traveling. They use no nails or bolts, binding the joints together with strong cords. There is much less danger of breaking, if made in this way, should the sled be overturned, as the joints will yield when thus tied together.

From the summit to the head of Lake Lindeman the distance is nine miles. The descent for the first half-mile is steep, then a gradual slope to the lake. But there is little time for resting and none for dreaming, as the edge of the timber, where the camp must be made, is seven miles from the summit. Taking the camping outfit and sufficient provisions for four or five days, the

sleigh is loaded, the rest of the outfit is packed up, or buried in the snow, shovels being stuck up to mark the spot. This precaution is necessary, for storms come suddenly and rage with fury along these mountain crests. The first half-mile or more is made in quick time, then over six or seven feet of snow the prospector drags his sleigh to where there is wood for his camp-fire. At times this is no easy task, especially if the weather be stormy, for the winds blow the new fallen snow about so as completely to cover the track made by the man but little ahead; at other times during fine weather and with a hard crust on the snow, it is only a pleasant run from the Pass down to the first camp in the Yukon Basin. In all except the most sheltered situations the tent is necessary for comfort, and the stove gives better satisfaction than the camp-fire, as it burns but little wood, is easier to cook over, and does not poison the eyes with smoke. It is a noticeable fact that there are fewer cases of snow blindness among those who use stoves than among those who crowd around a smoking camp-fire for cooking or for warmth. Comfort in making a trip of this kind will depend, in a great measure, upon the conveniences of camping, suitable clothing, and light, warm bedding. Yes, upon provisions, too, though often more depends upon the cook than upon what is in the larder.

Once on Lake Lindeman a new feature of the journey presents itself. Those who make the trip in summer will find the ice out of the lakes, but if an early start were made they would be able to cross Lake Lindeman

and the other lakes of the chain by means of ice boats temporarily constructed. After the 1st of May the lake course opens up and fairly good boats are a necessity.

Until the last year it was necessary for every miner to carry a whip-saw with him with which to cut the timber for his craft, and whip-sawing was one of the picturesque, although not especially inviting, incidents of the trip. But a saw-mill has recently been constructed. The only timber used in the construction of boats on the lakes is a local kind of spruce. In the first place, the timber has to be discovered, and this is not the easiest thing in the world, because the timber around the lake is nearly all burned off, and there is none suitable for boat building. After the timber has been found comes the construction of a saw pit. To construct a saw pit it is necessary to find trees so arranged as to support cross-pieces, the stumps being cut at a proper distance from the ground so as to take the notched cross-pieces in. This requires four trees about equi-distant from one another, and the cross-pieces have to be fixed very firmly in place so as not to slip, as the log which is to be sawed is likely otherwise to be the cause of an accident. Often a good woodsman will be able to fell the tree which is to be sawed in such a way that it will fall into the pit, which saves the time and trouble of skidding the log up and rolling it in place after felling, which is frequently a very difficult task. From the slabs and boards thus roughly made the flat-boats are constructed, upon which the miners

traverse the chain of lakes extending north from Chilkoot Pass.

From the head of Lake Lindeman, on both sides to Lake Bennett, the general character of the country is mountainous, with narrow benches skirting the shore. The distance across Lake Lindeman is nearly six miles, and from the foot of this lake about fifty yards of a portage is made of the one-mile river to Lake Bennett, because this stream is very crooked and full of rocks, making boat passage difficult and dangerous.

Lake Bennett is twenty-six miles in length and is separated from Tagish Lake by a six-mile river. This lake is some fifteen miles long, and empties into Mud Lake through an outlet three miles long. Mud Lake is about ten miles in length, and at the foot of it open water is usually found in April. Open water will probably be passed before reaching this point in the rivers connecting the lakes, but firm ice at the sides affords good sledding; but at the foot of Mud Lake a raft or boat must be built. Dry timber can be found along the shores with which to build a raft, which will take everything to the Lewes River Cañon, about forty miles to the northwest. The river cuts through high banks of cement and sand, where millions of martins have their nests. The little birds have usually burrowed into a stratum of sand which lies just under the crest of the perpendicular bank. For mile after mile the coping of this cañon is decorated with a frieze of martins' nests. Usually there is a single line of these

holes only a few inches apart, but sometimes it happened that there are one or two lower deposits of the same quality of sand, and wherever the material occurs it is always utilized by the martins. For hundreds of miles down the river there is an almost unbroken throng of these little fellows, and they seemed to subsist wholly on mosquitoes.

Miles Cañon is the first piece of dangerous water encountered. Nineteen men have lost their lives during the last three years in the three miles of the Lewes River, which include this pass and the White Horse Rapids. The cañon is about fifty yards wide with perpendicular granite walls on either side. About midway there is an enlargement of the bed, which causes the formation of a very treacherous whirlpool. The natives believe that anything caught in this suction never reappears. Its effect is to throw the water upon a central ride. To successfully pass these rapids one must keep his boat on top of this central crest. After emerging from the cañon for about two miles the river runs through a flat country, and then it is crossed at right angles by a chain of hills similar to that at the cañon, and again the river is hemmed in and is forced through a similar narrow and contracted outlet, White Horse Rapids, although in this case the water is confined for only a very short distance. At the rapids the hills do not approach very near to the river, but there is a margin, a plane of rock on either side, where one may approach and almost touch hands with those shooting

the rapids in a boat. It is in the apparent advantage that those projecting shelves offer that the danger lies. In these three miles the river bed drops thirty-two feet.

Two portages are made at White Horse, both of them short ones. The landing for the first is on the left or west bank. Sometimes a boat can be lowered through the first pitch with a rope, but the portage is safer. Below the portage the boat is paddled to the head of the last drop. This is "a drop too much" for any boatman to run. The channel closes in and the water goes down through with an angry roar. Fortunately, however, the portage is only about 100 feet long.

The rest of the river run to Lake Lebarge is clear. Lake Lebarge itself is thirty-one miles long and five miles wide. It is usual to steer straight for the island in the middle, and under its shelter work around to the east or west shore, according to the direction of the wind.

From the foot of Lake Lebarge to the mouth of the inflowing Hootalinqua or Teslintoo River, the current is rapid and there are many rocks, but it is not dangerous. Below the junction with the Hootalinqua the river is large and calm, and there is easy going for about 130 miles to the Five-Finger Rapids. This is one of the two or three obstructions that interfere with the free navigation of the river. A ledge of rock lies directly across the stream with four or five openings in it, that afford a scanty outlet for the congested current. The largest passage and the one commonly used is the one at the

right shore. There is a considerable fall, but the water is not badly broken, the gateway being succeeded by several big waves, over which a boat glides with great rapidity, but with a smooth and even motion. Shooting this rapid is an exhilarating experience, but with careful management is not considered dangerous, as there is no record of any one being drowned here. It is well to have the boat fairly light before running the rapids.

The run should then be made, landing on the right-hand side. Following the right-hand shore all the way for about five miles, Rink Rapids, one and a half miles in length (caused by a chain of rocks reaching nearly across the river) are reached. The right-hand side or east shore must be followed closely all the way. From this point the river is easy to navigate to its mouth. About fifty-five miles below the foot of Rink Rapids old Fort Selkirk is reached. It is situated near the confluence of Pelly and Lewes Rivers. Here a trading post is run by an old-timer named Harper, and this is also a winter port for steamboats plying on the Yukon and its tributaries. The fort was pillaged and burned by coast Indians in 1852, and ruins of what were once chimneys only being seen.

Continuing the journey, Stewart River is passed on the right; then White River on the left, so named on account of its milky-looking water; the next tributary on the same side is Sixty-Mile Creek, so called on account of its being considered sixty miles above Fort Reliance. Here the Yukon is over two miles in width.

The Klondike River and Dawson City are the next points of interest.

James Ogilvie, surveyor for the Dominion Government, has made the following table of distances from Dyea or Ty-a, using the Canadian name:

	MILES.
Head of canoe navigation, Ty-a River,	5.90
Forks of Ty-a River,	8.38
Summit of Chilkoot Pass,	14.76
Landing at Lake Lindeman,	23.06
Foot of Lake Lindeman,	23.49
Head of Lake Bennett,	28.09
Foot of Lake Bennett,	53.85
Foot of Cariboo Crossing,	56.44
Foot of Tagish Lake,	73.25
Head of Marsh Lake,	78.15
Foot of Marsh Lake,	97.21
Head of Miles Cañon,	122.94
Foot of Miles Cañon,	123.56
Head of White Horse Rapids,	124.95
Foot of White Horse Rapids,	125.93
Tahkeena River,	139.92
Head of Lake Lebarge,	153.07
Foot of Lake Lebarge,	184.22
Teslintoo River,	215.88
Big Salmon River,	249.33
Little Salmon River,	285.54
Five-Finger Rapids,	344.83
Pelly River,	403.29
White River,	499.11
Stewart River,	508.91
Sixty-Mile Creek,	530.41
Dawson,	575.70

Of all the overland routes to the Yukon gold fields the one *via* the Chilkoot Pass has been the most used by the miners. This is the oldest of the many routes, and

having been explored frequently by official expeditions of one kind and another the objections to it are pretty well understood, and many of its hardest places have been smoothed over. All along this route enterprising individuals have made improvements for the benefit of those who use it. The boarding-house at Sheep Camp, where meals are served at 50 cents apiece, and the saw-mill on Lake Lindeman, where boards are sold at $10 a thousand feet attest this fact.

The trail leading up over White Pass it is believed will eventually very largely supersede the Chilkoot route. By taking this road the steep declivity just to the south of the Chilkoot Pass will be avoided. For even an Indian this is a hard bit of going, and especially when loaded down with from one to two hundred pounds of provisions. At the present time the argonauts at Dyea seeking an entrance to the gold fields are at logger-heads as to the relative merits of these two trails. Skaguay, the starting point for the White Pass, is five miles distant from Dyea, on the Skaguay River. The trail runs parallel with Chilkoot Pass, and at no great distance from it.

Though the land carriage is somewhat longer by this, it appears to present less difficulty for the construction of a practical trail or road. The distance from the coast to the summit is seventeen miles. Five miles of this are level bottom land thickly timbered. The next nine miles are in a narrow cañon-like valley, where heavy work is encountered in constructing the trail. The remaining

distance of three miles to the summit is comparatively easy. The summit has an altitude of 2,600 feet. Beyond the summit a wide valley is entered, and its descent to the first lake is not more than a hundred feet. The mountains rapidly decrease in height and abruptness after the summit is passed, and the valley divides, one branch leading to the head of Windy Arm of Tagish Lake; the other, down which the water drains, going to Taku arm of the same lake.

This route being over level country as compared with that over Chilkoot Pass, is much better adapted to the use of pack-horses and trains. It has been reported that parties with horses have been able to get all the way through to Lake Bennett. Firmly convinced that it will eventually prove the most feasible, about nine hundred miners are now working on this trail, filling in its bogs, cutting away boulders where they obstruct the path, and putting things in shape for heavy travel. When finished, two days is the estimated time for the trip over this route.

A couple of Englishmen have erected wharfs at Skaguay, for the use of which they charge $2.50 a ton. Rather than pay this many of the miners take their freight from the steamers on rudely-constructed rafts and stack it on the beach. It has been reported that horses and cattle are thrown overboard and made to swim ashore.

The Canadians put great faith in the trail named after the Stickine River. A grant has just been made by the

Dominion Government to J. C. Galbreath to cut through a distance of 150 miles from the headwaters of Telegraph Creek to Lake Teslin to make the route feasible. Entering the Stickine River just above Fort Wrangel, this route goes up that river 175 miles to Telegraph Creek, and then almost due north along Telegraph Creek to the end of canoe navigation.

From this point to Lake Teslin, a distance of 150 miles, the trail has been cut and a pack train established. The steamer "Alaska" is now carrying passengers to Telegraph Creek. The country over which the trail runs is reported to be a comparatively level plateau or tableland, and very few of the hardships to be encountered by miners traveling the Juneau route are to be met with. From Lake Teslin everything is described by members of Galbreath's party as being smooth and open-water traveling, without a break clear down through the outlet of the lake, Teslintoo or Hootalinqua River, into the Lewes and Yukon Rivers.

A route from the head of Taku Inlet was explored by the Western Union Telegraph Survey thirty years ago; and emissaries of the fur traders and occasional prospectors kept open the knowledge of the Indian trail. The first modern account of it, however, was given by the late Lieutenant Schwatka, U. S. A., who re-explored the route in 1891 during his third and last trip to Alaska. With him went Dr. C. Willard Hayes of the U. S. Geological Survey, two photographers, and a large party of helpers.

Leaving Juneau in the beginning of May of that year accompanied by eighteen natives, Schwatka went through Taku and traveled up the Taku River with his party in canoes until they reached the headwaters of that stream. Several manuscripts in which Lieutenant Schwatka describes his experiences are extant. In one of these he says:

"We reached the headwaters of the Taku fifteen days after we had started out from Juneau, taking plenty of time over our trip. We went up as far along the headwater stream as we could get, and only stopped when our frail canoes grounded on the soft gravel and could go no farther. Although I had left civilization with the distinct belief in the reports brought in to me by Indians concerning the existence of a trail over table-lands between the Taku and Lake Teslin, it was with a feeling of great relief that I discovered these reports to be correct. Each of our Indians carried 200 pounds, and we all started out with our feet wrapped in rags of moose and caribou skins. We had many strange experiences on this trip, coming across most peculiar changes in the contour of the country. Led by three Indians who had been with me on my trip in 1888 when I left Juneau for Lake Lindeman, we soon struck a trail, and for two days going was very light. Not knowing what we would have to encounter before we got to the end of our journey, I was content to made ten miles per day.

"On the third day out, however, we found ourselves crossing such dangerous country that it was impossible

to travel faster than five miles in twelve hours of traveling. The mosquitoes were terrible, and bit our ears, eyes, and all exposed parts so much that we had to stop for hours at a time to try to get relief from their bites. The Indians, with their heavy loads, suffered considerably in the latter part of the trip, their feet being badly swollen and galled. On the morning of the fifteenth day out from Taku we reached a mountain pass, about 5,000 feet high, and on turning down into a sharp declivity came in sight of Lake Tes'l Heen, as the Indians call it. It looked like a long, narrow strip of blue as far as we could see. That night we reached the water, unslung our portable canoes, and were once more afloat. The first use we made of our new position was to capture ptarmigan and fish, a welcome relief from the carried canned provisions we had lived on so long."

A second letter of Schwatka's, written to a friend in Juneau, and dispatched by Indians, over the tedious route he had already compassed, contained the following:

"When Naniwak starts with this letter, we will be away up the Hootalinqua River in our canoes. I will probably go on to the Thirty-Mile, come down into Lake Labarge, and then on through the Fifty-Mile River and Mud Lake into Bennett, where I will continue through Lindeman, and join you in civilization once more down my old stamping ground through the Chilkoot. The result of my exploration, so far, I am confident, will establish for the people of Juneau a route into the

Yukon country far superior to any yet discovered, far shorter and far more easy of action. As far as that old Stickine River route that so many people run wild over is concerned, I think that our trail from the headwaters of the Taku knocks it out of consideration completely. To show the difference in the time taken from the headwaters to Lake Taku by men who know this newly-discovered trail, and by men that don't, you ought to know that last year a party of miners took eighty days to make it, but they had no trail to guide them, and simply trusted to luck. We had the bulge on the trail, however, and did it in exactly fifteen days. They can send their exploration parties out wherever they want to, but I know enough about Alaska to be certain that the Taku route is the only way that people of Juneau will want to get to the Yukon country, when once they understand its immense advantages. I reckon that it beats the Stickine route forty days, besides being better traveling, and you must consider that even the old Stickine route beats my first run up through Lake Bennett just as much. The new Indian pass can easily be made practicable for pack-trains or wagon road, and, if necessary, can be made to tap the Canadian Pacific Railway as well as the Yukon River country. The mosquitoes still stay with us, and are committing terrible ravages on every one of our party. Nothing seems to keep them away."

After reaching Lake Teslin, it will be noticed that Schwatka's route covers the same ground as the Stickine

trail, the great difference between the two being in the manner in which they reach the foot of the lake. There seems to be a great deal of discrepancy between the accounts given of the nature of the tablelands lying south of the lake by Mills and Schwatka. If what Mills says is correct, then the topographical features of the country must change in an alarming manner between very short points of distance, although even his roseate announcement about the conditions discovered by Callbreath's party does not obliterate the fact that their route is considerably longer than Schwatka's.

After leaving Lake Teslin, no serious obstacle is encountered, although the water toward its mouth is swift. From there the canoes run down the Lewes River, joining the regular line of overland travel.

Schwatka returned from the Hootalinqua up through Lake Bennett, and reached Juneau safely in the latter part of 1891, but stayed there only two days, leaving for the south by steamer before he had formulated any report of the new trail to Lake Teslin. He never returned to Alaska, dying at Portland, Ore., in November, 1892. There is no doubt that several miners who went into the Taku River country last year followed over this path to reach Lake Teslin, guided in all probability by members of the same Indian tribe as had piloted Schwatka through.

A route to Dawson City, which was used some during the last summer, leads up over the Chilcat Pass, at the head of Chilcat Inlet, and thence follows what has been

GROUP OF INDIAN WOMEN AND PAPPOOSE.

dubbed Dalton's trail entirely overland to the Yukon River, just below old Fort Selkirk. It is particularly adapted for driving cattle into the interior.

Quite a number of miners started for the Klondike this summer over the Hudson Bay trunk line. This line of traffic has been in use for a greater part of the way for over one hundred years.

Leaving St. Paul at nine o'clock in the morning, by the Canadian Pacific Railway, the international boundary at Portal will be crossed at four o'clock the next morning. The following morning Calgary is reached, where the branch line of the Canadian Pacific northward is reached. After traveling to Edmonton, a point 200 miles from Calgary and 1,772 miles from Chicago, the rail portion of the journey ends. The railroad fare from Chicago is $53.65.

A stage ride of 96 miles will bring one to Athabasca Landing. Here is to be found a continuous waterway for canoe travel to Fort Macpherson, near the mouth of the Mackenzie River, where Peel River enters from the south. From Edmonton to Fort Macpherson is about 1,816 miles.

So far as navigation is concerned it would be feasible to float down these rivers and lakes to Fort Macpherson or to the Arctic Ocean. The Hudson Bay Company have long had a service of steamboats the whole distance during the short summer, and will take any quantity of passengers or freight, for which they have room. Indian canoe routes and trails lead overland from Fort Macpher-

GROUP OF INDIAN WOMEN AND PAPPOOSE.

son to another post on Bell River, and up that stream and over a pass to the head-waters of Pocupine. This may be descended to Fort Yukon, or one may portage over rough mountains to the head of the Tatonduc River and descend almost straight to Forty-Mile.

It is quite likely that some persons will take this route from Canada to the Yukon gold fields next year; but at present it is too long, hazardous, and unknown to be recommended to any one.

The foregoing include all the overland routes which are from present information at all feasible.

The sea route from either Seattle or San Francisco is only open for three months of the year at the most. It is by far the most attractive route from a standpoint of comfort. From Seattle to St. Michael is 2,500 miles, and from St. Michael to Dawson is 2,200 more. Using San Francisco as the port of departure, the trip is lengthened by 400 miles. The cost of passage from Seattle to St. Michael, provisions included, is $165.

The first boat up the Yukon in the spring reaches Circle City toward the end of June, and the last one leaves there early in September on the return trip to St. Michael's Island. Between the coming of these boats there is no communication with the outside world except by dog sledges over the mountains. The trip of 1,300 miles to St. Michael's Island can be made by dog sledge over the frozen river, but at that point the voyager would be but little better off than he was at Circle City or Klondike, as the ocean steamers only run in

connection with the Yukon River boats. The last steamer for this season left Seattle for St. Michael's Island early in August, and, if there is no unforeseen delay, its passengers will be landed in Dawson City, the tented metropolis of the gold fields, about September 1st.

A number of schemes for penetrating the territory traversed by the Upper Yukon by railroads have been under way for some time, and the recent heavy travel in that direction has caused work on them to be pushed in earnest. What is generally considered the most feasible of these routes calls for a mixed rail-and-water route from Sault Ste. Marie, on Lake Superior, to the Yukon River. In an air line the distance from the "Soo" to Dawson City is about 2,100 miles, but an air line is out of the question, owing to the rugged country lying between. The projected route, which is proposed in sober earnest by men of prominence and means, who have been figuring upon the matter for the last year, calls for the building of about 625 miles of railway and the utilizing of practically all of the great navigable streams of the western half of British Columbia, as well as of Hudson's Bay.

The first and longest stretch of railway would be between Sault Ste. Marie and Hudson's Bay, touching at the mouth of the Moose River, a distance of about 400 miles. By building the first section from Missanabie, on the Canadian Pacific Railway, Hudson's Bay would be reached by 250 miles of rail. But the intention is to build the line to the Sault ultimately, independent of the

Canadian Pacific, although that road may be utilized at first from Missanabie to Lake Superior. From the end of the first rail line, at the mouth of the Moose River, there is a stretch of 1,300 miles of salt water, on the bay and on Chesterfield Inlet, to the head of navigable water. The season of navigation on Hudson's Bay probably would be nearly as long as on Lake Superior, the salt water counterbalancing the more severe climate.

From Chesterfield Inlet, 175 miles will reach Great Slave Lake, an enormous fresh-water sea, second only to the great lakes of this country in size. The outlet of Great Slave Lake is the Mackenzie River, one of the largest streams on the continent, and freely navigable without rapids or falls to the Arctic Ocean, a distance of 1,400 miles. The delta of the Mackenzie is only fifty miles from the Porcupine River, one of the principal affluents of the Yukon, which is navigable by steamers of large draft from the point where it is proposed to reach it with the fifty-mile strip of rail from the Mackenzie. The distance from the point where the rails would connect the Mackenzie and Porcupine Rivers to the mouth of the Porcupine at its junction with the Yukon is about 400 miles, the Porcupine emptying into the Yukon a short distance from Circle City. Dawson City, the main settlement of the Klondike region, is about 300 miles up the Yukon.

The total distance of the proposed route from Sault Ste. Marie, the outlet of Lake Superior, to Dawson City would be about 4,025 miles, of which there would be ap-

proximately 625 miles of rail and 3,400 miles of water transportation. This distance compares most favorably with the shortest route at present known from the great lakes, which is overland to Seattle or Vancouver, thence by water to Juneau, over the mountains to Lake Bennett and thence down the Yukon River on a raft or boat.

The three different sections of railroad would not be especially difficult to build, with the exception of the drawbacks suffered from short seasons. It would require very much less to the mile to build than the Canadian Pacific has cost, partly because of the cheaper methods of construction, but mainly because the topography of the country through which the rails are to be laid presents fewer difficulties to the road-builder. The 250-mile section from Missanabie to St. James Bay, the lower part of Hudson's Bay, would lie along the valley of the Moose River for the entire distance of 250 miles, and having rail connection at its southern end, it could be built as cheaply as any other of the roads of northern Ontario. The hills on the route of the 175-mile section, between Chesterfield Inlet and Great Slave Lake are of only moderate elevation. The fifty-mile strip to connect the Mackenzie and Porcupine Rivers would pass through an almost level country, the extreme northern spurs of the Rocky Mountains fading away 100 miles to the southward.

The intense cold of Alaska and of Arctic and subarctic British North America would not prove the bar to the building of railways and permanent occupation and development of the country which might be thought by

residents of more favored climes. The temperature at Fort William, the principal Lake Superior port of the Canadian Pacific, and at the northern angle of the lake, often exceeds 50 degrees below zero, and it has reached 60, while eighteen months ago, in Minnesota, a short distance west of Duluth, the temperature dropped to 67 below zero. The coldest weather reported from Alaska or the Northwest Territory is but 72.

It is also proposed to run a railroad from Telegraph Creek at the head of the Stickine River, on the coast of British Columbia, to Lake Teslin. It is claimed that the building of this road would be comparatively easy, and much the shortest rail route to the navigable inland waters. It runs through a mineral country which promises great future development of quartz mining. The Treadwell mine on Douglass Island is near its western end, and in the east it taps the western slope of the Cassiars. Like conditions will doubtless be found to prevail through almost its entire length, and the development of quartz ledges along its route will give it regular and continuous traffic in addition to supplying the through trade on the Yukon, all of whose gold-bearing tributaries are in easy reach.

To the Yukon Mining, Trading & Transportation Company, proposing this road, the Parliament of British Columbia at its last session gave full power to build its line and a land grant of 750,000 acres, which grants were confirmed by the Dominion Parliament at Ottawa last May, with additional privileges and concessions.

CHAPTER IV.

THE OUTFIT OF AN ARGONAUT.

The qualifications of a successful miner—One temptation of the gold-digger—Provisions for the journey to Dawson City—Camping outfit and cooking utensils—The tool chest of a Lake Lindeman boat-builder—What to wear in low temperatures—Supplies for a year's stay—Turnips by the pound—The Dawson City storekeeper's scale of prices—Reasons for lower prices—The custom houses at Dyea and Lake Bennett—A few pointers for prospective Alaskans.

TO be well prepared is half the battle won. This is the substance of an old adage which is peculiarly adapted to the case of one starting out to the Alaskan gold fields in the search of wealth, or even of a simple livelihood. The conditions of life in any newly-discovered mining country are such as to place a man on his mettle, to bring out everything that is in him, to make him resourceful and self-reliant. But these things being equal, it is the one who has just the right equipment who will have the advantage when the going is hard and to all appearances pretty even.

To be sober, strong, and healthy is the first requisite for any one who wants to battle successfully for a year or two in the frozen lands of the far North. A physique hardy enough to withstand the most rigorous climate is an absolute necessity. With a temperature varying from almost one hundred degrees above zero in midsummer to fifty, sixty, and even seventy below that point in winter, with weeks of foggy, damp, thawing weather,

and with winds that rage at times with the violence of hurricanes, the man with a weak constitution is bound to suffer untold hardship. No one with weak lungs or subject to rheumatism ought to think of wintering along the Yukon. In short, making the venture means, according to one who has tried it, "packing provisions over pathless mountains, towing a heavy boat against a five to an eight-mile current, over battered boulders, digging in the bottomless frost, sleeping where night overtakes, fighting gnats and mosquitoes by the millions, shooting seething cañons and rapids and enduring for seven long months a relentless cold which never rises above zero and frequently falls to eighty degrees below."

If a man is able to meet these conditions he is almost sure of making a good living and takes chances with the rest in making a fortune. It is not alone to the physical side of the question that one should look. Temperament counts for a great deal in the miner's life. Men should be of cheerful, hopeful dispositions and willing workers. Those of sullen, morose natures, although they may be good workers, are very apt, as soon as the novelty of the country wears off, to become dissatisfied, pessimistic, and melancholy.

Good judgment is also a prime requisite. Once in the atmosphere of the gold country one hears constantly of newly-found placers which are reported to be vastly richer than anything yet discovered. With each such report scores of miners leave diggings which are vastly superior to those which they propose to seek six, twenty,

or one hundred miles away. If one is constantly on the jump from claim to claim there is evidently no time left for the only work that counts, separating the gold from its containing earths. One of the returning miners on the "Excelsior" said that the hardest work he had to do in the Klondike region was to keep pegging away at his claim, which, by the way, was a very good one, and give a deaf ear to the stories of fabulous wealth being found just beyond the nearest range of mountains. These stories are often put in circulation by people who are anxious to see certain claims forsaken by their owners that they themselves may step in and become the owners.

As to the outfit, both that part of it which bears on the journey proper and those things which are to form the basis of existence for the stay in the gold country, the greatest care must be exercised. To meet with the largest measure of success and in order to be in a position to move and work rapidly, which amounts to the same thing, one must strike a happy medium between taking too much and leaving behind some of the numerous essentials. Joseph Ladue, who has spent years in this country and who is given credit for having founded Dawson City, says in regard to this:

"It is a great mistake to take anything except what is necessary. The trip is a long, arduous one, and a man should not add one pound of baggage to his outfit that can be dispensed with. I have known men who loaded themselves up with rifles, revolvers, and shot-

guns. This is entirely unnecessary. Revolvers will get you into trouble, and there is no use of taking them with you, as large game of any character is rarely found on the trip. I have prospected through this region for some years and have only seen one moose. You will not see any large game whatever on your trip from Juneau to Dawson City, therefore do not take any fire-arms along."

In addition to the great inconvenience of carrying a great deal of luggage it is a matter of continual expense. It is said that the Indians are disposed to gauge a man's ability to pay by the amount of baggage he takes with him, and scale their prices accordingly. At 15, 20, or 25 cents a pound for packing over the Chilkoot Pass it makes considerable difference whether a man has with him a hundred weight or half a ton of freight. Then there are steamer charges, wharfage fees, and often portage expenses to be defrayed, to say nothing of customs duties. One hundred and fifty pounds of baggage is all that is allowed for a passenger on the Yukon River boats and those sailing from Seattle and San Francisco for Alaskan ports.

The general practice as to clothing for miners who remain over winter is to adopt the dress of the natives. Water boots are made of seal or walrus skins; dry weather, or winter boots, from various skins, fur trimmed. Trousers are made of Siberian fawn and marmot skins, while the upper garment, combined with a hood, called tarka, is made of marmot trimmed with

long fur, which helps to protect the face of the person wearing it. Flannels can be worn under these, and not be any heavier than clothing worn in a country with zero weather. For bedding, woolen blankets are used, combined with fur robes. If the former are used it is well to be provided with two pairs.

The best robes are of wolf skin, but they cost $100 apiece. There are cheaper ones made of bear, mink, and fox skins. A good, stout pair of rubber boots is also essential. The boots made by the natives sell from $2 to $5 a pair.

As to provisions, it is impossible to lay down any definite scheme. The first consideration is to have enough to last for the journey from the coast to the interior. Figuring on thirty days as the shortest time possible in which this trip can be made, the supply ought to be about as follows: Twenty pounds of flour, twelve pounds of bacon, twelve pounds of beans, four pounds of butter, five pounds of vegetables, five pounds of dried fruits, four cans of condensed milk, five pounds of sugar, one pound of tea, three pounds of coffee, one and one-half pounds of salt, five pounds of corn-meal, a small portion of pepper and mustard, and baking-powder.

To one accustomed to camp life there are many things in the way of utensils and apparatus generally that can be dispensed with which, to the man new to such modes of living, are, or seem to be, absolutely necessary. A pretty complete outfit includes matches, cooking utensils and dishes, frying pan, water kettle, duck tent, rubber

blanket, bean pot, drinking-cup, two plates, tea-pot, knife and fork, large cooking pan, small cooking pan. A fine addition to the culinary department will be a good assortment of fish-hooks, gill nets, and fishing tackle. These ought to be graded through the medium and small sizes. Alaskan fish are for the most part gamey.

Ample provision must be made for the boat, raft, and sled building, which is a feature of every journey overland. To this end these items will be found not only useful but absolutely necessary: One jack-plane, one whip-saw, one cross-cut saw, one rip-saw, one axe, one hatchet, one hunting-knife, one two-foot rule, six pounds of assorted nails, three pounds of oakum, five pounds of pitch, 150 feet of rope.

Inasmuch as gnats and mosquitoes abound all over the Alaskan interior, some means of protection from their assaults must be provided. Mosquito netting is recommended, and it is well to buy that with the smallest mesh obtainable. Snow spectacles and a simple medicine chest ought to find a place in every outfit. One man ought never to try the trip alone, and where four or five pool their interests one tent, one stove, and one set of tools will suffice for the party.

After the supplies for the trip to the mines have been decided upon, the more extensive task of laying in provisions for the stay can be taken up. A good, safe rule is to estimate on remaining on the Yukon a full year. If one decides later to prolong the time it will be easier to send back or go back to Juneau for further supplies

than to be burdened with them during the first months of life in camp, and more especially when making the first trip over the mountains.

A miner who, after spending long years in the Colorado camp, went to Alaska to tempt fortune on the Klondike, gives the following list his indorsement as containing everything necessary for one man for one year: Flour, 400 lbs.; corn-meal, 2-10s, 20 lbs.; rolled oats, 4-9s, 36 lbs.; rice, 25 lbs.; beans, 100 lbs.; sugar, 75 lbs.; dried fruits (apples, peaches, apricots), 75 lbs.; yeast cakes (6 in pkg.), 6 pkgs.; candles, 40; dry salt pork, 25 lbs.; evap. potatoes, 25 lbs.; evap. onions, 5 lbs.; butter; bacon, 150 lbs.; dried beef, 30 lbs.; extract of beef (4 oz.), ½ doz.; baking-powder, 10 lbs.; soda, 3 lbs.; salt, 20 lbs.; pepper, 1 lb.; mustard, ½ lb.; ginger; coffee, 25 lbs.; tea, 10 lbs.; condensed milk, 2 doz.; soap (laundry), 5 lbs.; soap (toilet), 5 cakes; matches, can of 60 pkgs.; tobacco; compressed soup, 3 doz.; compressed soup vegetables, 10 lbs.; Jamaica ginger (2 oz.), 2 bottles; stove, 1; gold pan, 1; granite buckets, 2; knives and forks, 1 each; spoons, 3 tea and 3 table; Quaker bread-pan, 1; cups, 2; plates (tin), 3; whetstone, 1; coffee-pot, 1; picks and handles, 1; sleds; hatchet, 1; saws (whip), 1; saws (hand), 1; shovel, 1; nails, 20 lbs.; files (assorted), ½ doz.; axe and handle, 1; draw knife, 1; plane, 1; brace and bitt, 1; chisels (assorted), 3; butcher knife, 1; compass, 1; revolver, 1; evap. vinegar, 1 qt.; rope (½ inch), 100 ft.; medicine case; pitch; oakum; fry pan, 1.

As a general rule miners find it to best advantage to buy the larger part of their outfits in Juneau rather than in the United States or on the Yukon. Buying in the United States one has to pay the freight to Juneau or Skaguay, and perhaps wharfage at those points. The prices prevailing in Juneau for the necessary commodities are not prohibitory at all. But the same cannot be said of the tariff in vogue among the storekeepers of Dawson City, as witness the following scale of prices: Flour, per 100 lbs., $12; moose ham, per lb., $1; caribou meat, per lb., 65 cts.; beans, per lb., 10 cts.; rice, per lb., 25 cts.; sugar, per lb., 25 cts.; bacon, per lb., 40 cts.; butter, per roll, $1.50; eggs, per doz., $1.50; better eggs, per doz., $2; salmon, each, $1 to $1.50; potatoes, per lb., 25 cts.; turnips, per lb., 15 cts.; tea, per lb., $1; coffee, per lb., 50 cts.; dried fruits, per lb., 35 cts.; canned fruits, 50 cts.; canned meats, 75 cts.; lemons, each, 20 cts.; oranges, each, 50 cts.; tobacco, per lb., $1.50; liquors, per drink, 50 cts.; shovels, $2.50; picks, $5; coal oil, per gallon, $1; overalls, $1.50; underwear, per suit, $5 to $7.50; shoes, $5; rubber boots, $10 to $15; lumber, per 1,000 feet, $150.

In some of the camps further back from the river even higher prices prevail. Some idea of them can be gained from the following:—Bacon, per lb., 75 cts.; coffee, per lb., $1; sugar, per lb., 50 cts.; eggs, per doz., $2; condensed milk, per can, $1; picks, each, $15; shovels, each, $15.

Of course, a few months will make a great difference

in these matters. Already the steamboat companies doing business on the Yukon are making plans to send thousands of tons of food supplies and clothing to the gold fields when the ice breaks up next summer. Their efforts will be largely supplemented by private enterprises of one kind and another, so that it is confidently expected that the exorbitant rates which now obtain on the Klondike will be materially reduced next summer.

A good clothing outfit for a year's stay is this:—Two pairs heaviest wool socks, one pair Canadian laragans or shoe packs, one pair German socks, two pairs heaviest woolen blankets, one oil blanket or canvas, one mackinaw suit, two heavy flannel shirts, two pairs heavy overalls, two suits heavy woolen underwear, one pair rubber boots (crack proof preferable). one pair snowshoes, heavy cap, fleece-lined mittens.

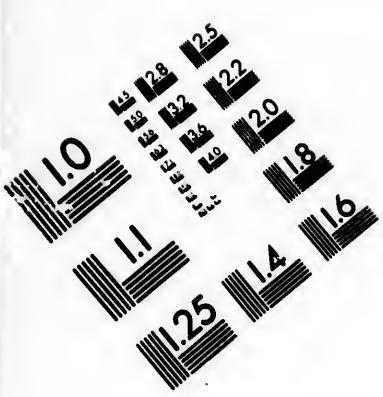
To the prosperous mechanic or business man this list may look a little scant as to some of its numbers. For the enlightenment of those who would be thus critical be it said that it is the custom among miners to resort to frequent washings and mendings rather than to carry along a great variety and large number of the various articles of apparel.

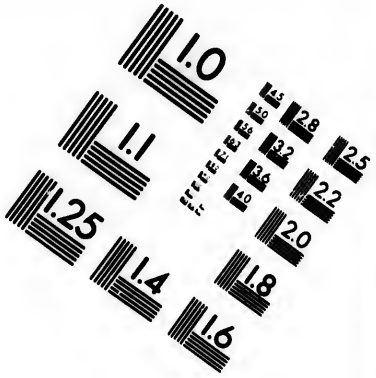
The situation in Alaska as regards the collection of customs duties is, to say the least, a little complicated at the present moment. Acting under orders from Secretary Gage, the newly-appointed collector for the territory, Mr. Ivey, of Oregon, has established a subport of entry at Dyea. Of course, after the machinery

of this new custom house has become sufficiently clocklike in its workings, goods from the United States destined for the Klondike, will be inspected, tagged, and sent in bond over the passes to the Canadian custom house to be established on Lake Bennett in just the same way as it is done with baggage belonging to passengers on Michigan Central trains going from Buffalo to Chicago. Twelve Canadian customs officials have started for the interior where they will set up an office on the portage between Lakes Bennett and Tagish, a point by which all Yukon or Klondike travelers must pass if they start from Dyea or Skaguay. The rate of duty will average about $30 on the average outfit of a Yukoner. The officers are well armed, and will have the assistance of the mounted police to enforce the collection of duties. Further down the river will be stationed guards to intercept any one who might elude the vigilance of the officers.

American miners who have investigated the question, assert that the treaty between Russia and Great Britain provided that the Yukon, Porcupine, and Skeena Rivers should be free for commercial purposes and exempted from the imposition of customs duties. The Canadians evade the point at issue by claiming that prospectors crossing the mountain ranges to the lakes or headwaters of the Yukon do not go into the territory *via* any of the rivers mentioned, but that they cross Canadian territory, and before they can reach the Yukon the duty is exacted.

MINERS ENROUTE TO KLONDIKE.





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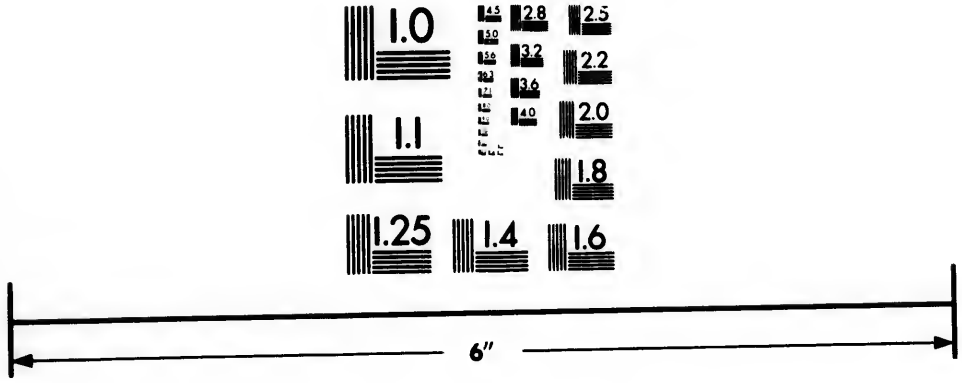

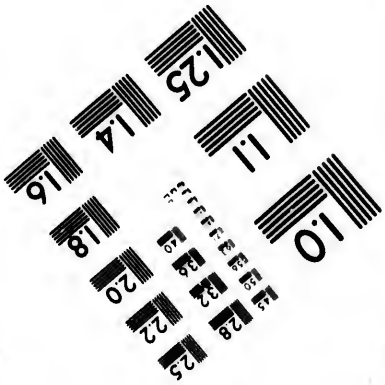

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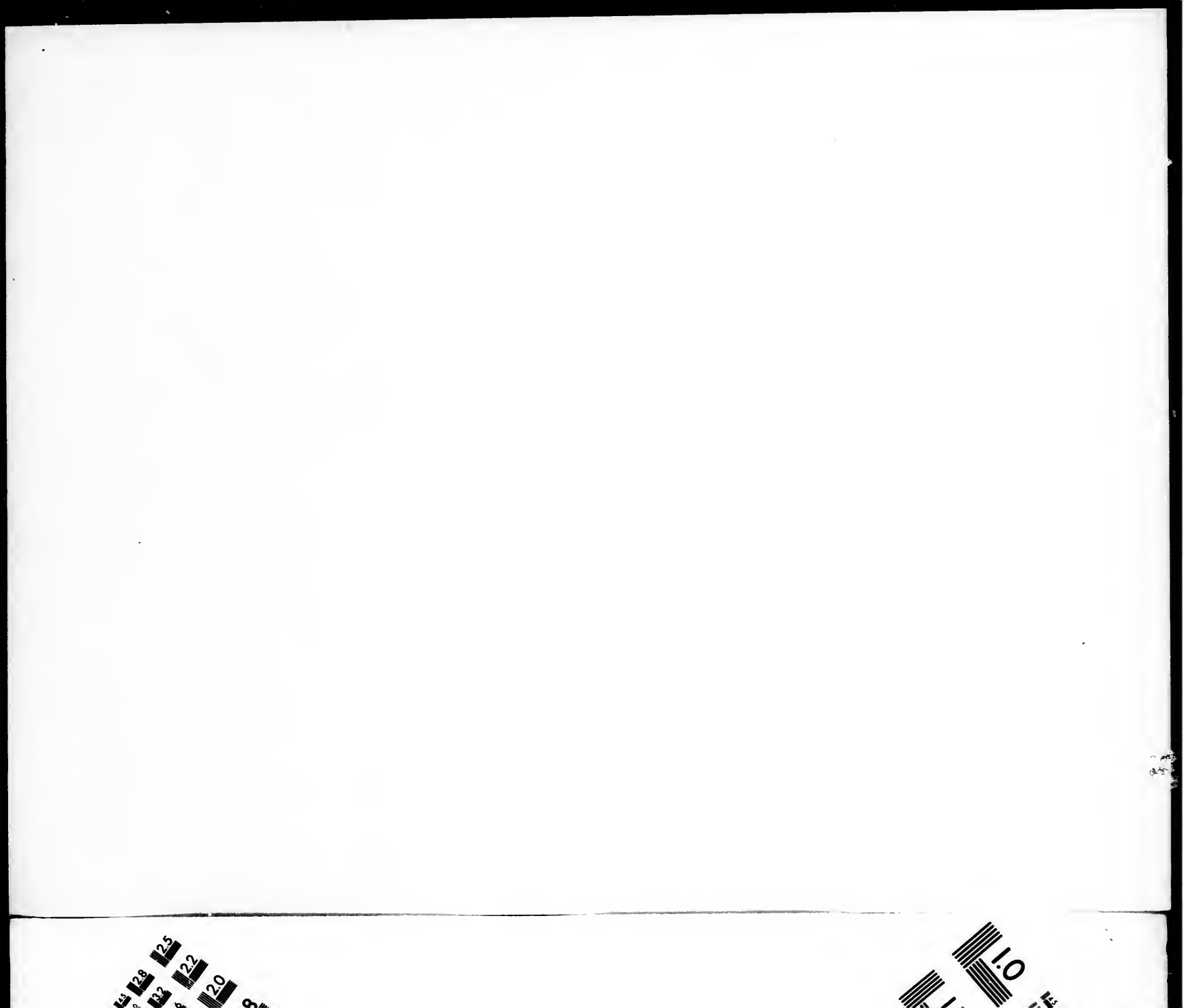


The Canadian officers are taking with them a full year's supplies, and with the assistance of the mounted police propose to maintain an official monthly mail service, for official purposes only, between the Klondike and Ottawa.

In conclusion, here are a few pointers dictated by experience for the benefit of the Klondiker. For the most part their observance will involve but little trouble, and, on the other hand, will add vastly to one's comfort while in the frozen lands:

Don't waste a single ounce of anything, even if you don't like it. Put it away and it will come handy when you will like it.

If it is ever necessary to cache a load of provisions, put all articles next to the ground which will be most affected by heat, providing at the same time that dampness will not affect their food properties to any great extent. After piling your stuff, carefully heap heavy rocks over it. Take your compass bearings, and also note in your pocket some landmarks near by, and also the direction in which they lie from your cache—*i. e.*, make your cache, if possible, come between exactly north and south of two given prominent marks. In this way, even though covered by snow, you can locate your "existence." Don't forget that this may be the proper name for it at some future time.

Shoot a dog, if you have to, behind the base of the skull; a horse between the ears, ranging downward. Press the trigger of your rifle. Don't pull it. Don't

catch hold of the barrel when thirty degrees below zero is registered. Watch out against getting snow in your barrel. If you do, don't shoot it out or the gun may and probably will burst.

A little dry grass or hay in the inside of your mittens, next your hands, will help retain the heat, especially when they get damp from the moisture of your hands. After taking off your mittens, remove the hay ond dry it. Failing that, throw it away.

If by any chance you are traveling across a plain (no trail) and a fog comes up, or a blinding snowstorm, either of which will prevent you from taking your bearings, camp, and don't move, no matter what any one may urge, until the weather becomes clear again.

Keep all your draw-strings on clothing in good repair. Don't forget to use your goggles when the sun is bright on snow. A fellow is often tempted to leave them off. Don't you do it.

Travel as much on clear ice toward your goal as possible in the spring. Don't try to pull sledges over snow, especially when it is soft or crusty.

If you build a sledge for extreme cold don't use steel runners. Make wooden ones, and freeze water on them before starting out. Repeat the process if the sled begins to drag and screech.

In building a sledge use lashing entirely. Bolts and screws rack a sledge to pieces in rough going, while lashing will "give."

Take plenty of tow for packing possible cracks in your

boat, also two pounds of good putty, some canvas, and, if possible, a small can of tar or white lead.

Establish camp rules, especially regarding the food. Allot rations, less while idle than when at work, and also varying with the seasons, a man requiring less food, or at any rate less of certain kinds in warm than in cold weather.

Keep your furs in good repair. One little slit may cause you untold agony during a march in a heavy storm. You cannot tell when such a storm will overtake you.

No man can continuously drag more than his own weight. Remember this is a fact.

Be sure during the winter to watch your foot-gear carefully. Change wet stockings before they freeze, or you may lose a toe or foot.

Keep the hood of your kooletah back from your head if not too cold, and allow the moisture from your body to escape that way.

If your furs get wet dry them in a medium temperature. Don't hold them near a fire.

When your nose is bitterly cold stuff both nostrils with fur, cotton, wool, or anything else soft enough. The pain will cease.

Don't try to carry more than forty pounds of stuff over a stiff climb, at least the first day.

In cases of extreme cold at toes and heel, wrap a piece of fur over each extremity.

Keep your sleeping-bag clean. If it becomes inhabited with vermin freeze the inhabitants out.

Remember success follows economy and persistency on an expedition like yours.

White snow over a crevasse, if hard, is safe; yellow or dirty color, never.

Don't eat snow or ice. Go thirsty until you can melt it.

Shoot a deer behind the left shoulder or in the head.

Choose your bunk as far from tent door as possible.

Keep a fire hole open near your camp.

The man who knows little now will come back knowing more than he who knew it all before starting.

CHAPTER V.

THE MINING CAMPS OF THE UPPER YUKON: THEIR LIFE AND LAWS.

Phases of Human Existence in the Ice-Bound Towns—Circle City as a Base of Supplies and the Metropolis of the Yukon Country—Fort Cudahy and the Famous Forty-Mile Post—Dogs by the Hundred—Homes Without the Vanities of Civilized Regions—Gambling with Big Stakes—Liquor Traffic and Its Evils—The Boom at Dawson City—Some Strange Things About the Mail Service—A Small Fortune Spent in Delivering Each Mail Bag—Bottles of Gold the Legal Tender—The Canadian Mounted Police.

NOWHERE else on earth will the student of human nature find more to interest him than in the mining camps of the frontier. In no other spot will he find the conditions which surround the existence of man so strangely varied. The sudden gathering of all classes, races and ages, widely separated in birth and breeding, character and customs and tongue, confronted by the greatest hardships, surrounded by the extremes of human joy and human sorrow, brings about a situation that forms a basis for many startling chapters in the book of life.

The ice-bound camps of the great Yukon have not been very different in history from those which have existed elsewhere in other times, but some of the phases of life familiar in the outposts of civilization, where the greed for gold has been the great factor of the day, have been accentuated by the isolation and the peculiar hardships which the men who lived there encountered. There has been a notably small amount of the more important

forms of vice. The people seem less indifferent to the rights of their neighbors, less careless about the sanctity of human life than in other mining camps. This may be because the inhabitants of the ice bound camps feel that the great distance of the places from outside help, makes it necessary that they should, by simple laws of their own, keep in check the dangerous tendencies of such communities, or it may be because the red record of other mining towns has taught humanity a lesson that is not to be soon forgotten. Lawlessness there is, and probably always will be where men are gathered under such circumstances, but the verdict of the best authorities seems to be that Dawson City is morally a better place in 1897 than Leadville was in 1879, or Cripple Creek was in 1895 and 1896. In the scramble for treasure, the sordid selfishness of humanity has not covered up the tenderness and sympathy and generosity that is in the hearts of nearly all men, and there are many cases in the annals of the Yukon country which go to show that the sunny side of life shines quite as brightly sometimes in the arctic regions of the United States as it does in the metropolis of the nation.

Circle City was up to the time of the Klondike discovery the most important town of the Yukon country. It was a base of supplies for hundreds of prospectors, and in its palmiest days was a lively town. Until last winter the miners spent most of their time in the town, as they had not learned the trick of working the frozen ground. This made different forms of amusement popular, and the town boasted in addition to its gaming and

small dance halls, two variety theatres. Circle City stands on a level plain near the most northern bend of the Yukon River. It obtains its name from its proximity to the Arctic Circle. In the back-ground is the low range of hills, across which runs the now well-known portage of six miles to Birch Creek.

Circle City is a log town. Four hundred buildings constructed of roughly hewed logs line the streets. The style of architecture is unvaried. Whether the building is large or small it is low and square with wide projecting eaves and a roof covered with dirt. The cracks between the logs are chinked with mud, moss, paper and old clothes. The smaller cabins can be built by a couple of men in a few days, and when completed, they rent for $15 or $20 a month. The lots on which they are built can be bought for $2.50 from the town clerk, and the house and ground together bring from $300 to $500 according to location. The building logs are rafted down the river from some wooded islands twenty miles above. Some simple methods of sawing have now been adopted, and by paying a good price, crude boards can be obtained.

It was once said that there were more dogs in Circle City to each inhabitant than in any other town in the world. There were so many that no attempt was made to feed them all, and as a result, in their foraging for food, they became a nuisance. So ravenous were many of them that even miners' boots, brushes and other valuable articles were torn in pieces and devoured by them. Every available dog has been hurried off to the Klondike

as a beast of burden, and no doubt, more than one of them will have fallen a prey to the appetite of man before they see Circle City again

Robert Krook, the Swedish Klondike miner, says that Eskimo dogs will draw 200 pounds each on a sled, so that six dogs will draw a year's supplies for one man. He, however, puts in the proviso that the sleds should not have iron runners, because the snow sticks to the iron and increases the friction so much that the dogs cannot haul more than 100 pounds apiece. With brass runners this drawback is obviated. Last winter Eskimo dogs cost from $75 to $200 apiece, and he does not think the price will increase materially, because when the demand is known the supply from other parts of Alaska will be plentiful at Dyea and other points along the Yukon. Sometimes the feet of the dogs get sore and then the Indians fit mocassins on them; as soon, however, as the tenderness is gone from their feet, the dogs will bite and tear the mocassins off. In speaking of the dogs, he said that they need no lines to guide them and are very intelligent, learning readily to obey a command to turn in any direction or to stop. They have to be watched closely, as they will attack and devour stores left in their way, especially bacon, which must be hung up out of their reach. At night, when camp is pitched, the moment a blanket is thrown upon the ground they will run into it and curl up, and neither cuffs nor kicks suffice to budge them. They lie as close up to the men who own them as possible, and the miner cannot wrap himself up so close that they won't get under his

blanket with him. They are human, too, in their disinclination to get out in the morning.

Where sleds cannot be used, the dogs will carry fifty pounds apiece in saddlebags, slung across their backs in pannier fashion. Nature has fitted these dogs for their work, and mastiffs and St. Bernards are not as serviceable. The two latter breeds cannot stand the intense cold so well, and though at first they will draw the sleds cheerfully, their feet cannot resist the strain, and begin to bleed so freely that the dogs are useless. The pads under the feet of the Eskimo dogs are of tougher skin.

Circle City came into existence when some half-breed Indians discovered gold in considerable quantities on Birch Creek, several years ago. Supplies from down the Yukon River began early to pass through the town and over the portage to Birch Creek. The cost of transportation is $45 for 100 pounds and upwards, which high rate is felt severely by the miners. Once on Birch Creek the supplies are sent up the stream by boats, which are propelled by the slow poling process. One of the queer teams, until recently, engaged in the supply traffic to the creek, was composed of a moose, which had been caught when a calf and trained, and a mule. The moose, which was the pride of its owner, a Circle City merchant, was shot one day by a tenderfoot, who had heard many stories of Alaska game, and believed the animal had wandered into the town in search of food.

The theatres in Circle City are not supplied with the

best talent in the land, but there is frequently a "show" at one or the other, and if the scenery and surroundings are not of the most pretentious, the result is not seen in a small audience. One of the theatrical troops which visited Circle City last winter was composed of six young women and five men, who walked something like 500 miles in the course of their journey for the purpose of amusing the miners. They were all dressed in Mackinaw suits with trousers.

The present conception of the popular taste in Alaska seems to be that the public wants a strong show, and in the attempt to meet the demand the managers cannot find anything up to the standard in books and are driven to the point of inventing new features. "The man from Douglas Island" was an original drama that was offered to the people of Juneau. The title had local significance, as Douglas Island is just across the channel from the town. It was a very successful play. The hero was a barkeeper named Charlie, and the heroine, to use the hero's own words, was a "perfect lady," who had a desire to see something of the town with a fancy, rather unusual in a person of that description, for incidentally "hitting the pipe." There was a bootblack, a Chinaman, an Irish policeman, a dude and a number of sports and "ladies" in the piece. After the requisite amount of adversity and bad luck had been ground out, the hero, with the help of the bootblack, triumphed over the dude, got a "pull" with the policeman, married the heroine and otherwise attained brilliant success as the proprietor of the "finest joint in the town," to quote his own language again.

Up to within the last few months it was the custom in Circle City for the postmaster, upon the arrival of the mail, to stand upon a shoe-box before the assembled populace and read off the address on each letter. Each fortunate man would step up as his name was called and get his letter, and be envied by his lucky fellow citizen. There were some touching scenes on these occasions. Many of the men had not heard from home and friends for many months, some of them not for years. There were many surprises in the letters. Some of them brought joy to the hearts of those who read them, but there were others to whom the missives meant only disappointment and grief, and so smiles and tears mixed in the motley gathering.

There are three or four doctors and as many lawyers, though briefless ones, for the days of litigation have not come, and nearly every walk of life is represented for better or worse in this arctic city. Nobody bothers about free or any other kind of coinage. Dust is the legal tender and it is passed about in bags and bottles, big and little, with the same freedom that the Philadelphian exchanges his coins for pins and potatoes. Of course, much of the dust which has cost so much to gain in labor and time and hardship goes easily and rapidly over the bars in the saloons, and into the pockets of the men who shuffle dirty cards for a living, and into the hands of painted-faced women, who dance very badly for the amusement of their motley audiences.

When a Circle City man has been there long enough to acquire a quantity of gold dust, in the absence of a

bank, he takes it around and puts it into Jack McQuestion's or Capt. Healy's safe; that is, those who do not care to keep it themselves. Miners are susceptible to the fascination of the dance hall and to the click of ivory chips, and they know it is better not to have their gold too convenient. They are much addicted to tossing their nuggets over the bar and saying: "Here, Mack —never mind the change; I'll dance it all out!"

So they take their buckskin bags and hand them over the counter. Some are long and slender, with more room than dust in them, while others are bulky and well-filled like shot bags; but the striking thing about it is that there is no account taken of them. The owner's name is generally written on the bag, but the dust is not weighed, nor is any entry made or receipt given for it. In their relations to each other these men are much like a big family. In one safe were nuggets and dust to the amount of something over $100,000.

Fort Cudahy and Forty-Mile Post are on opposite sides of Forty-Mile Creek at the point where it joins the Yukon. Being in British territory where they are under the eyes of the Canadian police, law and order are preserved with somewhat less difficulty than at Circle City. The latter town suffers much from the constant influx of undesirable characters who escape across the border in search of safety on the American side. Forty Mile is the most important of the two settlements, and the indications point to a prosperous future for it. There are some 250 cabins there and the number is being constantly added to. No animal save man and dog was

seen in its streets until recently, and there is not a wheeled vehicle in the place.

The Alaska Commercial Company has a two-story building for its agents' office, and there are others; a few saloons and stores and the Pioneer Hotel, but there is one form of architecture that seems to fill all the requirements of the climate and of taste. It is a log house twenty feet square, with a perfectly flat, dirt-covered top. The top of the house is a hanging garden, which, if the structure is more than a year old, is covered with a rank growth of weeds. When the town begins to take some note of its appearance the mowing of the roof will be one of the householder's regular duties.

It would be hard to find anything else than dirt that would keep out the cold. In building such a house there is a groove cut in what is to be the underside of each log, that it may fit down snug to the timber just beneath it, and there is a packing of moss put in all the joints between the logs to fill all possible inequalities. Moss is the best non-conductor of heat or cold that the country affords, and it is put to a variety of uses in building. To make a roof a course of stout poles is first laid across, and after that a thick coating of moss; then the flower garden is put on—that is, about a foot of dirt. There is no floor, except the natural one, and the furniture is an after consideration, made to suit the requirements of the occupants; a bedstead made altogether of poles, as is usually the table also, chairs of great variety of design and finish, a moose-skin rug or two, and the

invariable Yukon stove. The latter is made of sheet-iron, and weighs about twenty-five pounds. There are no vanities of any sort about a Forty Mile house. It is made primarily to keep out the cold. It has a single door—extending no higher or lower or wider than is necessary for getting in or out—and a single window of four small panes of glass. In winter another sash is put in to make a double thickness.

Forty Mile suffers, as do all the towns of the Yukon country, because of the uncertainty about supplies. Each boat on the river carries goods to its utmost capacity, but even that is not enough, and when the next boat happens to be a week or two late the price of provisions rises as rapidly from day to day as does wheat in the produce exchange in bull times. Arrangements are, however, being perfected to do away with this difficulty, and human ingenuity will undoubtedly succeed at this task.

The great man of Forty Mile is at present a Swede named Johnny Miller. He has been in Alaska eight years, and hope had nearly failed him when last winter he started a hole in the ground out of which he took within a few weeks more than 250 pounds of the yellow metal, and he is still taking it out.

The gold diggings of the Yukon are graded according to their depth as winter and summer mines, a classification that has been recognized only within the last two years. Until within that time the miners considered it impracticable to do any work in the winter, and so they hibernated for eight long, dark months, consuming what they had earned during the short summer season. Win-

ter was a time for gambling and dissipation, and they all collected at Forty Mile, and whiled away the long night of self-imposed imprisonment.

Though the people of Forty Mile still expect quite a muster from the mines at the approach of cold weather, there is a very radical change from the old order. They have discovered that they can accomplish more in winter than in summer, and as a consequence the working year is three times as long as it used to be. And here comes in the utility of classifying the diggings according to their depth. If the gold lies only from two to six or seven feet from the surface it is necessary to remove all the worthless ground, throwing it to one side until after the pay dirt is taken out, after which it may be piled where it was originally taken from. The difficulty of such mining is increased threefold by the fact that the ground is frozen. Every foot of it, either in sinking or drifting, has to be thawed by small fires. The shallower mines—the whole process being in the open air—are worked in summer. In the other kind, where the gravel is more than seven feet from the surface, they sink a shaft for a beginning, and then burrow or drift under the superficial part, removing only enough dirt to allow space to work in. These operations being under ground, where the miner is protected from the weather, are better adapted for the cold season. So the miner builds his cabin at the mouth of his shaft, gets in a supply of wood to the most accessible place, and tranquilly views the approach of cold weather.

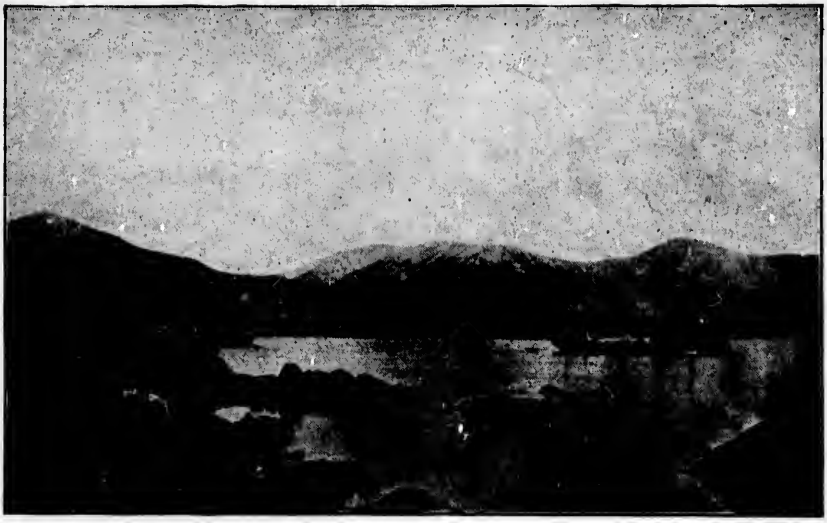
If he is of provident habit it is not necessary for him to

expose himself greatly. He must bring to the surface and dump possibly a ton of "dead" ground in a day, and also carry and leave in a safe place a few hundred pounds of pay gravel. There is no necessity for being out of doors more than a minute or two at a time.

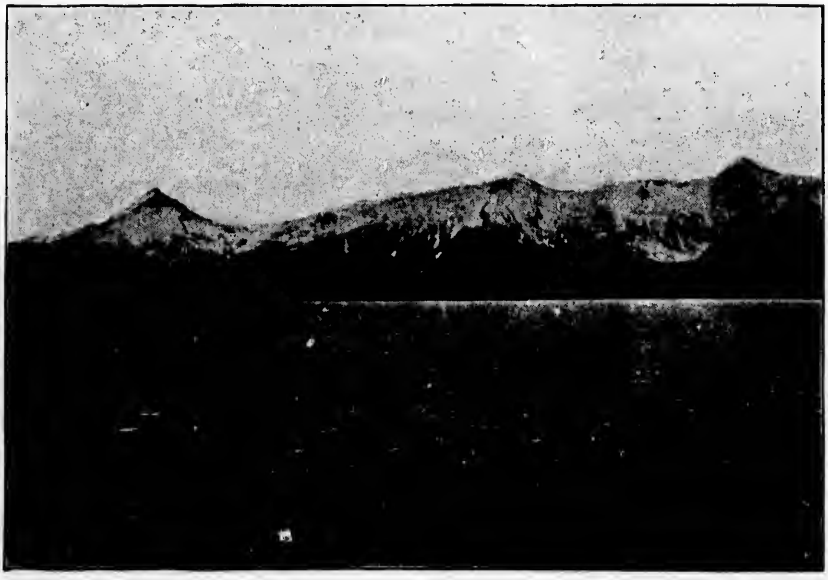
If one is prepared for them, the winters at the mines are not killing bad by any means. Seventy degrees below zero is about the coldest, but that is not of frequent occurrence. There is a good deal of dry, still weather, with the thermometer from 10° to 30° below, and as much probably, early and late in the season, when it hardly falls below the zero mark.

August and September are the months for preparing for winter and also for prospecting. During that time a great many of the men hunt for awhile and endeavor to lay in a supply of fresh meat.

West of the Klondike River at its junction with the Yukon and on the north bank of the latter is located the now world famous camp called Dawson City. It is the metropolis of the Klondike country and if not the largest city in the world, it now takes first rank among the liveliest and most thriving. For months thousands have turned their eyes toward it longingly. Hundreds have arrived there within the last few weeks and hundreds more are striving with all the energy and persistence man is capable of to get there. Unless something unforseen occurs it will have many thousands within its fold before another year has passed. In the meantime all is bustle. Homes, offices, stores, churches and all the other requisites of a big town in the way of buildings are



CHILKOOT MOUNTAINS—ROUTE TO MINES.



MT. ST. ELIAS AND MUIR GLAZIER.

being hurried to completion for present and future uses and hundreds of busy hands are delving in the gulches and canons and mountains and streams beyond for the yellow treasure that brought Dawson into existence.

Dawson City is in the character of its buildings and inhabitants much like its sister camps. There are at present two stores. One of the Alaska Commercial Company, the other of the North American Transportation and Trading Company. On these two establishments everyone who goes to Dawson without provisions must rely mainly. Even those who have a good outfit will find it often necessary to patronize one or other of the stores. Prices are on an average three times as high as at Juneau or St. Michaels and four to five times as steep as in San Francisco. When the winter is nearly over and supplies begin to run short prices are, as a consequence, raised. Toward the close of last winter before the new supplies came up the river prices were doubled. All through the winter men arrive at such mining towns as Dawson City, bringing with them from one to two tons of food and clothing. They go up the streams and peddle their goods, taking care to lose nothing for their time and trouble.

There is but one blacksmith shop and to this place all the miners for miles around must go to have their tools repaired or for the purpose of getting implements made to order which the stores cannot supply.

Dawson City can boast of two good practicing physicians—Police Surgeon Wills and another doctor who went from Circle City to Dawson last year. They carry

their own supplies of staple drugs and medicines, so as to be able to compound their own prescriptions. Ordinary remedies are to be obtained at the two trading stores. There was one lodging-house in Dawson last winter, though the name lodging-house is a courtesy in this case. It was a low, log house and is now being replaced by a better one. Laborers in the mines and handicraftsmen fare about the same, though carpenters last winter obtained $20 a day, whereas miners got $15. The difficulty is to find men willing to work at their trades.

The cost of living at Dawson for a man living alone varies from $5.00 to $10.00 a day. Single meals have been costing $1.50. There are two assayers and fifty will be there by next spring probably. Overalls cost $3.00 a pair; stockings, $1.50; coats and trousers, $10.00 each and upwards; shoes, $8.00 a pair; shirts, $5.00; flour, $12.00 per hundred; pans, $2.50; picks, $7.00, and so on.

Joseph Ladue, one of the most celebrated of the Alaska bonanza kings, was the founder of Dawson City and the owner of the site. He has done much to insure the future prosperity of the city by encouraging the building of a school house and promoting other institutions. While there has been much of the usual excitement of the mining camp at Dawson, considering the character of the population very little trouble of any kind has thus far been reported. Gambling for high stakes is to be seen on every side, but the Canadian government is making a desperate effort to curb the

liquor traffic and its consequent evils. The law against carrying fire arms is as strictly enforced as is possible, and the result of this is noteworthy.

Collector Ivey, who has gone to Alaska to assume charge of the customs district of that Territory, it is understood, has specific instructions from the Treasury Department to enforce to the letter the executive order restricting the importation and sale of liquors in Alaska.

Under the laws governing the Territory of Alaska, no liquors, malt or vinous, can be imported, manufactured, or sold there, save by a special permit, allowing their use for medicinal, mechanical or scientific purposes. Despite this regulation, there are now in Alaska five breweries in operation, and 142 other places where liquors are sold. Alaska is in the internal revenue district of Oregon, and during the year 1896 there were 147 special taxes collected from persons engaged in selling liquor. There are numerous saloons in Juneau, Sitka, and other Alaskan towns where liquor is obtained for the asking, and no attempt is made to conceal the fact that this business is being carried on. The special tax which every one in the liquor business is forced to pay is not issued as a license, or to afford any protection to the holder, as it is expressly stated thereon that the same shall not be in conflict with any municipal, county or State laws concerning the regulation of the liquor traffic.

The sale of liquor in Alaska is only allowed under the Executive order for medicinal, mechanical or scientific purposes, by persons who obtain a permit to do so from

the Governor of the Territory. Before the permit is issued the applicant has to make an affidavit and furnish a bond in not less than $500 that he will not sell intoxicating liquors to any person not known to him, or duly identified, nor to a person in the habit of becoming intoxicated, nor on his premises, and that he will make full returns of the disposition of liquor he is permitted to have. Every person under the regulations who secures a permit from the Governor to sell liquors for medicinal, mechanical and scientific purposes is required to secure from the Collector of the Oregon district a special tax receipt as a liquor dealer. Two of the breweries pay a special tax on the manufacture of 500 barrels of beer or over, and the remaing three on less than 500. The other special taxes are issued to druggists and retail liquor dealers.

Just how five breweries and 142 other places can find it a paying business to sell liquors only for medicinal, mechanical and scientific purposes is the question that Collector Ivey has to wrestle with. It is understood that he has explicit instructions to enforce the regulations against liquor in his district, and, if he does, the law, hitherto more honored in the breach than in its observance, is likely to become odious, and be followed by a strong effort to secure the removal of the present restrictions.

On the American side the only laws which are enforced to keep order in the camps are such as the people themselves have made. Lynch law and the regulations of the Vigilantes, who are organized in the larger

towns, are the only codes really effective, as the forces of the American government do not at present extend beyond the older settlements of the coast. But on the Canadian side the case is different.

Here and there among the mass of matter that has been written concerning the wonderful Klondike mines, brief allusions have been made to the fact that a little body of mounted police has been patrolling the district ever since the excitement began, keeping perfect order and preserving among the constantly swelling populations of the various camps as peaceable conditions as can be found in the heart of any highly civilized community. And in all the speculation concerning the future of the locality, its probable immense growth and the fear of starvation, sickness and death, no fear has ever been expressed that anything in the nature of lawlessness or crime may get the upper hand and run rampant, or that property rights and safety of the person will be in the least danger.

Though the excellent British mining laws, or rather, laws founded by the Canadians on British precedent, are in the main responsible for this feeling of security, the men who undertake their enforcement are, after all, entitled to a great share of the credit, for good laws, illy enforced, are worse than useless. The Northwest Mounted Police of Canada, a body whose wonderful discipline and bravery have given the Dominion food for most of her later literature, are the officers in whose hands has been placed the carrying out of these laws, and at this time, therefore, something concerning that

organization and its internal workings should be of interest.

The Northwest Mounted Police, whose scarlet tunic is the symbol of law and order in the Northwest, were organized when Alexander Mackenzie was Premier, and were one of Sir John Macdonald's inspirations, and after his return to power, in 1878, they always remained under his own eye. The nucleus of the force was got together at Manitoba in 1873. They originally numbered 300, and by their coolness and pluck, at critical periods, they accomplished much in reducing the Indians and lawless whisky traders to a state of order. The police built posts and protected the white settlers and the surveyors, who had already begun parceling out the country and exploring the route of the Canadian Pacific Railway. In 1877, nearly the whole of the little force was concentrated on the southwestern frontier to watch and check the 6000 Sioux, who sought refuge in Canada after their defeat and massacre of Custer and his little command on the Little Big Horn. It was through the efforts of the Mounted Police that the Sioux were finally induced to surrender peacefully to the United States authorities in 1880-81. After the outbreak of the half-breeds under Louis Reil, in 1885, the force was increased to 1000 men, their present number.

The Mounted Police, like the Royal Irish Constabulary, on which it was modeled, is in the eye of the law a purely civil body. Its officers are magistrates, the men are constables. But so far as circumstances will allow, its organization, internal economy and drill are those of

a cavalry regiment, and when on active service in a military capacity the officers have army rank. The affairs of the force are managed by a distinct department of the Government at Ottawa, under the supervision of a Cabinet Minister. The executive command is held by an officer styled the Commissioner and ranking as Lieutenant-Colonel. The Assistant Commissioner ranks with a Major, and after three years' service as a Lieutenant-Colonel. Ten superintendents, with captains' rank, command the divisions, with about thirty-five inspectors as subalterns, who correspond to lieutenants. The medical staff consists of a surgeon, five assistant surgeons and two veterinary surgeons. The non-commissioned officers are as in the army, while the troopers are called constables.

The rank and file are not excelled by any picked corps in any service. A recruit must be between twenty-two and forty-five years old, of good character, able to read and write English or French, active, well-built and of sound constitution. The physique is very fine, the average of the whole thousand being five feet nine and a half inches in height, and thirty-eight and a half inches round the chest.

There has always been an unusual proportion of men of good family and education in the service. Lots of young Englishmen who came out to try their hand at farming in the far west have drifted into the police, as also many well-connected Canadians, Waifs and strays from everywhere and of every calling are to be found in the ranks. The roll call would show many defaulters if

no man answered to any name but his own. There is at least one lord in the force and many university graduates.

The officers' pay is not large, ranging from $2400 a year to the Commissioner to $1000 to the inspectors, with, of course, quarters, rations, fuel, etc.

The Klondike is even more squeamish on some points than some older diggings, like Gotham and Paris. Bloomers don't go. Capt. Constantine, of the Canadian mounted police says so, and from his words there is no appeal. The new women can straddle Chilkoot Pass in bloomers if they like, but in the chaste and refined society circles of Dawson and Cudahy, skirts are "en regle"—even if "de trop."

No one ever locks a cabin door. You can leave a few thousands in gold dust lying around loose, and on one will steal it. This forbearance is not so remarkable as it seems. If a thief did steal when there is nothing to break through he couldn't spend his money or leave the country unsuspected.

It will be of interest to know that there are post office facilities for the gold fields of Alaska, and the Northwest territory, for many persons have started for that region and their friends will naturally be anxious to hear from them. Additional contracts for the delivery of mail have been made in the Post Office Department in view of the influx of Americans there.

Since July 1st contracts for mail over what is known as "the overland route" from Juneau to Circle City have been made by the department. The round trip over the

Chilkoot Pass and by way of the chain of lakes and the Lewes river takes about a month, the distance being about 900 miles. There will be a mail carrying party to leave regularly on the first of each month hereafter. The cost is about $600 for the round trip. The Chilkoot Pass is crossed with the mail by means of Indian carriers. On the previous trips the carriers after finishing the pass built the boats, but they now have their own to pass the lakes and the Lewes river.

In the winter, transportation is carried on by means of dog sleds, and it is hoped that under the present contracts there will be no stoppage, no matter how low the temperature may go. The contractor has reported that he was sending a boat, in sections, by way of St. Michael, up the Yukon river, to be used on the waterway of the route, and it is thought much time will be saved by this, as in former times it was necessary for the carriers to stop and build boats or rafts to pass the lakes.

In addition to this for the summer season, contracts have been made with two steamboat companies for two trips from Seattle to St. Michael, and three from there to Seattle. When the steamers reach St. Michael, the mail will be transferred from the steamers to the flat-bottomed boats running up the Yukon as far as Circle City. It is believed the boats now run further up.

The contracts for the overland route call for only first-class matter, whereas the steamers in the summer season carry everything up to five tons a trip.

Some extracts from the official report of the second assistant postmaster general for the fiscal year ending

June 1, 1896, will prove of interest. Under date of September 23, 1896, contractor Beddoe wrote to the department concerning the trip to Circle City, the establishment of that post office having been authorized March 19, 1896. He says:

"I have just returned from my first round trip through to Circle City with the United States mail, under contract route No. 78,103, and in accordance with your instructions, corroborating those received through the superintendent of the Pacific coast, at Seattle, I delivered the return mail from Circle City to the postmaster at Seattle and accompanied to Juneau such mail as remained for that point.

"I have already delivered (or have en route) the mail for June, July, August and September. It will be impossible for any other mail to leave here until spring, outside of the winter contract.

"If you were familiar with the conditions which obtain in the Yukon you would be in a better position to regulate the dates of departure and arrival for said service. For instance, I left this point on June 10 for Dyea; for sixteen hours it was impossible to land owing to storms, and as the landing is made in small boats, the conditions must be favorable. I took with me sufficient lumber to build two boats; the ones I had already built could not be taken over the summit in consequence of excessive snow storms. Upon my arrival at the base of the summit the Indian packers refused to go over with the lumber. I was compelled to abandon it there, having paid $67.50 for packing it. The packing of sup-

plies, etc., cost $320 additional. However, I pushed on and upon arriving at Lake Lindeman, a distance of thirty miles, I built a raft, there being no lumber in that locality, and upon this raft we journed to Lake Bennett, where we found sufficient lumber to build a boat. A start was made in five days after arrival, although the lumber had to be cut from the trees, and from there on we traveled day and night until our destination, Circle City, was reached and the mails delivered in good order.

"The question now was to get the return mail to Juneau the quickest moment. It was impossible to start up the river in consequence of the rapid water, the current averaging eight miles an hour for 500 miles. If I remained in Circle City until July 30 it would probably take forty-five days to pole the boat up the river. I therefore decided to go on down to St. Michaels and come out through Bering Sea. I was fortunate in getting there in time for the steamship "Portland," which sailed from that point to Seattle, via Unalaska—3,500 miles. At Seattle, I took the Alki and reached here in due course, having traveled 6,500 miles in addition to the regular trip, and saving thereby over a month of time in the delivery of the return mail; and I owe it to myself to say that I was the last man into the Yukon and the first one out this season, which is evidence that no unnecessary delay occured.

"The Yukon trip is a terrible one, the current of the river even attaining ten miles an hour. Miles Canyon is a veritable death trap into which one is likely to be drawn without notice, and the White Horse rapids, known as

the miners' grave, to say nothing of the Five Finger and Rink rapids, both of which are very dangerous. All of these dangers are aggravated by reason of the defective maps and reports of the country.

"It is my intention to submit to the department a map with many corrections, although in the absence of a proper survey it will necessarily be only an approximate reflection of the river's course. You are probably not aware that for a distance of 150 miles, commencing at Circle City, and going north, the river is fifty miles between banks, and contains thousands of islands, very few of which appear on any map.

"It is impossible to perform this mail contract without having at least three parties fully equipped, the distance being so great and it being out of the question for the first party to return in time to depart with the succeeding mail, and the expense of each will be about the same. I shall have made four round trips by the end of this month. The last mail in should arrive at Circle City in one week from now. The return mails I am looking for daily. At the end of this month the north end of the Yukon river will freeze and the ice will gradually form to the south, and the same, as a waterway, will become impassable and remain so until midwinter."

CHAPTER VI.

PLACER MINING.

Ancient and modern methods as applied to the Klondike fields—How the riches are carried from mountain to gulch and plain—Pans, rockers, sluice-boxes, and other implements of the miner's craft—Watching for the yellow metal in the streams of muddy water—The wonders of hydraulic operations—Methods in vogue on the frozen gravels of Alaska—Opinions of experts on the present and future.

IN spite of the fact that gold has been known to man and struggled for since pre-historic times, it is only within the last half-century that any satisfactory methods have been employed for its extraction from the earth. The discoveries in California in 1849, followed almost immediately by those in Australia, turned the energies of thousands of able, active, intelligent men into this new channel. In the mad race for wealth which then ensued, the primitive methods in use up to that time were found to be too crude and too slow to satisfy the ambitions of modern gold diggers. This is particularly true of the methods then and now in vogue for working the poorer alluvials and low-grade reefs which remain after the rich shallow placers and superficial pockets of gold quartz have been exausted on a claim.

Without going deeply into the subject of the formation of the element known to the world as gold, it is sufficient to say that the mineral is deposited in ledges or

veins of quartz, ranging in thickness from the leaf to several inches. There are instances, though very few, where these veins have reached several feet of almost pure gold. These veins extend from the surface of the ground, in a slanting direction, sometimes several thousand feet into the earth. The surface ends of these ledges are often exposed on the edge of a mountain, and have come to be known in the mining world as the "outcroppings." Often, however, they are covered by several feet of forbidding gravel and earth and only the patient labors of the gold seeker reveal them. Undoubtedly thousands of these precious ledges remain unknown to man, and probably will remain so always unless some strange chance, such as revealed some of those in the Klondike and elsewhere, should lead daring and ambitious miners to the places where they rest.

The taking of the yellow metal from the ledges is known comprehensively as quartz mining, and the processes by which it is done are varied according to local conditions.

Ages have elapsed since the deposit of the gold in the rock ledges, and the forces of nature have proved themselves more active and persistent in extracting the precious metal than the host of hungry, anxious miners will ever be. As time passed the action of the water and other agencies on the rock masses caused them to crumble and liberate the exposed treasure. This gold, once free, has been carried to lower altitudes and deposited in the cañons, gulches, flats, and river bars from

the mountains to the sea. The gathering of this loose, drifted gold is what is known as placer mining.

In Alaska, thus far, vein or quartz mining has been attempted only on the coast. In the Yukon districts placer mining is the only form in use. This is due to various causes. The main obstacle up to the present time has been the cost of labor, which, in the interior, very rarely gets below $15 a day, and often exceeds that figure. Then, again, vein mining requires the transportation and erection of costly and heavy machinery, which, in a country as poorly provided with transportation facilities as is the interior of Alaska, would involve untold expense. There is every reason to believe that the interior is richly endowed with gold quartz, and with the development of the country will probably come the development of this feature of gold mining. This has been the history of the California fields—first the placer and then the veins, and history will probably repeat itself. The sequence is a natural one. Man will surely seek the source of his supplies, whatever they may be, sooner or later.

The usual methods pursued in placer mining are very simple. Even the most improved process, though saving much time and labor, is still not an intricate one. The specific gravity of gold is much greater than that of any rock, gravel, or earth with which it is found. It is many centuries since man discovered this fact, and upon it all the methods of extraction are based. The gold-bearing gravels, sands, and muds are turned into a receptacle

of some kind when with the aid of water the precious metal is worked to the bottom, the lighter substances removed, and the treasure revealed.

The most common implement among placer miners is the "pan." It costs only a few cents, and with it any man in a rich district can make fair wages every day, and many a lucky one has turned a fortune out of it. This receptacle closely resembles the ordinary milk-pan. It holds usually about six quarts, and is made of heavy tin or zinc. The miner goes to the gravel banks along the streams, where deposits of precious metal are believed to be, and fills his pan. Conveying the material to the water, he selects a place where there is little or no current, immerses his pan entirely in the water, and then shakes the gravel in the pan thoroughly under the water. The pan is held with both hands, and so shaken that the gravel is given a circular motion, two or three motions being sufficient to precipitate the gold to the bottom of the pan. The pan, still beneath the surface of the water, is then held so that the outer edge dips downward at an angle of ten or fifteen degrees, and the gravel is made to slowly slide out of the pan by a backward and forward movement, care being taken, after a portion of the gravel has been expelled, to again give the pan the circular motion, so as to be sure that the gold is kept at the bottom. Not more than a half-minute is required to get rid of the gravel, and there will be nothing left in the pan but a little "black sand" (magnetic iron), which always accom-

OLD RUSSIAN BLOCK HOUSE ON THE YUKON, A SORT OF FORT FOR PROTECTION FROM THE INDIANS.

panies gold in gravel, and whatever particles of gold were contained in the gravel. The pieces or specks of gold are then easily seen, and by their number or quality the prospector judges somewhat as to the wages he can make by washing the gravel. The specks of gold are called "colors" by the old hand. A very few of these welcome "colors" in a single pan will demonstrate to the miner the value of the gravel in which he is prospecting. If he is a poor man or lacks energy he will probably continue to use the pan like thousands of others, putting the few bits of yellow metal away in bags and bottles day after day, until he has by laborious effort gleaned enough to satisfy him or worked out the gravel in that location.

But the energetic miner uses the pan only by way of experiment. Once having found the "colors" with the aid of that crude implement, he turns to other methods to develop his find. Next after the pan in the way of invention came the "rocker." It is not unlike the crude bed in which our grandparents slept as babies. It is a box on rockers, about four feet long, two feet wide, and several inches in depth, with the upper end elevated so that the water will pass through freely. A hopper, or riddle box, with perforated sheet-iron bottom, occupies the upper half. Under this is an apron of cloth or sheet-iron, sloping downward toward the upper end. Two cleats are nailed across the bottom, one in the middle and one at the lower end. The riddle box being filled with auriferous dirt from the bank, the miner rocks the

cradle, pouring water in meanwhile to dissolve the mass. The latter is carried through the perforations upon the apron and thence down over the bottom of the "rocker" to the lower end and out into the stream. The gold, being heavy, is lodged behind the cleats or "riffles," and there the miner gathers them and repeats the operation. The finer particles of gold are often lodged on the apron, and this is frequently washed in a bucket and the metal taken from the bottom.

After the rocker came the "Long Tom," which is a rough trough ten or twelve feet long, narrow at the upper end and wider at the lower. It is placed on an incline. It has an iron plate on the bottom which is perforated so that the gold will drop through in the washing process. This invention, it will be readily seen, is a development of the rocker.

The sluice-box was the next step taken by miners. The one who has found "pay-dirt" and desires to get the gold to the mint as quickly and in as large quantities as possible, soon drops his pan and rocker and turns to the sluice. The "sluice-box" may be constructed of three boards twelve feet long and one foot wide; one board forming the bottom and two the sides of the box—simply a long, narrow, open box or trough. The box must be set on such a grade (usually five or six inches higher at the head of the box than at the foot or "tail") that the water running through will carry off quickly the stones, dirt, and general *débris*. Upon the bottom of the box are placed "riffles," made of long, narrow strips or

boards or of small poles, which permit the gravel to run over them, but into which the heaviest materials, including the "black sand" and gold will settle and remain secure. The "riffles" are practically slats made into a frame and wedged or nailed to the bottom of the box so that they will not rise in the water. The water necessary to run the sluice-box must be brought into it from a point above, so that grade sufficient to bring a steady flow of water and allow for the increased grade of the box will be secured. The water is usually conducted by what are termed "lead-boxes," made similar to the sluice-box itself. Water enough, say three or four inches deep in the box, with a five-inch grade, to carry off quickly the gravel shoveled into it, is necessary for good and rapid work. After the miner has shoveled into his box what he considers a good day's work he then turns off nearly all the water and takes up his riffles. Water enough is left running to still carry off the bulk of the dirt, sand, and small gravel that has become packed in the riffles, leaving nothing behind on the bottom of the box save the gold, some sand, and perhaps a few pebbles. The water is then entirely shut off, and everything left in the box is carefully and thoroughly swept into a pan. It is then a simple matter to pan this residue down to the clean gold, and if the miner finds that he has, say, half a teaspoonful of gold, he is making considerably more than living wages.

In constructing the sluice-box care should be taken to have the bottom-board perfectly sound; that is, free

from knots or cracks—even a nail-hole in the bottom would be sure to lose a large portion of the gold. After the side-boards are firmly nailed on, even if the box seems perfectly tight, the side seams should be strongly calked with old cotton rags. It is well to have the bottom-board planed, that it may be swept easily, for fine gold adheres so closely to a rough board that it is almost impossible to sweep it off. The best thing to sweep the box with is a brush made of split bamboo or cane, that may be purchased in the mining towns.

In many cases there is deposited behind the riffles a fine black sand, which is magnetic iron ore. In order to separate the gold from this a small quantity of quicksilver is placed behind the cleats. The quicksilver is useful also in holding many particles of "flour gold" so minute that otherwise they might be lost. The sluice-box was for a long time by far the most important contrivance in placer mining, and is still in common use, though here and there money and brains have combined to bring about more satisfactory methods. Even where the latter have been adopted the sluice-box is called into service to work over the "tailings" of previous operations, that name being applied to dirt that has once been worked and deposited by the water after leaving the "tail end" of a sluice, rocker, flume, etc. Sluices, often called flumes, are sometimes several hundred, and even thousand, feet in length. Often it is necessary to elevate the dirt in what are known as "dry diggings," or to carry it to some distance to a point where water

can be used to advantage, and various devices are adopted, the most common being large buckets swung upon cranes. In some places where hydraulic mining is not practicable, "drifting" is resorted to. A tunnel is run into the hill and "drifts" are run from it, the dirt being brought out for washing, or else a shaft is sunk and the dirt sent up to the surface in buckets. In some places long series of sluice-boxes may be found containing thousands of feet of lumber.

All placer mining is of necessity hydraulic, since water is always used to separate the gold from the dirt. But the name "hydraulic" is generally used to designate the method of washing down auriferous banks by turning on them a powerful stream of water, the gold being caught in long flumes or ground sluices, through which the muddy liquid is made to flow. It is in this form of mining that the most capital is invested in the placer operations.

Often the flumes and tunnels of the hydraulic systems, which sometimes pass through hills and even mountains, are paved with stone, instead of wood, the stone catching the fine gold better than the wooden riffles. Stone flumes are not so easily robbed by sluice-box thieves as the wooden ones, and thus operate as a partial protection against the operations of midnight miners. The work of making a "clean-up" by taking up the stone bottom, removing the amalgam, and relaying the stones again, takes more time, but the wear and tear on long wooden flumes by the heavy rocks carried through them by the strong current is an offset to this, and clean-ups

are not made very often, in some mines only twice a year. The hydraulic system has developed through a series of years, beginning in 1852, in Nevada City, Cal., when a miner turned a small canvas hose against the bank with a pressure of sixty feet of water, and reaching a point where water is forced through a nozzle ten inches in diameter with a pressure of 500 feet, a resistless torrent thrown upwards of 300 feet. Not many of these powerful streams are in use, a nozzle of from three to six inches and a pressure of not more than 400 feet being found the most serviceable and economical. The water is carried down into the mine from some elevated point in huge pipes of boiler iron, strongly riveted to resist the tremendous pressure, and is discharged through machines known as "monitors" or "little giants." The machine is double-jointed at the base, and can be depressed or elevated or turned to either side at the will of the operator, who has thus perfect control of the stream discharged from it, and may direct it at any portion of the bank desired. The force of a column of water 400 feet high, compressed from an eighteen-inch pipe to a six-inch orifice, is not easy to realize. The torrent rushes forth with a roar, and hurls itself in an almost solid mass against the bank, which melts as though it were a heap of snow. A discharge of 1,000 miners' inches of water is not unusual. This is equivalent to 1,500 cubic feet per minute, or 7,000,000 gallons in ten hours. At the estimated average this would excavate nearly 3,000 cubic yards of earth.

When the mine is not so situated that a flume can be built along the ground with a proper fall for the "tailings," it becomes necessary to tunnel through a hill for an outlet. Some of these tunnels are necessarily very long and expensive, and it is in such enterprises that large capital is required in hydraulic mining. The tunnel is paved for a sluice, and often a long flume extends beyond it for the same purpose. Much ingenuity has been displayed in constructing flumes so as to save as much of the fine gold passing through them as possible, and yet much of it is carried away. This is shown in a few favorable localities by persons who have constructed flumes in the beds of streams into which tailings are discharged, by which they take profitable toll for letting the tailings again pass over hundreds of feet of riffles.

The discharge of tailings into streams flowing into the Sacramento Valley has caused much trouble in California, and the detritus, *débris*, or "slickins" has filled up the beds of the streams, covered the fertile bottom lands with a sterile deposit, and produced more frequent floods and overflow of low lands. In Oregon and Washington this trouble has not occurred, since the topography is such that the tailings from hydraulic mines are not deposited on agricultural lands, and do not fill up the beds of streams running through them.

An essential feature of a hydraulic mine is a water ditch running either from some unfailing stream or natural or artificial reservoir. Some of these ditches

are many miles in length, and are carried for part of the distance through tunnels or across gulches in high wooden flumes. Some of the reservoirs constructed to supply the ditches hold nearly a billion cubic feet of water. The construction of such large ditches and reservoirs calls for the investment of much capital. In places these ditches are constructed by companies and the water sold to the miners using it; also to farmers for irrigating purposes when favorably situated. The capacity of mining ditches varies from 500 to 10,000 inches of water. An inch varies in different localities, but the usual standard is the quantity that will flow in twenty-four hours through an aperture one inch square, with the water six inches above the point of discharge. This equals 16,725 gallons.

The courts of the Pacific Coast have firmly established the principle of absolute property in water. By their decisions, given after much long and expensive litigation, they have affirmed the principle that a water right of a definite number of inches may be located on any stream where prior rights do not exist, and that the quantity located may be taken out, even to the draining of the original stream, may be conveyed away, sold, and never returned to the original channel. One right may be located above another, but only for such surplus water as was not located by the prior claim. This doctrine has been found as necessary in irrigating districts as in mining sections. It is a complete reversal of the old common-law doctrine of riparian rights, established under

conditions far different from those prevailing on the Pacific Coast.

Most of the hydraulic mines are worked in the channels of an extinct system of rivers, running in places at right angles with the present water-courses. This fact was not disclosed for many years, but as the working progressed it was seen that the auriferous gravel, or cement, occupied well-defined channels running tortuously along in the usual manner of water-courses. The conclusion has been reached that these were pre-glacial streams, and that since the ages in which they accumulated their present store of gold the topographical contour of the mountains has been completely changed and the present water-courses been opened up. It may be said that these ancient channels have only been tapped here and there, and that hundreds of miles of these auriferous banks yet await the dissolving touch of water.

While placer mining must necessarily be conducted in much the same general way the world over, the conditions which are presented in the Klondike country make some modifications necessary. The extreme cold of most of the year in that latitude brings with it obstacles which are hard to overcome. Man will overcome them, because he knows that gold is there, and because he wants it, but at present he overcomes them slowly and laboriously. His reward is great enough, however, in many cases to make him forget the hardships.

In addition to the dangers to health the great difficulty that the miner has to contend with is the fact that the

ground is frozen solid nearly all the year, and even in summer thaws only a few inches. This makes it necessary to thaw the ground artificially, and this is done by "burning." Fires are built on the surface and the ground is thawed a few inches beneath the surface. This is then dug out; another fire is built in the hole, and this process is continued until bedrock is reached. Then fires are built against the side of the shaft, and drifts and tunnels are thawed out. All the dirt thus taken out is piled outside until the stream opens in the spring. Then the sluice-boxes are set up and the winter's diggings washed out. Thus a miner is enabled to keep busy about all the year.

This method of burning out a shaft and tunnels is by no means new, for it has been carried on for many years in the basins of the Amoor and Lena Rivers in Siberia, where the conditions are very similar to those in the Klondike region. Placer mining in Alaska really differs from placer mining in warmer climates only in that the dirt has to be thawed out, and that water for washing can be obtained there only a month or two in each year. And even when bedrock is reached it is in many cases filled with cracks and seams which are rich in gold and well worth the digging out. As to the value of explosives in this frozen soil authorities differ. The *Mining and Scientific Press* said recently that they can be used effectively, while the *Mining and Engineering Journal*, in speaking of the Siberian mines, where the conditions are similar, says their effect is simply to mat the ground together

harder. For this same reason, says the latter journal, the ground cannot be dug with a pick and shovel until thawed out. As is almost invariably the case in cold climates accidents have been somewhat frequent in Alaska in the use of explosives. The sticks of dynamite which the miner uses in his work freeze easily, and in thawing them out, great care must be used. They are often placed in a pan near the fire or in the ovens of the crude stoves used by the miners. Carelessness, in a number of instances, has led to their explosion.

Scientific men in the United States and abroad were by no means surprised when the stories of great gold finds first came out of Alaska. For years geologists, mineralogists and mining experts have been studying Alaska and making frequent trips both along its fringed coast and far into the interior. The discoveries they have made—geological, mineralogical and geographical—have all pointed toward the eventual laying bare of rich mineral deposits. It is now the consensus of belief among these men that the discoveries have only begun, that the wedge has only entered.

Professor S. F. Emmons, of the United States Geological Survey, recently said:—

"The real mass of golden wealth in Alaska remains as yet untouched. It lies in the virgin rocks, from which the particles found in the river gravels now being washed by the Klondike miners have been torn by the erosion of streams. These particles, being heavy, have been deposited by the streams which carried the lighter matter onward to the ocean, thus forming, by gradual accumula-

tion, a sort of auriferous concentrate. Many of the bits, especially in certain localities, are big enough to be called nuggets.

MONEY PICKED OUT OF THE DIRT.

"In spots the gravels are so rich that, as we have all heard, many ounces of the yellow metal are obtained from the washing of a single panful. That is what is making the people so wild—the prospect of picking money out of the dirt by the handful literally.

"But all this is merely the skimming of grease from the pot; the soup remains, and precious rich soup it is. The bulk of the wealth is in the rocks of the hills, waiting only for proper machinery to take it out. For you must remember that the gold was originally stored in veins of the rocks, which are of an exceedingly ancient formation. Nobody can say how many millions of years ago the metal was put there, but it must have been an enormously long time back.

"The streams wore away the rocks, carrying gold with them, and this process continued for ages, making immense deposits of rich, gold-bearing gravels. Eventually these deposits were themselves transformed into rock—a sort of conglomerate in which pebbles, small and big, are mixed with what was once sand. To-day the strata composed of this conglomerate are of immense extent and unknown thickness. The formation closely resembles that of the auriferous 'banket' or pudding stone of the South African gold fields; but the South African pudding stone was in far remote antiquity a sea beach, whereas the Alaskan formation is a deposit made by streams, as I have said.

"In a later epoch the stream continued to gnaw away at the hills, bringing down more gold and leaving it behind in the gravels of their bottoms. It is these comparatively modern rivers which are responsible for the pay dirt of the Klondike district and of all that region. Naturally, because it was easily got at and worked, the miners have struck this surface alluvium first. The streams at various times have followed different courses, and it is in the gravels of the dry and disused channels that the gold miners dig with such fabulous profit.

A GOLDEN FEAST.

"You will observe from what I have said that the gold of that region exists under three widely different conditions—in the gravels, in the conglomerate or pudding stone and in the ancient rocks of the hills. When the modern stream deposits, now being worked, are used up, the miner can tackle the conglomerate, which represents the gravels of ages ago. Finally, when they are provided with the requisite machinery, they will be in a position to attack the masses of yellow wealth that are stored in the veins of the mountains. At present we can hardly consider that the first bite has been taken of the golden feast which Alaska offers to hungry man."

Last summer the government sent a commission of men from the Geological Survey into Alaska. At the head of this party was Josiah Edward Spurr. He has recently made his report. He says, as to the Forty Mile district, that, in the latter part of 1887, Franklin Gulch was struck, and the first year the creek is esti-

mated to have produced $4,000. Ever since it has been a constant payer. The character of the gold there is nuggety, masses of $5 weight being very common. The yield the first year after the discovery of Forty Mile has been variously estimated at from $75,000 to $150,000, but $60,000 probably covers the production.

The discovery of Davis Creek and a stampede from Franklin Gulch followed in the spring of 1888. In 1891, gold mining in the interior, as well as on the coast, at Silver Bow basin and Treadwell, received a great impetus. The event of 1892 was the discovery of Miller Creek. In the spring of 1893 many new claims were staked, and it is estimated that eighty men took out $100,000. Since then Miller Creek has been the heaviest producer of the Forty Mile district, and, until recently, of the whole Yukon. Its entire length lies in British possessions.

The output for 1893, as given by the mint director for the Alaskan creeks, all but Miller Creek being in American possessions, was $198,000, with a mining population of 196. The total amount produced by the Yukon placers, in 1894, was double that of the previous year, and was divided between the two districts. In 1895, the output had doubled again.

Forty Mile district, in the summer of 1896, is described in the report as looking as if it had seen its best days, and, unless several new creeks are discovered, he predicts that it will lose its old position.

The Birch Creek district was, last summer, in a flourishing condition. Most of the gulches were then run-

ning, miners were working on double shifts, night and day, and many large profits were reported. On Mastadon Creek, the best producer, over 300 miners were at work, many expecting to winter in the gulch.

As to hydraulic mining, the report says:

"Some miners have planned to work this and other good ground supposed to exist under the deep covering of moss and gravel in the wide valley of the Mammoth and Crooked Creeks, by hydraulicking, the water to be obtained by tapping Miller and Mastadon Creeks near the head. It will be several years before the scheme can be operated, because both of the present gulches are paying well and will continue to do so at least five years."

"With the announcement of gold in the winter of 1896–97," says the report on the Klondike district, "there was a genuine stampede to the new region. Forty Mile was almost deserted. But 350 men spent the winter on Klondike, in the gulches and at the new town of Dawson. The more important parts of the district are on Bonanza and Hunker Creeks. There is plenty of room for many more prospectors and miners, for the gulches and creeks, which have shown good prospects, are spread over an area of seven hundred square miles.

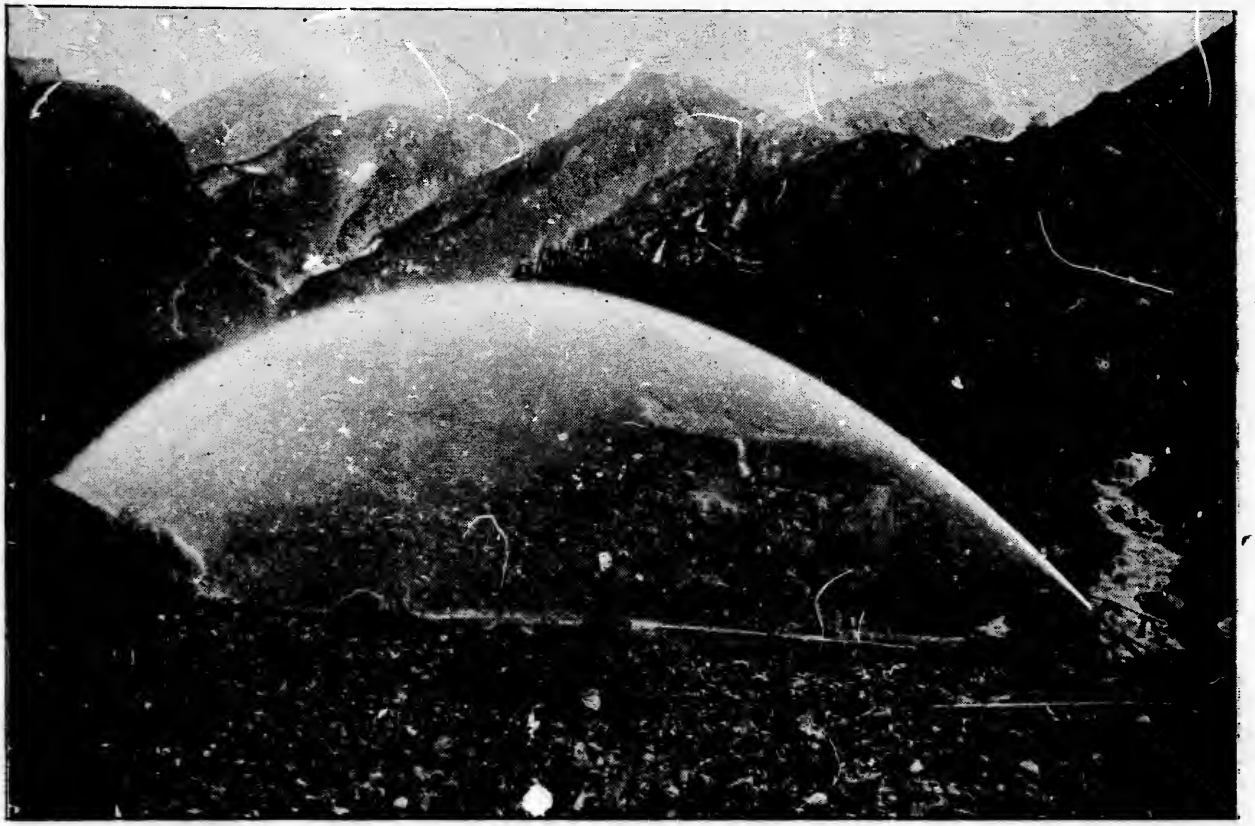
ALASKAN GOLD PRODUCTION FOR 1896.

"The estimated Alaskan gold production for 1896, made by the Spurr report, is $1,400,000. The report points out the difficulties in the way of speedy development of the country. First, the climate, with its short

summer season and long, cold winter. Prospecting is done in the winter more and more every winter because frozen ground renders traveling over the swampy, moss-covered country more easy, and the miner is thus able to begin work with the first spring thaw.

LABOR AT A PREMIUM.

"Whatever Alaska may be in the future, it is not now self-supporting agriculturally. Moose, caribou and hare are variable in quantity, abundant one time and disappearing from the region for twelve months at a time. Ten dollars a day is the general wage paid, twelve dollars for a day of ten hours being paid in some of the more remote gulches. In winter the pay for labor is from five to eight dollars per day of six hours. Many times the miners have been at the point of starvation, and there has hardly been a winter when they have not been put on a ration basis. Universal suffrage is given, and all have an equal vote. Penalties include: For stealing, banishment from the country, in some cases also whipping; threatening with weapons, the same; murders, hanging; but there have been no murders so far."



HYDRAULIC MINING IN SILVER BOW BASIN NEAR JUNEAU.

CHAPTER VII.

ALASKAN QUARTZ MINES AND MINING.

The location of gold deposits on the coast of the southeast—The Great Treadwell Mine on Douglass Island—The largest quartz mill in the world—Thousands of dollars a day from low-grade ores—Other mines of the section—The quartz veins of the Klonkike country—Large amounts of capital being gathered to work them—The rich promise of the future—The rules which the prospector must follow in his search for hidden treasure—Methods employed in working the golden veins—Processes of the rock-breaker, stamp-mill, and concentrator.

THE progress made in the location of gold deposits on the southeastern coast constitutes a separate chapter in Alaskan mining history. It is recorded that Doroshin, in 1848, made small finds of gold near the present site of Fort Kenai, on the Kakni River, on the Kenai Peninsula, far to the westward of Juneau. A few years later he continued his prospecting in these regions, but meeting with indifferent success and encountering the opposition of the Russian-American Company, which at that time controlled the country, he abandoned the work. Tradition has it that even before the days of Doroshin an emissary of the Russian Government found gold on the northern end of Baronov Island, upon which Sitka is situated. Pressure was brought to bear upon him by the then all-powerful trading company, and his success was never brought to light. It was the constant policy of the Russian-American Company to keep out the white man, as it

was feared that the development of the natural resources of the country would in time have a depressing influence upon the trade in furs, skins, etc., upon which the company depended. This same policy was pursued by the other companies trading in these parts.

The next find in southeast Alaska was in the immediate vicinity of Sitka, in the year 1873. This caused the first interest to be taken in prospecting in Alaska. Miners from British Columbia crossed the border in great numbers, and in 1880 the yellow metal was brought to light in the immediate vicinity of Juneau. In fact, Joseph Juneau, after whom the village was named, was the first man to show that gold occurred in Alaska in any considerable quantities. After the discovery of gold in the cliffs above Juneau, came the location of the great Treadwell claim on Douglass Island, about two miles from Juneau and beyond Gastineau Channel. It was in 1881 that miners first set foot in this region. The island itself was named by Vancouver for his friend, the Bishop of Salisbury. Among the early claims were two owned in partnership by men named Bean and Matthews. They became indebted to John Treadwell, a San Francisco builder, for a loan of $150, and put up their rights on Douglass Island as security. Failing to make payment, the property passed into the hands of John Treadwell. He was not any too well pleased with his bargain, but soon became convinced that the land could be worked for its gold with profit. He bought out a neighboring claim held by a character

well known about Juneau, who rejoiced in the sobriquet of "French Pete." The latter received $300. Treadwell associated with himself four other men, among them Senator John P. Jones, of Nevada, and active work was begun on the development of the property.

Mr. Treadwell stood on the ground which afterward became the site of one of the most remarkable quartz operations in the world, and fought the squatters who insisted on washing the surface for gold until the organic act secured his title. Since then $1,000,000 have been expended on the works. Many thousands were spent in constructing a ditch eighteen miles long to bring the necessary water to the ground, and over $300,000 was involved in various experiments in improving the chlorination process. The great mill of 240 stamps remains now the largest of its kind in the world, and has never stopped, night or day, save for repairs, since it was started. Six hundred tons of ore are milled every day, at an average profit of $4 each, so that it can be seen that many good-sized fortunes have passed into the pockets of its fortunate owners. The ore is quarried in three large open pits, and, falling thence through ore-shoots to cars in three tunnels below, is moved by gravity through each process. The heavy smoke from the Treadwell chlorination works has killed vegetation for a mile up and down the island.

While the ore from the Treadwell is of such a low grade that in most places with the ordinary processes it would not be worked at all, it is present in such quantities that

many years must elapse before the stream of riches ceases to flow from this one property. The experience gained from the Treadwell property in working these low-grade ores will in time be of inestimable value to other operators in similar fields.

The Mexican mine adjoining the Treadwell on the east is owned by the same company. Here 60 stamps are at work. In the two properties 175 men are employed.

Another important mine of that locality is the Bear's Nest, which, owing to disagreements among its English and German owners, is not being worked at present. The promise of its future built up the neighboring town of Douglass City.

Many mining experts who have examined the enormous gold deposit on Douglass Island think it is a freak, a chimney of quartz which is not paralleled elsewhere on the island. But the most experienced engineers confess themselves puzzled by the geological formation of Alaska. It seems to be unlike any other. The general formation is slate, which, with granite, holds the quartz veins, but the latter are often broken and confused. Dr. George M. Dawson says in a paper on the subject: "It presents none of the characteristics of an ordinary lode or vein, being without any parallel or arrangement of its constituents and showing no such coarse crystalline structure as a lode of large dimensions might be expected to exhibit."

Miners' wages in these mines are not large, Indians getting $2 and white men $3 per day.

Sixty miles north of Juneau on Berners Bay are the works of the Berners Bay Mining & Milling Company, which is operating the Comet mine at Seward City. This mine, which is owned by a syndicate including several members of the Rothschild family and Mr. D. O. Mills, produced $2,500,000 in 1896.

Some operations have been carried on in the valley of the Stickine River, several hundred miles below Juneau. As early as 1861 gold was discovered there, and by 1874 several thousand miners were at work. It was estimated that the yield from the placer mines that year was more than a million dollars. Later, when the placer claims seemed exhausted, and expensive machinery was needed to operate in the quartz, many of the miners disappeared, and only a few are at work there now.

In the Silver Bow Basin, at the head of Gold Creek, and near Juneau, extensive mining operations are being carried on. The deep bowl here has long received the washings from the great mountain walls which surround it, and thousands of dollars were taken from the placer grounds annually, until they were worked as low as the water system would permit. Since then the Silver Bow Basin Mining Company has bought many of the claims, as well as quartz claims, in the mountains around, and running a tunnel three thousand feet in length in from Charlotte Basin below, has succeeded in keeping a big stamp-mill busy with the ore obtained. A number of other companies are also engaged in similar enterprises.

These are some of the more important of the gold discoveries in the southeastern coast section, but the yellow metal has been found in varying quantities at a large number of other points, and lies hidden in many places where man has never sought it. In a number of places not specially mentioned it is even now being mined at a large profit.

The quartz veins of the newly-discovered gold country have as yet been almost untouched. The location of a few are already known, and, judging from the rich deposits of the placer grounds, many more will in the course of time be discovered. Just at present the transportation facilities do not admit of the carrying in of necessary implements and machinery for the quartz processes, but undoubtedly, the near future will see these difficulties overcome. Man has the habit of securing gold in some way when once his eyes are fastened on it. Already there is a long list of companies which have been formed, representing immense sums in capital from all over the world, to work in the new fields. Some of them no doubt for the time being will confine themselves to placer ground, but few of them will be satisfied to stop short of the big quartz lodes which are known to exist. Some of the more important of these companies and their capital are as follows:—Cudahy-Healy Yukon & Klondike Mining Co., $25,000,000; Boe & Barnes, $950,000; Alaska Syndicate Co., $400,000; Acme Development Co., $150,000; Alaska Co-operative Co., $100,000; Yukon-Cariboo Co., $5,000,000; New York

& Alaska Gold Exploration Co., $1,000,000; Norse-American Gold Co., $750,000; Alaska Klondike Co., $600,000; Gold Syndicate, $5,000,000; Kootenay-Cariboo Co. (Ltd.), $2,500,000; Exploration Syndicate, $100,000; Philadelphia & Alaska Gold Mining Syndicate, $500,000; Alaska Co-operative Development Co., $200,000; Northwest Mining & Trading Co., $5,000,000.

In nearly every city of any size throughout the land companies are being formed. Colorado Springs has the Alaska-Klondike Company, with a million-dollar capital, and William P. Bonbright as president. Columbus, O., reports a $500,000 company, with a West Virginia charter; this company will charter several ships, load them at Montreal with goods and machinery likely to be needed in the Alaska gold fields, thus escaping customs duty, and sail around the Horn with them. They will also engage in mining, but trading is the principal object. Seattle reports that $1,000,000 has been invested in incorporated companies, with ever so much more in irregularly organized concerns. Victoria, B. C., reports that it has been in the Klondike business for a long time. At the last session of the British Columbia Legislature four companies were chartered and liberal grants of land secured from the unsuspecting legislators. In other places the story is the same. Money that has been tied up with studious care during the hard times is being put freely forth to snare the treasures of Alaska.

There can be no settled rules laid down for the pros-

pector in seach of gold veins. Conditions are different in each new section discovered. The best-known laws of the geological world have their exceptions, but there are some general principles which the seeker for gold-bearing rock will do well to study.

In every quartz mining region there are fissure systems which are more or less regular, much depending upon the kinds of rock in which they are formed. The miner or prospector soon finds that very important relations exist between dikes and other bodies of igneous rock and ore deposits. Whatever the nature of the stratified rocks, sections of the country where no bodies of eruptive rocks are found are but poor in minerals. This is on account of the dikes opening a passage during the process of their upheaval from those deep-seated regions whence rise mineral-charged vapors and emanations from metals in fiery depths, therefore the part they play in lode formation is more mechanical than chemical. They merely open a passage upward from nature's secret laboratory, in unknown and unknowable subterranean depths.

The fissures in which the mineralized veins are formed are what might be termed mechanical accidents, as they owe their existence to the yielding of the superincumbent country rock at the point of least resistance at the time of the upheaval. The fissures thus formed, the process of filling commences, some doubtless affording a better and more free passage than others to the ascending mineral-charged vapors.

The veins spoken of by miners as being "contact

veins" are usually such as are in contact with some intruded rock on the surface, being situated at the junction of stratified rocks with those of igneous origin, either in the shape of mountain masses or as narrow dikes. Other veins are at the surface in slate or other stratified rock, with no igneous rocks visible in the immediate vicinity. The lodes found so situated would not be spoken of by a miner as "contact veins," as they have the same rock for both walls. At a lower depth below the sedimentary rock granite, diorite, or some other igneous rock, will be reached, when the lode will be found to be a contact vein lying between the intruded igneous rock and the superincumbent stratified rock. Thus it will be seen that all lodes are doubtless contact veins at some point below the surface, but in most cases at a greater depth than is likely to be attained by the miner. Were the overlying sedimentary rock sufficiently tough and yielding to bear the strain of upheaval without cracking there would be no veins thus formed except contact veins, as all would lie between the uplifted stratified rock and the intruded igneous dike.

The secondary fissures are the result of fractures produced in the stratified rocks while they are being lifted during the elevation of mountain masses of granite, or the upheaval of dikes of other igneous rocks, and they have both walls of the same kind of rock. The real contact fissures would be found above, at the point where the stratified rock abuts upon the intruded igneous rock. This contact fissure might be very small, merely a part-

ing between the two kinds of rock, filled with crushed material from the walls, while below, in the overlying stratified rock, would be found very much larger fissures, and in some one of them—that having the best openings and most favorable situation—would be found the principal lode formation. In the other parallel fissures would be found other veins, all exhibiting the characteristics of the principal lode.

The regularity and smoothness of the fissures depend much upon the character of the country rock. If the overlying rocks do not cleave well and regularly the lodes found in them will be bunchy, as when bodies of serpentine lie in the line of the fissures. Fissures are generally very much more jagged and irregular on the cross sections of slate or slaty rocks than those that run parallel to the cleavage, and as the fissures are so are the lodes with which they are filled. The broader veins are so much the more regular is their course. The broadest veins are usually the longest. The greater the length of a vein the greater the depth to which it will probably extend.

A "true fissure" vein is one which traverses the country rock independently of its stratification, cutting through slaty rocks across the course of their cleavage. These veins sometimes cut across dikes of intruded igneous rocks. They are supposed to have been produced by deep-seated plutonic forces, while contact veins and their accompanying groups of parallel veins are the result of forces acting nearer the surface.

There are contact veins which lie between two kinds of igneous rocks. A dike of diorite may be upheaved in such a position as to form a contact with granite, or with an older dike of diorite or other intruded rock. In places where there are parallel groups of veins, as on the "mother lode," a diorite dike often forms the foot wall of one vein and the hanging wall of another. The black slate of that great mineral belt is in one place the hanging and in another the foot wall, while in many places it forms both walls.

If the gold comes from any of the wall rocks it must be at a great depth, where there is intense heat and great chemical action—at a point where all the metals are much more abundant than near the surface. The nature of the mineral solutions and the metallic vapors filling and passing up through the fissures have more to do with the character of the vein formed than have the wall rocks.

Mineral veins frequently intersect one another. When the intersecting vein fills a fissure in the intersected it shows it to be the more recent, the younger of the two. Some veins are intimately combined at the point of junction, showing them to have been filled at the same time. As a rule, the work of filling immediately follows the formation of the fissure. A vein intersected by a younger vein is generally rich, as it receives a double charge of mineralized solutions.

"Chimneys" or "shoots" of ore in a vein are probably owing to a considerable extent to the character of

the fissure at a greater depth. Though open and roomy near the top the fissure may be narrow or wholly closed at a deeper level, thus permitting the metallic vapors to ascend only at certain points. Thus we see steam rises in columns along the open fissures of hot springs, not in a continuous sheet. Wide places in a vein are more favorable to ore formation than narrow ones. In narrow places the motion of the ascending mineral-bearing solution or vapors is more rapid, therefore not so favorable to the formation of deposits as the wider places. This may cause the apparent "pinching out" of a vein. At such places no sign of the vein will be seen except a seam of clay, but if this is followed it is apt to lead to a broad place in the vein, filled with both quartz and ore. In some veins—owing to the irregular fracture of the rock forming the walls—there are found a succession of such pinches.

It is quite certain that mineral veins have been filled by circulation in the fissures in which they are found, of heated water, aqueous vapors, and various gases, all more or less mineralized. All veins have not been formed in the same way nor by means of vapors and emanations of the same character. No two veins are exactly alike in all respects. Had the veins been filled by means of molten matter from below (as many suppose) their metallic contents would have been the same in all parts, and would have been evenly distributed. There would have been seen no "bonanzas" or "chimneys" of rich ore, with barren spaces between. There can

be nothing found in or about any lode which shows it to be the result of a quickly completed process. On the contrary, all goes to prove that the formation is the result of a long-continued or periodically repeated process, with modifications at various times of the chemical conditions, degrees of heat and pressure, and variations in the nature of the mineral solutions or metallic vapors. Even the hydrostatic pressure in a column of minerals in solution in a fissure may exert a great influence in the disposition of ore. What might not be affected at a depth of a few hundred or 1,000 feet might be accomplished under the tremendous pressure of 5,000 feet. Doubtless most veins were formed at much greater depth than we now see them. They have become accessible to us through the upheaval and the erosion of what lay above them.

Lodes will more commonly be found in the neighborhood of plutonic rocks—rocks that have solidified beneath the surface—than near volcanic rocks, for the reason that lodes of value could only be formed at a considerable depth under a solid covering. It is useless to look for lodes in sections of a country covered with lava and similar volcanic rocks. Paying mineral veins are much more likely to be found in the older than more recent rocks, whether sedimentary or igneous. They are generally to be found in places where dikes of igneous rocks have been pushed up through the sedimentary rocks, either at the point of contact, between two kinds of rock, or at no great distance on either side.

In Cornwall almost the whole of the mineral wealth occurs within a space of two or three miles on each side of a granite and slate contact, but the veins are not richest on the immediate line of contact. In Australia the richest veins are found when the diorite, and other intrusive plutonic rocks, have formed dikes in the stratified rocks. And we see that in California the most noted mines are near dikes of igneous rock. Dikes, not continuous on the surface, may continue underground, some parts being pushed to a greater height than others at the time of their formation. A dike, which is continuous at no great distance below the overlying rock, may appear on the surface as a series of "humps." These may be from half a mile to a mile apart, but from them the prospector will be able to get the course of the dike. Also, where a dike that shows on the surface appears to come to an end, the prospector may take its course and be guided by it in making explorations, in the sections wholly covered by the country rock. The veins lying near the line of the dike will generally prove most valuable.

Usually, when a rich quartz vein has been discovered, there is a "rush" made for "extensions" on the course of the strike of the vein, and at times these locations extend for miles. Let the miner who does not reach the scene of the discovery in time to locate a first extension give no further thought to extensions, but turn his attention to a search for a parallel vein. Systems of parallel veins, more or less regular, depending upon the nature

of the country rock, are found in almost every quartz mining district of California. The chances for finding a paying parallel vein are often much better than for locating the extension of a newly-discovered lode, and, as has often happened, a parallel vein may be found which will prove richer than the first of the system located.

In California the miner found, when he first turned his attention to the quartz veins, that he was poorly provided with methods and implements for his task, but in the years which have ensued experience and brains have solved the problem of wresting the gold from the rock, and the operation is now performed, in a well-equipped plant, with comparative ease and celerity.

Prior to 1860, quartz mining operations were in an experimental stage, but about that time the great lodes, which were the source from which the rich deposits of the California placer fields came, were discovered, and men began mining them seriously. As a rule then, the miner blasted and picked out his material with crude implements, crushed and pulverized it in a ponderous machine, and extracted the gold by amalgamation on copper plates. This was an operation on the basis of the "free milling" process. But much more than half the gold escaped the seeker in the course of this operation, and only the richest material would pay the expenses of working. Only a small percentage of the gold in the average quartz lode is present in a free state, and for the rest intricate processes must be used

to rescue it. Even with present-day methods a considerable percentage still is lost to the miner.

Native gold as found in the lodes is never quite pure, being almost invariably alloyed with silver and not infrequently it contains small proportions of copper and iron. The gold-bearing ores consist chiefly of quartz, and in some cases they contain slate, baryta, and talc. Occasionally the metal is found in leaf or crystallized form between the layers of rocks, but generally it is scattered through in small particles, often so minute as to be scarcely visible to the naked eye.

When the vein lies close to the surface, it is the practice of the miner to strip the ground from it and attack the rock from the top, as far as permissible, but when it dips into the earth it is necessary to tunnel or sink a shaft to follow it. The underground method is, of course, vastly more expensive than the first mentioned. The gold-bearing rock being removed from its resting-place by the ordinary methods of blasting, is sent to the surface in buckets lowered and raised in the larger mines by machinery. The appearance of the valuable ore is not encouraging. The average man would fail often, even with the most careful examination, to detect any signs of treasure in the mass. A long and somewhat expensive process must be gone through with before the golden riches will be revealed.

Rock-breakers and stamps are used first, and then the free gold is amalgamated in the battery by various contrivances. After the ore reaches the mill it is weighed.

GROUP OF MINERS AND INDIANS.

GROUP OF KLONDIKE GOLD MINERS.

It is then crushed to the proper size for its reception by the stamp machines, and here the milling operation proper really begins. When, in the stamp mill, a suitable degree of fineness has been reached, the free gold is caught by amalgamating it. This operation may be carried on in the battery box itself or on tables outside, in mercury wells, or by special apparatus in pans, or, still again, by a combination of some or all these. Then the escaping pulp, which in most cases contains much the largest proportion of gold, is treated by some of the concentration methods to obtain the yellow metal.

There are still many cases where the rock, when first brought from the mine, is broken by hand with a heavy hammer, but this process is usually performed by a machine known as a rock-breaker. There are two main types of these machines. Both are made of heavy casting, and are box-like in form with fly-wheels on either side. In one the stone is crushed between a flat, fixed jaw and a reciprocating one, and in the other the fixed jaw is circular and the movable one gyrates inside. In both cases the wearing faces of the jaws are fitted with dies which may be renewed, and they must be changed frequently in the course of the severe task they are put to. As a general rule, the stone, which is fed to the rock-breaker, should come from its mouth of a size to pass through a three-quarter-inch ring when it is ready for the stamp-mill.

The original stamp-mill consisted of a stone mortar and pestle. The mortar was filled with the vein stuff

and the whole ground to powder. Then the larger grains of gold, which being malleable were not reduced to powder, were sifted out. Finally the siftings were placed in a prospecting pan and washed for the fine gold. This system is the basis of the ordinary modern method.

The California stamp-mill, which is the one now generally used, crushes the bits of ore by means of the action of a heavy piece, the stamp, which is lifted by appropriate mechanism and allowed to fall, under the action of gravity, upon the material in the mortar. It thus consists of three essential parts. The first is the mortar box proper, with its screens and other attachments, the mortar block, which forms the foundation, and the dies, which are the wearing face of the anvil upon which the ore is crushed. Second, is the stamp, which consists essentially of a long stem carrying at its extremity a head into which is fitted a removable shoe, which constitutes the wearing face of the stamp. With this is included also the tappet, which is, correctly speaking, a part of the lifting mechanism, but as it adds to the weight of the stamp is classed with it. Thirdly, comes the lifting mechanism, which consists of a horizontal shaft on which are keyed cams acting on the tappets, and also a pulley, which transmits the power to the shaft. The mortar block is usually constructed of sound, heavy pieces of timber bolted together. The mortar-box is made of iron, as are the other important parts of the machine.

In most cases amalgamation is commenced inside the mortar box, and to this end copper plates are fastened there. Five stamps usually compose what is known as a battery. The action of the stamp is two-fold, namely, crushing the ore in the first place and afterwards expelling the pulp, which consists of minute particles of ore suspended in water, through screen apertures. A supply of clean water, is required, which is so arranged as to run constantly into each battery when in operation.

After the crushing process is completed, the process of extraction of the gold commences. It has already been shown that the gold occurs in its ores in two forms, amalgamable and non-amalgamable. The former is obtained sometimes in the crushers and sometimes after the pulp leaves the mill. In the former case mercury, to about the amount of three times the anticipated gold, is dropped in the mortar-box. Falling among the ore it becomes suspended in the mass, by the action of the machine, and coming into contact with the particles of gold amalgamates them. This amalgam is in turn caught by the inside copper plates and by other similar devices outside. There are many contrivances based on the general principle of this process, but enough has been said to give an idea of the methods employed by the miner.

When the pulp that is pushed from the stamp-mill contains gold which refuses to amalgamate, still another scheme must be resorted to, which is known as the concentration process. All those minerals which carry gold

with them are comparatively heavy. The specific gravity of them may be taken at 5.5, while that of the non-metallic and worthless portions of the pulp may be placed at about 3. The object of the concentration process, briefly stated, is to separate in the pulp mass all those particles of specific gravity of 5.5 from those of 3. The mechanical principles followed in doing this are simple, though the process is of necessity somewhat difficult. All bodies that are acted upon by any force would be propelled by this force at equal velocities, if there were no resistance to their movement and if no friction existed. This theoretical condition is, of course, never realized, as every body meets with more or less resistance from the medium which surrounds it. But when by the aid of the stamp-mill the ore is ground to a powder, the particles of which are approximately spherical in shape, and a pulp formed by the aid of water, and the whole sent to a concentrator, there to be subjected to the action of a force which may be gravity or a mechanical impulse, the result is that the bodies, light and heavy, moving in a given direction are separated. Thus the miner is enabled to take his heavy mineral particles from the lighter worthless stuff.

The types of concentrators are three in number, those in which the heavy particles are allowed to settle under the action of gravity, those in which the latter action is assisted by external means, as in the case of buddles, and those in which force is communicated to the mass by mechanical action.

CHAPTER VIII.

THE MARKETING, SMELTING, ASSAYING, AND COINING OF GOLD.

What the miner does with the unrefined product of his stamp-mill and concentrator—Processes which the yellow metal must pass through before the world sees it as coin—The chlorination and cyanide operations—Acid baths to separate the baser metals from the treasure—The great smelting furnaces and their daily flood of riches—Among the ingots of pure gold at the mint—The assayer's difficult task—The world's output of gold in four hundred years.

AFTER what are termed sulphurets have been obtained by the miner in the form of concentrates they must pass through still other processes before the world handles them in gold coin, jewelry, and plate. These other processes are not in this day regarded as a part of the mill man's duty, and the material is usually sent to outside assay and reduction works where it is treated generally by one of two methods, the wet and the smelting.

It is interesting to note here what modern methods have done in the way of improvement in the securing of gold from ores. The Robinson mine in South Africa furnishes an admirable illustration of this as does also the Treadwell mine in Alaska. After the treatment of the Robinson ore by ordinary stamping and amalgamation methods the return of gold in a recent year was $1,885,583. The tailings from the stamp-mill were then passed over Frue vanners by which concentrates amounting to nearly three thousand tons were obtained. This

product was roasted and treated by chlorination and $219,514 resulted. The tailings from the concentrators were in turn passed through the cyanide works and yielded $289,722, more than half a million dollars being reclaimed, which under old methods would have gone to waste.

Gold, when it comes from the concentrator, usually contains silver. Some gold ores contain nearly all the metals used in the arts, and it will thus be seen that the material sent to the assayers and smelters is of the most heterogeneous description, and many methods must be used to purify the mass. The most important of these are the nitric acid process, the sulphuric acid and the electrolytic. The latter is little used outside the largest smelting plants.

Acid-parting processes depend for their success upon the solubility of silver, copper, and other metals in a liquid which will not attack the gold. Nitric acid was first used in Venice for this purpose, and for many years no other method was known. The operation consists of assorting and proportioning the bullion, granulation of the same, solution of the outside metals in acid, and treatment of the thus parted materials by washing, drying, and melting.

Thoroughly satisfactory as is the nitric acid process, so far as its effectiveness is concerned and the high grade of gold which it yields, yet the comparative high price of the acid and the necessity for using either platinum or porcelain vessels in the operation led to its

being superseded in many plants by the sulphuric acid process.

The electrolytic process gives the most satisfactory results when the bullion to be parted has been refined in a cupel furnace until it contains not over two per cent. of impurities, such as lead, copper, bismuth, and the like. The material is cast from the cupel into flat plates about eighteen inches long, ten inches wide, and one-half inch thick.

These plates form the anodes, and are suspended by three lugs cast on one of the long sides. They, therefore, hang with the greater length horizontal. Tanks of California redwood planks are very carefully made, eleven feet long by two feet wide and twenty inches deep (inside measure). Six partitions are placed crosswise in a tank so as to give seven separate cells or "baths." In each cell three plates or anodes are suspended, alternating with four cathodes. These latter are thin-rolled sheets of pure silver, thirteen by twenty by one-thirty-second inches thick, weighing fifty troy ounces each. The distance between anode and cathode is about one and three-quarter inches.

Both anodes and cathodes are suspended by conducting wires from copper rods resting on the edges of the tank. Two copper bars traverse these top edges, and are connected with the respective poles of the dynamo. The cross rods supporting the plates rest on these bars, but one end of the rod carrying an anode is insulated by a rubber band, while the opposite end of the rod

carrying a cathode is insulated in like manner. The current must therefore pass from one conductor to the anodes, through the solution and the cathodes, to the return conductor. It will be seen that the current is divided between these seven cells and that we have twenty-one anodes connected in *multiple* with twenty-eight cathodes.

A model plant consists of fourteen such tanks containing seven cells each. Ten of these tanks are constantly in circuit, four being in turn cut out for charging, discharging, and possible repairs. These ten tanks are connected in *series*. The dynamo furnishes a current of one hundred and eighty amperes, with an electromotive force of ninety volts. Such a current requires twenty-two horse-power. The total cathode surface is ten square feet in each tank. There is, therefore, a current density of eighteen amperes per square foot of cathode surface.

Each anode is inclosed in a muslin bag, that serves to catch the undissolved metals, which fall as a black slime. In this are found all the gold and bismuth, the greater part of the lead as peroxide, together with some silver and copper. Below this system of anodes, cathodes, and bags in the bath, is stretched on a box-like frame a piece of cloth, on which is gathered the deposited silver as it is scraped from the cathodes by wooden "brushes." These brushes straddle the cathodes without touching, and are kept moving to and fro by machinery, and they serve, not only to brush off the silver as fast as it is deposited,

thus preventing short circuits, but also to keep the solution uniform by gentle agitation.

The solution is one of silver and copper nitrate, to which about one per cent. of nitric acid is added. The acid tends to prevent the deposition of copper with the silver, and about one pint is added to each bath every twenty-four hours. Three-eights of one volt will decompose silver nitrate, while copper nitrate requires one-sixth of a volt more and lead nitrate a still higher voltage.

The chlorination process, which is familiar to all gold workers, was invented in 1848. It depends upon the fact that chlorine has a strong affinity for native gold, and readily combines with it, forming the soluble auric chloride. The solution containing the gold can be filtered off from the residue with ease. The subject to be treated is first properly moistened, in the improved method, and then shoveled into a vat with a double bottom. The upper false bottom is perforated and supports a suitable filter. Chlorine gas is passed into the space below this false bottom, and gradually rises until the vat is full. The lid is then adjusted and the whole allowed to remain until the action is complete, when the soluble chloride of gold is washed out through the filter into other vats, where the gold is precipitated. Various precipitants, such as ferrous sulphate, charcoal, sulphuretted hydrogen, and others are used for this purpose.

The presence of any substance which chlorine attacks necessarily causes a waste of the gas and a hindrance

to the process. It is, therefore, best to calcine the concentrates as perfectly as possible before attempting chlorination.

All concentrates can be treated by the smelting process. Smelting can, however, only be practiced when suitable ores are available for mixing to make a proper furnace charge. When argentiferous lead ores, such as galena, are smelted in the blast furnace it is necessary to add a flux of which oxide of iron is an essential ingredient, the products of fusion being base bullion, consisting of metallic lead which contains all the gold present in the furnace charge and a slag consisting of silicates usually of iron, lime, alumina, magnesia, and so on, according to the nature of the fluxes employed. Auriferous concentrates, consisting say of iron and arsenical pyrites, can be employed in this process by being first calcined. There will result an auriferous oxide of iron, which could be added as a flux to the other ingredients of the furnace charge. Almost all the gold present will alloy with the lead produced, and will be found in the base bullion from which it is afterwards separated.

According to the nature of the other ingredients, it is not infrequently an advantage to have a certain amount of crushed quartz left in the concentrates when they go to the smelter, but in general it is the rule of the mill man to send his material there as clean and rich as possible.

A bath of copper may be substituted for the lead in the smelting process—that is, the former metal is used in-

stead of the latter to collect the precious particles in the course of the operation. This process is particularly suitable when the concentrates contain a notable proportion of copper pyrites as the copper thus becomes one of the available ingredients of the product. Coarse copper is produced by a series of smelting processes carried on in reverberatory and blast furnaces and run into slabs, which are refined by electrolysis. During the electrolytic process the gold in an impure state is deposited in black mud at the bottom of the vats and refined by cupellation.

The cyanide process is still another branch of the refiner's art. It is not yet well understood, and can be applied to only a limited class of ores, though these are abundant in quantity. The process is declared by experts to have a promising future. It will extract gold often from products, such as old tailings, upon which other methods have failed. It has its basis on the fact of the solubility of gold in a solution of cynanide of potassium. As the solution has no action upon native sulphides, usually occurring in concentrates, it is unlike chlorine, and calcination can be dispensed with. It is therefore cheaper.

The process consists simply in allowing a weak solution of cyanide of potassium to percolate through crushed ore. It is found that such a solution dissolves a large proportion, perhaps ninety per cent. of the gold contents of the ore while scarcely attacking any of the base metals contained. The solution then contains gold in

the form of potassic aurocyanide, and is filtered off when the gold is precipitated. The apparatus consists of dissolving tanks, in which the solution is prepared, storage tanks in which it is diluted to the desired extent, leaching vessels, in which the lixiviation proper is carried out, and precipitating vats in which the precipitation takes place.

The purified bullion is ready for issue in either of the two fields, industrial or coinage. The consumption of gold and silver in the industrial arts is much greater than is generally supposed. During the year ending June 30th, 1895, gold and silver bars for industrial use were manufactured in the Philadelphia mint and the assay office at New York to the coinage value of $17,818,581, in about equal proportions as to value. Private refineries furnished not less than $5,000,000 more. This first cost for what to the gold-beater, jeweler, watch-case maker, etc., is simply his raw material, represents an enormous industry when we consider the amount of high-grade labor which is bestowed on gold and silver wares. These bars are 0.999 fine, and are furnished to the public by what may be called a system of exchange.

A depositor may bring crude bullion in any quantity ($100 or more in value) and receive either fine gold bars or coin, at his option, to the full value of the gold in his deposit, less a trifling charge for melting, assaying, parting, etc. These charges vary according to the nature of the deposit, but may amount to five cents per ounce. The bars or coin are delivered from stock on hand as soon

as the value of the deposit is ascertained by assay, usually the following day. For the silver contained in gold deposit the owner may either receive pure silver bars or be paid in silver dollars or currency, at the market value of silver.

Having a stock of refined gold and silver nearly pure, the first step toward conversion into coin is to make an alloy with copper, in such proportions as will produce standard planchets or "blanks" in the hands of the coiner. While the standard fineness of gold and silver coin is the same, yet, as will appear later, the quantity of copper to be used in the two cases differs a little, yet materially.

Weighed quantities of gold and copper, or of silver and copper, are melted together in a large black-lead crucible. The molten metals thoroughly mixed are then poured into cast-iron molds to produce what are known as ingots. These are rectangular bars, differing in size according to the kind of coin for which they are intended. The ingot for silver-dollar coinage is 1 5/8 inches wide by one-half inch thick and 12½ inches long. Some 70 such ingot bars are made from one "melt," and weigh collectively about 3,300 ounces (220 pounds). All the ingots are stamped with the melt number, of which a record is kept by the melter and refiner, by the assayer, and by the superintendent.

The crucible is set for the day's work in a furnace peculiarly adapted to the purpose, and a continuous fire maintained, using the best stone coal and a natural draft.

Five or six melts are made in each furnace during the eight hours; and if the crucibles were taken out of the furnace at each time of pouring much time would be lost in resetting and surrounding it with a fresh fire.

The metal, when melted, is thoroughly mixed by stirring with a tool not unlike a churn-dasher, and it is then ladled out into the molds with what is called a "dipping cup." This is a small black-lead pot made with a lip on one side and a straight edge on the opposite side so formed as not to be crushed when firmly gripped by a pair of nipping tongs.

The molten metal is slowly poured from the dipping cup into upright molds, of which some twenty are placed in a shallow iron pan convenient to the furnace. As soon as a mold is filled it is removed by an attendant helper, and passed by him to another, who opens it on an iron-covered table and throws out the red-hot ingots. These are chilled in water and then immersed for a few minutes in very dilute sulphuric acid. This latter removes a slight coating of copper oxide and gives the ingots a bright matte color. The gate end of the ingot is then cut off in a machine which has a shear knife. The little fringe left on the ingot by the parting line of the mold is removed with a file, and then each ingot receives a number indicating the melt from which it is made.

Standard coin is composed of 900 parts of gold and 100 parts of purest copper. While the law allows a slight variation in the fineness of coin, to provide for the limitations of human workmanship, yet this margin is

sharply defined and is but a small fraction of 1 per cent.

The manufacture of gold ingots is much less troublesome than silver. The crucible which has a holding capacity of, say, 3,300 ounces of standard silver will serve for a gold melt of 6,000 to 6,500 ounces (400 to 430 pounds avoirdupois).

The fineness of gold bars is furnished to the melter and refiner by the assayer to the tenth of one-thousandth. Bars, preferably of identical fineness, are weighed off in proper quantity for a melt, and placed on a hand-truck with a melt number tagged to each little pile of bars. A sufficient number of such are prepared for a day's melting. A chest of drawers mounted on a truck carries suitable-sized boxes, each having a permanent number plainly marked on it.

The copper requisite for melts Nos. 1, 2, 3, etc., is placed in boxes 1, 2, 3, etc., and the trucks with bars and the one carrying the boxes of alloy meet in the melting room, where the distribution is made, a single melt at a time—bars and alloy—to each furnace.

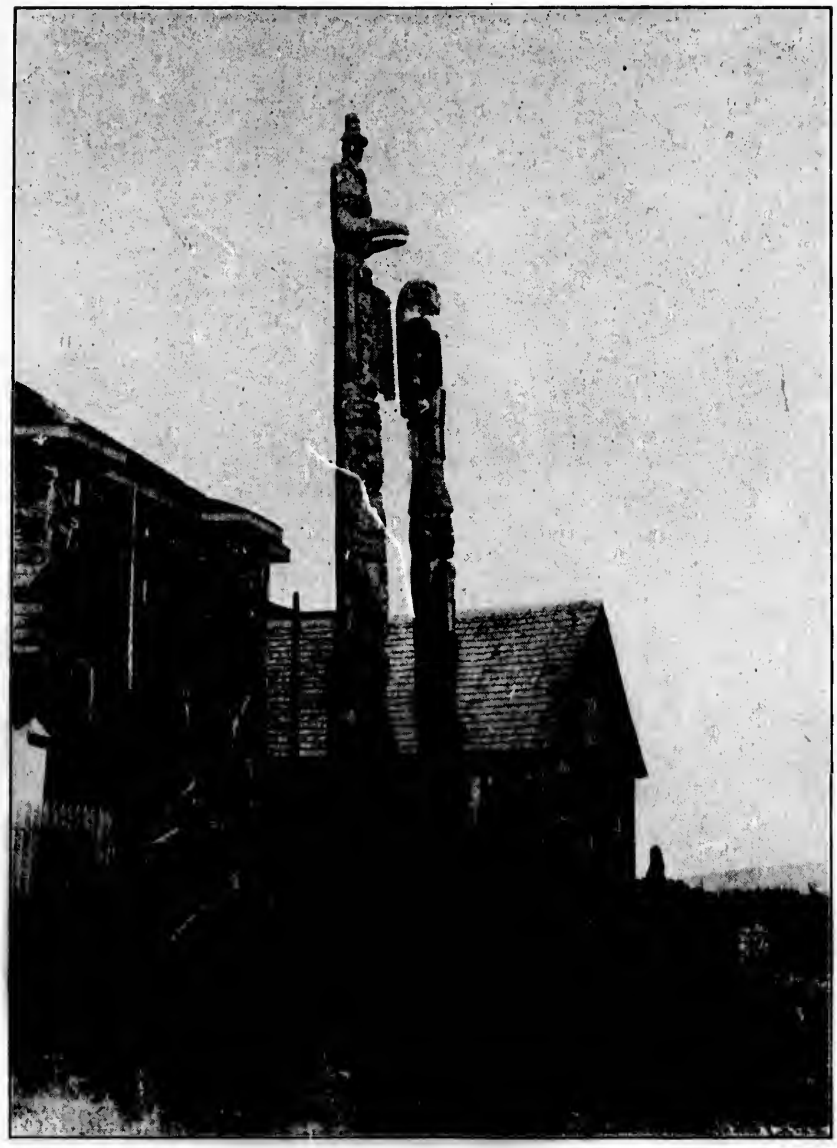
A strict record is kept, and the melting room is charged with weight of all metals sent into it in the morning. At the close of work for the day and before the workmen are dismissed, all returns from the room, whether ingots, tops, filings, etc., are weighed, when any shortage, real or apparent, will be noted. Of course the returns never exactly equal the charge sent out, since some little metal will adhere to the crucibles and some will be found in

the ashes. This is afterward recovered as "sweeps." But for the time being these shortages are unknown quantities. Experience, however, has shown what may be expected to pass into the sweeps, and an allowance is made in comparing the charge and returns from the day's work.

The sweep is a very broad general term in mint practice, and includes every kind of waste material known to contain, or likely to contain, gold or silver, except actual sweepings. The floor of the melting room is swept each day, but the gatherings from the broom are carefully mingled with a suitable flux and thrown into one of the crucibles, still hot and surrounded by the fire left from the day's work. A crucible is selected which has seen such service as to entitle it to retirement from age. On the following morning the contents of the crucible will be found to have "sweated" down, the flux to have fused into a glass, and a lump of metal or "king" will be found at the bottom on breaking the crucible. This king is weighed, credited to the melting room, sent to and charged to the refinery.

The actual "sweeps" consist of broken crucibles and dipping cups, all ashes from the fires, burnt gloves, aprons, saw dust, and packages in which bullion has been sent to the mint, settlings in catch wells and in roof gutters; in short, everything which may contain bullion without its being visible to the eye.

All material of this kind is sent to the sweep cellar, and such as needs crushing is passed under heavy cast-



MINER'S HOUSE AND NATIVE'S TOTEM POLE.

iron rollers mounted in a mill similar in principle to the Chilian. The advantage of the roller crushing is that while brittle materials are reduced to a coarse powder, any pellets of metal will be flattened out and caught in the sifting operation which follows. These metallic scales are melted down and find their way to the refinery.

The assaying of gold is still another important process which must be gone through with at the mint and elsewhere to ascertain its fineness and value.

Gold received at the mint for refining or coinage, either in a manufactured or native condition, is of every variety of fineness, the alloy in a majority of cases being silver, with a smaller proportion of base metal. In some cases of low-grade gold the alloy is largely composed of copper. The object of the assay is to ascertain these different proportions, both in order to base the calculations for value and for subsequent minting operations. For this purpose a small sample is cut from each bar after melting. The fineness of this sample must, if the melting has been properly conducted, be the fineness of the gross amount.

The fineness of gold being expressed in thousandths (pure gold being 1,000), it has been found expedient in assaying to employ the French system of weights, using the demigramme as a unit of 1,000 parts with the decimal divisions to the ten thousandth of that weight. The demigramme is rather less than eight grains. From the sample, after it has been laminated for convenience in chipping, there is accurately weighed one demigramme

on the assay balance. This assay balance is so constructed as to be of the utmost precision and delicacy, and so fine is the adjustment that it is sensitive to the fiftieth of a milligramme.

To the gold, after being accurately weighed, there is added sufficient fine silver to make about twice (according to one system) or thrice (according to another method, now less used) the estimated amount of silver which may be contained in the alloy, extreme care being necessary that the amount of silver added varies as little as possible from this proportion, as in any marked divergence the result would be liable to inaccuracy. Practice enables an expert to judge of the fineness of the gold within a few thousandths, thus securing the proper basis for the addition of silver. It is needless to say that the added silver is accurately weighed. If the gold or assay is of low fineness, or contains a large amount of base metal, where it is impossible to estimate the quality, it is customary to make a preliminary or approximate assay as a basis or guide for a subsequent rigid assay.

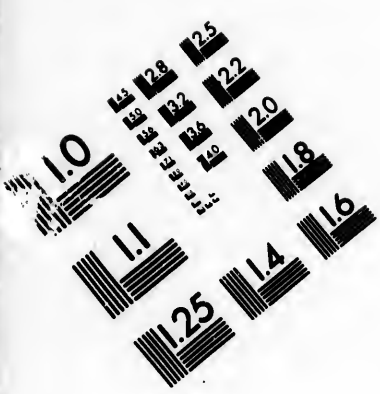
The gold and silver, each having been weighed, are inclosed in a piece of lead foil about ten times the weight of the assay. A very little copper is added, merely to assist the cupellation. These are now ready for what may be termed the first part of the operation, that of removing the copper and other base metal. This is effected by the cupelling process. The cupel is a small, shallow cup made from the ash of bones or the pith of

animal horns. It possesses the quality of absorbing the oxides of the metals, but not the metals themselves. The bone or pith is first well burned in open air and thoroughly ground, after which it is moistened with water and pressed in a mold to the desired shape.

The assay furnace is oval in cross section, about one foot in height, made of fire brick. Extending across the furnace about the centre is what is known as the "bridge" (this is also made of fire brick), and is designed to support the muffle. The muffle is the oven for the reception of the cupels. It is flat-bottomed, with an arched top, its length nearly corresponding to the depth of the furnace. The modern furnace is arranged for burning gas; the flame completely surrounding the muffle subjects it to a high heat, easily controlled and regulated.

The front of the furnace has an arched opening corresponding to the muffle; through this opening the cupels are introduced by a long pair of spring tongs. When in operation the muffle is nearly closed by a door, allowing, however, the entrance of a regulated current of air, which, passing over the assay, oxidizes the lead and base metals, their oxides being absorbed by the cupel. At the back of the muffle is a slit or opening, which allows the exit of the unabsorbed fumes formed by the oxides of the metals, which are not absorbed by the cupel.

The furnace having been properly heated, the cupels are placed therein and brought to a uniform temperature, of which the assayer must judge from experience.



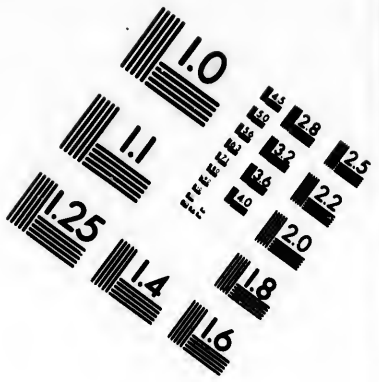
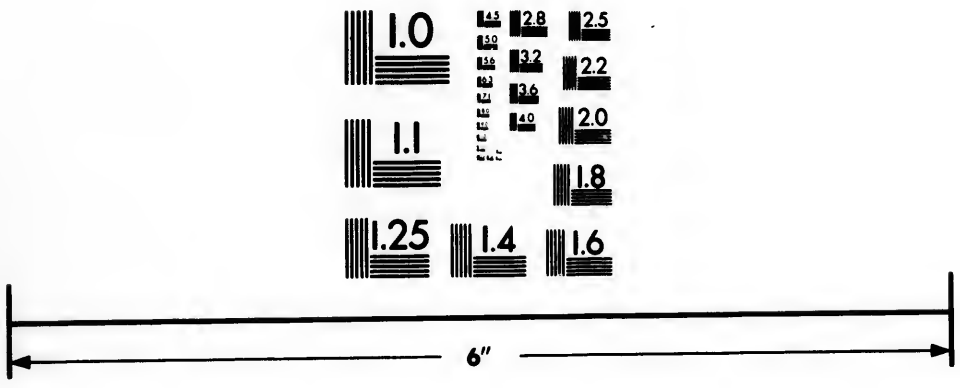
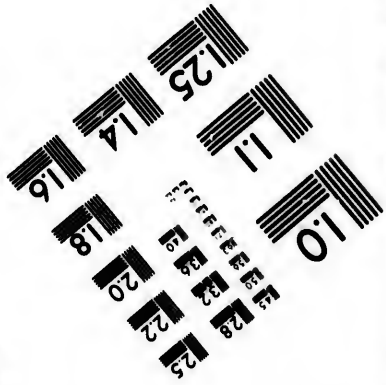


IMAGE EVALUATION TEST TARGET (MT-3)





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Each leaden bullet, with its contents, is then placed in its cupel and the furnace closed. The lead, in which the gold and silver is inclosed, is rapidly changed to a fluid, vitreous oxide, which, exerting an oxidizing effect on the base metals in the gold, causes their absorption into the pores of the cupel. The lead likewise serves to form a more uniform alloy between the gold and silver. The precious metal is allowed to remain in the cupel until all agitation ceases, when it presents a bright surface, which indicates that the base metals have oxidized and absorbed. The cupel is now allowed to cool gradually and the button of pure gold and silver detached.

The next step is to extract the silver, which is accomplished by digesting the rolled-out button in nitric acid. The object of the original addition of the silver is to make an alloy in which the particles of gold shall be so far separated from each other that the action desired shall not be interfered with. The button is hammered and rolled into a thin sheet to give the widest possible surface for the action of the acid. The sheet is rolled loosely into what is termed a cornet. The latter is introduced into a small vessel, where a boiling process in acid takes place. When the digesting process is completed it is presumed that all silver has been removed. The acid is poured off, the cornet well washed and placed in a small clay crucible to be dried and annealed. The cornet, which is then fine gold, is taken to the assay balance and its weight ascertained in thousandths of a demigramme. The number of thousandths

which it weighs expresses the fineness of the original sample.

In assaying fine (or nearly fine) gold the proof is weighed to 1,000 parts of the test gold; but in assaying ingots for coinage and the ordinary class of deposits a proof of 900 parts is used, and in lower grades of gold a synthetic proof is used corresponding to the approximate or supposed fineness of the metal, the object being to subject an alloy of known composition closely similar to that under test to identical treatment.

After the ingots have been made, the first and last ingot from every melt are carried to the assay room and a sample slip taken from each. These are assayed separately and their fineness reported to the melter and refiner. The ingots or melts which may be too far from the legal standard, or fail to show a uniformity of fineness in the assays, are condemned. They are then remelted with the proper addition of either gold or copper, as the case may require, to bring them to standard.

With every sample of gold assayed there is also a corresponding duplicate assay made, to guard against any error which might possibly occur in the various assay processes. Besides this, the duplicate serves to show if the alloy be of a uniform fineness throughout. If such is not the case (as shown by the variation of the assays), the mass from which the sample was taken is remelted and stirred to make it homogeneous, after which it is assayed in duplicate as before.

In case the gold for assay be of low fineness, or if

there is but a small proportion of gold in the alloy, it is found to be expedient in preparing the assay to add sufficient fine gold so that the assay may contain 900 parts of gold in the thousand. By this course the exact fineness of the alloy is ascertained, otherwise an allowance would have to be made for a slight absorption of gold by the cupel, which will happen when a large proportion of alloy is present. When the weight of the cornet is ascertained, the amount of fine gold which was added must be deducted, the difference being the fineness of the original alloy.

It sometimes happens that the ordinary amount of lead is insufficient to cause the entire elimination of all the base alloy in the gold. It may be, too, that the cupel is not capable of absorbing the entire amount of lead which such an assay would require. To avoid these difficulties it is customary to weigh the assay at one-half the usual weight, adding fine gold as described above, thus diminishing in like proportion the amount of base metal to be oxidized and absorbed by the cupel.

The ingots as received from the melter and refiner by the coiner vary in size and weight according to the denomination of the piece for which they are to be used. The first operation in converting ingots into coin, called "breaking down," is the passing of them between heavy rolls, which results in the ingot being formed into "strips." To more clearly understand this, it may be said that the ingots are divided into drafts of from forty to sixty ingots, and each draft passed between the

"break-down" rolls a number of times, determined by the malleability of the metal. After each operation the rolls are tightened and brought closer together by means of wedges under the lower roll, which wedges are worked by means of a worm wheel. Such tightening of the rolls is shown by an indicator similar to a clock dial.

In "breaking down" ingots the metal becomes hard and springy, and too much rolling without softening causes the strips to crack and split. To avoid this they are annealed as follows: Inclosed in copper canisters, sealed with potters' clay to exclude air and thus prevent oxidation, the strips are placed in a furnace heated to about 1,500° F., where they remain for about one hour and a half, the time depending upon the heat of the furnace and the size of the strips. After being cooled off in water and each strip wiped dry they are ready for further reduction in the finishing rolls.

Double eagles and eagles are passed through the finishing rolls three times, half-eagles and quarter-eagles four times.

The strips, upon leaving the finishing rolls, are again annealed, cut in two for convenience in handling, and taken to the pointing rolls, where the end is flattened to permit of an easy passage through the dies of the draw-bench. The draw-benches are double, and each section is independent of the other in action. Each has two dies, regulated by set screws. Between these dies the pointed end of the strip is passed, and being seized by the jaws of the carriage, which is drawn by means of an

endless chain, the strip is passed through and reduced as near as may be to the standard weight. The operation is similar to that of wire drawing. When the strips are drawn to the proper weight, which is ascertained by weighing, each piece is weighed in the adjusting room, and if found to be heavier than the legal limit, is reduced within the limit by filing the edge of the planchet; if lighter than the legal limit, it is condemned and returned to the melter and refiner to be remelted. Those planchets which have been adjusted are then taken to the milling machines to undergo the operation of having the raised edge (technically termed "milling") put on them. The milling protects the surface of the coin from abrasion.

In the milling machines the planchets are fed by hand into a vertical tube, and, one by one, are caused to rotate in a horizontal plane in a groove formed on one side by a revolving wheel and on the other by a fixed segment of a corresponding groove. Each piece as it passes through this narrow groove has its edge evenly forced up into a border or rim. The milled pieces are then taken to the cleaning-room to be cleaned. To facilitate the cleaning, as well as to soften the pieces for the imprint of the dies, they are again annealed by heating to a cherry red, then dipped into a solution of sulphuric acid and water sufficiently strong to clean and brighten them. After being thoroughly rinsed in boiling water they are hand-riddled in sawdust to dry them, and are then ready for the stamping-press.

The most important operation in the stamping of a

piece is the adjustment of the dies in the press. This adjustment requires great skill and long experience, much depending upon the character of the metal to be operated upon. The pieces are fed to the press through a vertical tube, and as each piece reaches the bottom of the tube steel feeders carry it over between the dies, place it in a steel collar, when the dies close upon the planchet and the obverse and reverse impressions are made. The inner rim of the collar is reeded or fluted, and the planchet before being struck is slightly less in diameter than the collar; but the pressure upon the dies causes the piece to expand in the collar and takes from it the reeding on its edge.

There is a limit of tolerance on individual pieces, but all coins are far within this limit. Those pieces that are heavier than the standard weight are termed "heavies;" those that are lighter than standard weight are termed "lights." Gold coin is put up in drafts of $5,000 each. The legal weight of $5,000 in gold coin is 268.75 troy ounces, but there is a deviation allowed by law of one-hundredth of an ounce from this legal weight. In making up the drafts the "lights," "heavies," and "standards" are mixed so that the deviation from 268.75 ounces shall not exceed one-hundredth of an ounce.

The production of gold in Alaska in 1895 was 78,000 ounces; in 1896 it reached 120,000 ounces.

The following table is of great interest, showing, as it does, the world's output of gold in the last 400 years, according to the United States government report:

	Period.	Gold.			
		Annual average for period.		Total for period.	
		Fine ounces.	Value.	Fine ounces.	Value.
1	1493–1520, . .	186,470	$3,855,000	5,221,160	$107,931,000
2	1521–1544, . .	230,194	4,759,000	5,524,656	114,205,000
3	1545–1560, . .	273,596	5,656,000	4,377,544	90,492,000
4	1561–1580, . .	219,906	4,546,000	4,398,120	90,917,000
5	1581–1600, . .	237,267	4,905,000	4,745,340	98,095,000
6	1601–1620, . .	273,918	5,662,000	5,478,360	113,248,000
7	1621–1640, . .	266,845	5,516,000	5,336,900	110,324,000
8	1641–1660, . .	281,955	5,828,000	5,639,110	116,571,000
9	1661–1680, . .	297,709	6,154,000	5,954,180	123,084,000
10	1681–1700, . .	346,095	7,154,000	6,921,895	143,088,000
11	1701–1720, . .	412,163	8,520,000	8,243,260	170,403,000
12	1721–1740, . .	613,422	12,681,000	12,268,440	253,611,000
13	1741–1760, . .	791,211	16,356,000	15,824,230	327,116,000
14	1761–1780, . .	665,666	13,761,000	13,313,315	275,211,000
15	1781–1800, . .	571,948	11,823,000	11,438,970	236,464,000
16	1801–1810, . .	571,563	11,815,000	5,715,627	118,152,000
17	1811–1820, . .	367,957	7,606,000	3,679,568	76,063,000
18	1821–1830, . .	457,044	9,448,000	4,570,444	94,479,000
19	1831–1840, . .	652,291	13,484,000	6,522,913	134,841,000
20	1841–1850, . .	1,760,502	36,393,000	17,605,018	363,928,000
21	1851–1855, . .	6,410,324	132,513,000	32,051,621	662,566,000
22	1856–1860, . .	6,486,262	134,083,000	32,431,312	670,415,000
23	1861–1865, . .	5,949,582	122,989,000	29,747,913	614,944,000
24	1866–1870, . .	6,270,086	129,614,000	31,350,430	648,071,000
25	1871–1875, . .	5,591,014	115,577,000	27,955,068	577,883,000
26	1876–1880, . .	5,543,110	114,586,000	27,715,550	572,931,000
27	1881–1885, . .	4,794,755	99,116,000	23,973,773	495,582,000
28	1886, ...	5,135,679	106,163,900	5,135,679	106,163,900
29	1887, ...	5,116,861	105,774,900	5,116,861	105,774,900
30	1888, ...	5,330,775	110,196,900	5,330,775	110,196,900
31	1889, ...	5,973,790	123,489,200	5,973,790	123,489,200
32	1890, ...	5,749,306	118,848,700	5,749,306	118,848,700
33	1891, ...	6,320,194	130,650,000	6,320,194	130,650,000
34	1892, ...	7,094,266	146,651,500	7,094,266	146,651,500
35	1893, ...	7,618,811	157,494,800	7,618,811	157,494,800
36	1894, ...	8,783,342	181,567,800	8,783,342	181,567,800
37	1895, ...	9,694,640	200,406,000	9,694,640	200,406,000
	Total, . .	. . . . .	. . . . .	424,822,381	8,781,858,700

CHAPTER IX.

MINING LAWS OF THE UNITED STATES AND NORTHWEST TERRITORIES.

Early Laws on the Yukon—Gold and Silver Mines the Property of Kings—The Establishment of a Gold Commissioner at Fort Cudahy—The Newly Promulgated Canadian Mining Regulations — Alternate Claims Reserved for the Crown—The Levying of Royalties—Chartering of Companies in the Northwest Territories—Fees for Incorporation—Application of the United States Land Laws to Alaska—The Mining Acts of 1866 and 1872—The Miners' Meetings—Size and Location of Claims—The Camp Recorder and His Fees.

MINING has been going on along the Yukon for a good many years, and but little attention has been paid to the statutes covering claims. There has been room for all, a few rudely-framed rules were established and in general observed, and for the rest might gave right. The United States Government has never until quite recently shown any disposition to enforce laws of any kind in the Alaskan interior. Naturally the mining code of the United States has played but an insignificant rôle along the Birch and other gold-producing waters. The same is true of the territory on the Canadian side of the boundary line. The Dominion Mining Laws, enacted in 1889, were nominally in force within a very recent date, but as no provisions were made to carry out their various clauses, they have been honored more in the breach than in the observance. However, when the great finds along the Klondike and other Canadian waters became known, the Dominion officials saw fit to revise these laws and also to provide

for their enforcement. No restrictions have been placed upon Americans in working claims upon Canadian soil, and, unless some change is made later on, the American citizen on the Klondike will work on an equal footing with subjects of the Queen. Gold and silver mines have always been looked upon as the property of the sovereign by virtue of the royal prerogative. Acting on this principle, it has been the disposition of most states to treat gold and silver mines as public property, and a part of the natural domain worked by the state on its own account or granted by the state to individuals to be worked by them under certain restrictions.

In order to carry out the newly-promulgated laws, the Canadian Government has established at Ft. Cudahy a Gold Commissioner invested with extraordinary powers. In order to strengthen his hands in carrying on the arduous duties of his post, the force of Mounted Police in the district has been materially strengthened.

Copies of the regulations now in force along the Yukon River and its tributaries in the Northwest Territories of the Dominion of Canada, with such changes as may be made in them from time to time, can be obtained by applying to the Department of the Interior, Ottawa, Ontario; or to the Gold Commissioner, at Fort Cudahy, Yukon District, Northwest Territories, Canada.

These laws, as they now stand, read as follows:

"INTERPRETATION.

"'Bar diggings' shall mean any part of a river over which the water extends when the water is in its flooded state, and which is not covered at low water.

"Mines on benches shall be known as bench diggings, and shall for the purpose of defining the size of such claims be excepted from dry diggings.

"'Dry diggings' shall mean any mine over which a river never extends.

"'Miner' shall mean a male or female over the age of eighteen, but not under that age.

"'Claims' shall mean the personal right of property in a placer mine or diggings during the time for which the grant of such mine or diggings is made.

"'Legal post' shall mean a stake standing not less than four feet above the ground and squared on four sides for at least one foot from the top. Both sides so squared shall measure at least four inches across the face. It shall also mean any stump or tree cut off and squared or faced to the above height and size.

"'Close season' shall mean the period of the year during which placer mining is generally suspended. The period to be fixed by the gold commissioner in whose district the claim is situated.

"'Locality' shall mean the territory along a river (tributary of the Yukon) and its affluents.

"'Mineral' shall include all minerals whatsoever other than coal.

"NATURE AND SIZE OF CLAIMS.

"*First.* Bar diggings: A strip of land one hundred feet wide at high-water mark and thence extending along into the river to its lowest water level.

"*Second.* The sides of a claim for bar diggings shall

be two parallel lines run as nearly as possible at right angles to the stream, and shall be marked by four legal posts, one at each end of the claim at or about high-water mark, also one at each end of the claim at or about the edge of the water. One of the posts at high-water mark shall be legibly marked with the name of the miner and the date upon which the claim is staked.

"*Third.* Dry diggings shall be one hundred feet square, and shall have placed at each of its four corners a legal post, upon one of which shall be legibly marked the name of the miner and the date upon which the claim was staked.

"*Fourth.* Creek and river claims shall be 500 feet long, measured in the direction of the general course of the stream, and shall extend in width from base to base of the hill or bench on each side, but when the hill or benches are less than 100 feet apart, the claim may be 100 feet in depth. The sides of a claim shall be two parallel lines run as nearly as possible at right angles to the stream. The sides shall be marked with legal posts at or about the edge of the water, and at the rear boundaries of the claim. One of the legal posts at the stream shall be legibly marked with the name of the miner and the date upon which the claim was staked.

"*Fifth.* A bench claim shall be 100 feet square, and shall have placed at each of its four corners a legal post upon which shall be legibly marked the name of the miner and the date upon which the claim was staked.

"*Sixth.* Entry shall only be granted for alternate claims, the other alternate claims being reserved for the

crown, to be disposed of at public auction, or in such manner as may be decided by the Minister of the Interior.

"The penalty for trespassing upon a claim reserved for the Crown shall be immediate cancellation by the Gold Commissioner of any entry or entries which the person trespassing may have obtained, whether by original entry or purchase for a mining claim, and the refusal by the Gold Commissioner of the acceptance of any application which the person trespassing may at any time make for a claim. In addition to such penalty, the mounted police, upon a requisition from the Gold Commissioner to that effect, shall take the necessary steps to eject the trespasser.

"*Seventh.* In defining the size of claims, they shall be measured horizontally, irrespective of inequalities on the surface of the ground.

"*Eighth.* If any person or persons shall discover a new mine, and such discovery shall be established to the satisfaction of the Gold Commissioner, a claim for the bar diggings 750 feet in length may be granted.

"A new stratum of auriferous earth or gravel situated in a locality where the claims are abandoned shall, for this purpose, be deemed a new mine, although the same locality shall have previously been worked at a different level.

"*Ninth.* The forms of application for a grant for placer mining and the grant of the same shall be those contained in forms 'H' and 'I' in the schedule hereto attached.

"*Tenth.* A claim shall be recorded with the Gold Commissioner in whose district it is situated within three days after the location thereof, if it is located within ten miles of the commissioner's office. One extra day shall be allowed for making such record for every additional ten miles and fraction thereof.

"*Eleventh.* In the event of the absence of the Gold Commissioner from his office, entry for a claim may be granted by any person whom he may appoint to perform his duties in his absence.

"*Twelfth.* Entry shall not be granted for a claim which has not been staked by the applicant in person, in the manner specified in these regulations. An affidavit that the claim was staked out by the applicant shall be embodied in form 'H' of the schedule hereto attached.

"*Thirteenth.* An entry fee of $15 shall be charged the first year and an annual fee of $100 for each of the following years. This provision shall apply to the locations for which entries have already been granted.

"*Fourteenth.* A royalty of ten per cent. on the gold mined shall be levied and collected by the officers to be appointed for the purpose, provided the amount so mined and taken from a single claim does not exceed five hundred dollars per week. In case the amount mined and taken from any single claim exceeds five hundred dollars per week, there shall be levied and collected a royalty of ten per cent. upon the amount so taken out up to five hundred dollars, and upon the excess, or amount taken from any single claim over five hundred dollars per week, there shall be levied and col-

TEN THOUSAND SEALS.

lected a royalty of twenty per cent., such royalty to form part of the consolidated Revenue, and to be accounted for by the officers who collect the same in due course. The time and manner in which such royalty shall be collected, and the person who shall collect the same, shall be provided for by regulations to be made by the Gold Commissioner.

Default in payment of such royalty, if continued for ten days, after notice has been posted upon the claim in respect of which it is demanded, or in the vicinity of such claim, by the Gold Commissioner or his agent, shall be followed by cancellation of the claim. Any attempt to defraud the Crown by withholding any part of the revenue thus provided for, by making false statements of the amount taken out, shall be punished by cancellation of the claim in respect of which fraud or false statements have been committed or made. In respect of the facts as to such fraud or false statements or non-payment of royalty, the decision of the Gold Commissioner shall be final.

"*Fifteenth.* After the recording of a claim, the removal of any post by the holder thereof, or any person acting in his behalf, for the purpose of changing the boundaries of his claim, shall act as a forfeiture of the claim.

"*Sixteenth.* The entry of every holder for a grant for placer mining must be renewed, and his receipt relinquished and replaced every year, the entry fee being paid each year.

"*Seventeenth.* No miner shall receive a grant for more than one mining claim in the same locality; but the same

miner may hold any number of claims by purchase, and any number of miners may unite to work their claims in common upon such terms as they may arrange, provided such agreement be registered with the Gold Commissioner and a fee of $5 paid for each registration.

"*Eighteenth.* Any miner or miners may sell, mortgage, or dispose of his or their claims, provided such disposal be registered with and a fee of $2 paid to the Gold Commissioner, who shall thereupon give the assignee a certificate in form "J" in the schedule hereto attached.

"*Nineteenth.* Every miner shall, during the continuance of his grant, have the exclusive right of entry upon his own claim for the miner-like working thereof and the construction of a residence thereon, and shall be entitled exclusively to all the proceeds realized therefrom; but he shall have no surface rights therein, and the Gold Commissioner may grant to the holders of adjacent claims such rights of entry thereon as may be absolutely necessary for the working of their claims upon such terms as may to him seem reasonable. He may also grant permits to miners to cut timber thereon for their own use upon payment of the dues prescribed by the regulations in that behalf.

"*Twentieth.* Every miner shall be entitled to the use of so much of the water naturally flowing through or past his claim, and not already lawfully appropriated, as shall in the opinion of the Gold Commissioner, be necessary for the due working thereof, and shall be entitled to drain his own claim free of charge.

Twenty-first. A claim shall be deemed to be aban-

doned and open to the occupation and entry by any person when the same shall have remained unworked on working days by the grantee thereof or by some person on his behalf for the space of seventy-two hours, unless sickness or other reasonable cause may be shown to the satisfaction of the Gold Commissioner, or unless the grantee is absent on leave given by the Commissioner, and the Gold Commissioner, upon obtaining evidence satisfactory to himself that this provision is not being complied with, may cancel the entry given for a claim.

"*Twenty-second.* If the land upon which a claim has been located is not the property of the Crown, it will be necessary for the person who applies for entry to furnish proof that he has acquired from the owner of the land the surface right before entry can be granted.

"*Twenty-third.* If the occupier of the land has not received a patent therefor, the purchase-money of the surface rights must be paid to the Crown, and a patent of the surface rights will issue to the party who acquired the mining rights. The money so collected will either be refunded to the occupier of the land when he is entitled to a patent therefor, or will be credited to him on account of payment for land.

"*Twenty-fourth.* When the party obtaining the mining rights cannot make an arrangement with the owner thereof for the acquisition of the surface rights, it shall be lawful for him to give notice to the owner or his agent, or the occupier, to appoint an arbitrator to act with another arbitrator named by him in order to award

the amount of compensation to which the owner or occupant shall be entitled. The notice mentioned in this section shall be according to form, to be obtained upon application from the Gold Commissioner for the district in which the lands in question lie, and shall, when practicable, be personally served on such owner or his agent, if known, or occupant, and after reasonable efforts have been made to effect personal service without success, then such notice shall be served upon the owner or agent within a period to be fixed by the Gold Commissioner before the expiration of the time limited in such notice. If the proprietor refuses or declines to appoint an arbitrator, or when, for any other reason, no arbitrator is appointed by the proprietor in the time limited therefor in the notice provided by this section, the Gold Commissioner for the district in which the lands in question lie shall, on being satisfied by affidavit that such notice has come to the knowledge of such owner, agent, or occupant, or that such owner, agent, or occupant, willfully evades the service of such notice, or cannot be found, and that reasonable efforts have been made to effect such service, and that the notice was left at the last place of abode of such owner, agent, or occupant, appoint an arbitrator on his behalf.

"*Twenty-fifth.* (a) All arbitrators appointed under the authority of these regulations shall be sworn before a Justice of the Peace to the impartial discharge of the duties assigned to them, and they shall forthwith proceed to estimate the reasonable damages which the owner or occupant of such lands according to their several inter-

ests therein shall sustain by reason of such prospecting and mining operations.

"(b) In estimating such damages the arbitrators shall determine the value of the land, irrespectively of any enhancement thereof from the existence of mineral therein.

"(c) In case such arbitrators cannot agree they may select a third arbitrator, and when the two arbitrators cannot agree upon a third arbitrator the gold commissioner for the district in which the lands in question lie shall select such third arbitrator.

"(d) The award of any two such arbitrators made in writing shall be final, and shall be filed with the gold commissioner for the district in which the lands lie.

"If any cases arise for which no provision is made in these regulations, the provisions of the regulations governing the disposal of mineral lands other than coal lands, approved by his Excellency the Governor in council on the 9th of November, 1889, shall apply."

The following is the form which a certificate of assignment of a placer claim assumes:

"Form 'J.'

"No. ——.

"DEPARTMENT OF THE INTERIOR.

"AGENCY, ———, 18—.

"This is to certify that (B. C.) has (or have) filed an assignment in due form dated ——— 18—, and accompanied by a registration fee of two dollars, of the grant to ——— (A. B.) of ———, of the right to mine in ——— (insert description of claim) for one year from ———, 18—.

"This certificate entitles the said ——— (B. C.) to all rights and privileges of the said ——— (A. B.) in respect of the claim assigned—that is to say, the exclusive right of entry upon the said claim for the miner-like working thereof, and the construction of a residence thereon, and the exclusive rights to all proceeds therefrom for the remaining portion of the year for which said claim was granted to the said ——— (A. B.)—that is to say, until the ———, 18—.

"The said ——— (B. C.) shall be entitled to the use of so much of the water naturally flowing through or past his (or their) claim, and not already lawfully appropriated, as shall be necessary for the due working thereof, and to drain the claim free of charge.

"This grant does not convey to the said ——— (B.C.) any surface rights in said claim or any rights of ownership in the soil covered by the said claim, and the said grant shall lapse and be forfeited unless the claim is continually and in good faith worked by the said (B. C.) or his (or their) associates.

"The rights hereby granted are those laid down in the Dominion Mining Regulations, and are subject to all provisions of the said regulations, whether the same are expressed herein or not.

"———————,

"*Gold Commissioner.*"

A specimen application blank for grant for placer claim and affidavit of applicant is as follows:

"Form H.

"I, (or we) of ———, hereby apply under the Do-

minion Mining Regulations for grant of a claim for placer mining as defined in the said regulations in ——— (here describe locality), and I (or we) solemly swear:

"*First.* That I (or we) am (or are) to the best of my (or our) knowledge and belief the first discoverer (or discoverers) of the said deposit; or,

"*Second.* That the said claim was previously granted to ———(here name the last grantee), but has remained unworked by the said grantee for not less than ———.

"*Third.* That I (or we) am (or are) unaware that the land is other than vacant Dominion lands.

"*Fourth.* That I (or we) did on the ——— day of ——— mark out on the ground in accordance in every particular with the provisions of the mining regulations for the Yukon River and its tributaries the claim for which I (or we) make this application, and that in so doing I (or we) did not encroach on any other claim or mining location previously laid out by any other person.

"*Fifth.* That the same claim contains as nearly as I (or we) could measure or estimate an area of ——— square feet, and that the description (and sketch, if any) of this date hereto attached signed by me (or us) sets (or set) forth in detail to the best of my (or our) knowledge and ability its position, form, and dimensions.

"*Sixth.* That I (or we) make this application in good faith to acquire the claim for the sole purpose of mining, prosecuted by myself (or us), or by myself and associates, or by my (or our) assigns.

"Sworn before me ———, at ——— this ——— day of ———, 18—.

(Signature.) "——— ———"

A grant for a placer claim reads thus:

"Form 'I.'

"DEPARTMENT OF THE INTERIOR,

"AGENCY, ———, 18—

"In consideration of the payment of the fee prescribed by clause 12 of the mining regulations of the Yukon River and its tributaries by ——— (A. B.), accompanying his (or their) application No. ———, dated ———, 18—, for a mining claim in ——— (here insert description of locality), the Minister of the Interior hereby grants to the said ——— (A. B.), for the term of one year from the date hereof, the exclusive right of entry upon the claim (here describe in detail the claim).

"GRANTED, For the miner-like working thereof and the construction of a residence thereon, and the exclusive right to all the proceeds derived therefrom. That the said ——— (A. B.) shall be entitled to the use of so much water naturally flowing through or past his (or their claim, and not already lawfully appropriated, as shall be necessary for the due working thereof, and to drain his (or their) claim free of charge.

"This grant does not convey to the said ———(A.B.) any surface right in the said claim or any right of ownership in the soil covered by the said claim, and the said grant shall lapse and be forfeited unless the claim is continuously and in good faith worked by the said ——— (A. B.) or his (or their) associates.

"The rights hereby granted are those laid down in the aforesaid mining regulations and no more, and are sub-

ject to all the provisions of the said regulations, whether the same are expressed herein or not.

"——— ———,

"*Gold Commissioner.*"

The local government of the Northwest Territories, now having a standing as a representative part of the Dominion of Canada, is in the hands of a legislative assembly. The territorial assembly is empowered to incorporate companies with purely territorial objects, except railway, steamship, canal, transportation, telegraph, insurance, and street railway companies. Applications for charters for companies not coming within the classes thus excepted must be made directly to the Dominion Government.

Those companies which are incorporated by the territorial government are licensed to do business by the issue of letters patent given by the lieutenant-governor under a general enactment known as "The Companies' Ordinance," which is about the same thing as "The Companies' Act," of the Dominion Parliament. The stipulations of the territorial law not held in common with that of the Dominion are as follows:

1. The number of applicants for charters must be at least three.

2. One month's notice must be given in the *Territorial Gazette*, and in the local news sheets which are published nearest to the chief place of business of the company in the territories.

3. The petition may be presented at any time within two months from the last publication of the notice.

4. The number of directors shall not be less than three, nor more than nine.

The fees which the territorial enactment call for upon the issuing of letters patent or upon the filing by a foreign corporation of its charter are as follows:

When capital stock is $400,000 and upwards, $200; when capital stock is $200,000 and under $400,000, $150; when capital stock is $100,000 and under $200,000, $100; when capital stock is $50,000 and under $100,000, $50; when capital stock is $40,000 and under $50,000, $40; when capital stock is $10,000 and under $40,000, $30; when capital stock is under $10,000, $20—in addition to advertising charges.

All joint stock companies and corporations other than those incorporated under it or by the Parliament of Canada, or insurance companies licensed thereby, shall, before proceeding to do business in the territories, file in the office of the lieutenant-governor a certified copy of its charter of incorporation authenticated as such by its president and secretary, failing in which said company shall incur a penalty of $500, to be recovered at the suit of the lieutenant-governor in any civil court in the territories.

The public land laws of the United States do not apply to Alaska, and neither do the coal land regulations, which are distinct from the mineral regulations. The Territory of Alaska is expressly excluded from the operations of the public land and coal laws by provisions of the laws themselves. The Hon. Bruger Hermann, Commissioner of the United States General Land Office, has

authorized the statement that the following laws are applicable to the territory:

First. The mineral land laws of the United States.

Second. Town-site laws, which provide for the incorporation of town sites and acquirement of title thereto from the United States Government by the town-site trustees.

Third. The laws providing for trade and manufactures, giving each qualified person 160 acres of land in a square and compact form.

The territories have no title to the unappropriated minerals in the public lands. Prior to the Act of Congress of July 26, 1866, the United States had not done anything which amounted to a dedication to the public of the minerals in the public lands. Congress, prior to 1866, passed some acts reserving mineral lands from sale, but did nothing else in regard to the mineral lands. In July, 1866, a general act was passed, throwing open to exploration and purchase by any citizen of the United States, or anyone who has declared his intention to become such, all the mineral lands in the public domain. This act, in connection with one passed the following year, created three distinct classes of titles: (1) a title by right of possession, which is the lowest grade of title known to the mineral laws; (2) the equitable title, which accrues upon purchase and entry; and (3) the fee simple, which is acquired by patent.

The original act provided that the mineral lands should be open to exploration and purchase by all citizens of the United States and those who have declared their inten-

tion to become such. In this point of citizenship being requisite to the exercise of their right, there has been no change in the law.

No where in any of the various United States or State codes is any distinction made on account of age or sex, and the female, who comes within the terms of the law, is capable of making a valid location as also is a minor.

The right to mine can be given, whether by State or federal laws, only in public lands. When the lands have become the property of an individual, the government's right over them is gone.

There are in the United States three sources of binding regulations as regards mines and mining: (1) the Federal laws, as enacted by Congress; (2) the State and Territorial laws, as enacted by the State and Territorial legislatures; and (3) the community laws, as enacted by a miners' meeting. They take precedence in the order named. Up to 1866, all mineral lands were held by virtue of compliance with the third class named. There were no absolute titles recognized by the Government. In other words, there were no mineral lands, prior to 1866, which had passed beyond the control of the Government. The act of 1866 gave practical recognition to the laws of the miners' community, and titles were issued accordingly. The regulations of the community are still recognized as being official.

The character of the mineral lands open to exploration was not designated by the Act of 1866, but in 1872 an act was passed stipulating that it must contain "valu-

able mineral deposits." Non-mineral lands may be located as mill sites, either in connection with a lode location or separate therefrom, but only to the extent of ten acres. Mineral lands are not subject to entry and settlement under the homestead acts. The statutes define a placer to be any form of deposit, except veins of quartz or other rock in place. Where a person is in possession of a placer claim, which includes one or more lodes or veins, he must, in his application for a patent, state that fact, or the lodes will be excluded from his patent, provided that they are known to exist at the time of such application. If they are not known to exist at the time, then the patent for the placer ground will convey all the mineral and other deposits within the boundaries thereof. If made on surveyed lands, the location must conform to the United States surveys as near as possible; but where they cannot be so made, a survey and plat may be made as on unsurveyed lands.

In many of the codes it is stipulated that the vein or lode must not only be located, but laid bare, exposed to view, and this for some distance along its course.

Under the Act of 1866, no single locator could claim more than two hundred feet on the same vein, except that an additional two hundred feet was allowed to the discoverer of the vein, nor should a patent issue for more than one vein or lode. No association or persons, however large, could take up more than three thousand feet on any one ledge.

The Act of 1872, changed this by providing that no claim located after that date should exceed fifteen hun-

dred feet along the middle of the vein at the surface, nor should it exceed in width three hundred feet. It further provided that no mining regulation should ever limit the width of the location to less than twenty-five feet on each side of the middle of the vein.

Most of the states and territories have cut down the Federal figures on the size of claims and in some states, notably Colorado, they vary with the different camp. It is not necessary that the vein should lie along the middle of the claim. It is a miner's trick to make the vein almost form the boundary on one side, and by so doing another vein on the opposite side can thus be brought within the boundary of the claim.

A valid location of a mining claim can be made only when the ground is open to exploration and appropriation. Discovery and appropriation are the sources of right and development the condition of continued possession. In taking up a claim usually one hundred dollars worth of work must be done before the miner gets a standing in the eyes of the miners' community. This amount of work must be done each succeeding year until the patent is granted. This is supposed to show his good intentions. The digging of a hole ten feet deep in most settlements is taken as a guarantee of good faith. This amount of work done, the claim can be recorded on the camp's record books. A year from this date must elapse before application can be made to the Federal Government for letters patent. In the meantime five hundred dollars worth of work must have been put in on the claim. Application for letters having been made

the surveys are made by the Federal authorities, and every chance given for contesting the validity of the claim before the miner enters upon his undisputed possession.

The certificates of location issued by the camp recorder—an official elected by the miners' meeting, are presumptive evidence of discovery, and every reasonable presumption should be indulged in in favor of the integrity of the locations.

All that is required by the acts of congress is that the location shall be along the vein or lode; that it shall be distinctly marked on the ground so that its boundaries can be readily traced; that the record shall contain such description by reference to some natural object or permanent monument as will identify the claim, and that all the lines shall be parallel. All other details are left to be governed by the rules and regulations of the miners in each district, which are valid and effectual if not inconsistent with the act of congress or any State law.

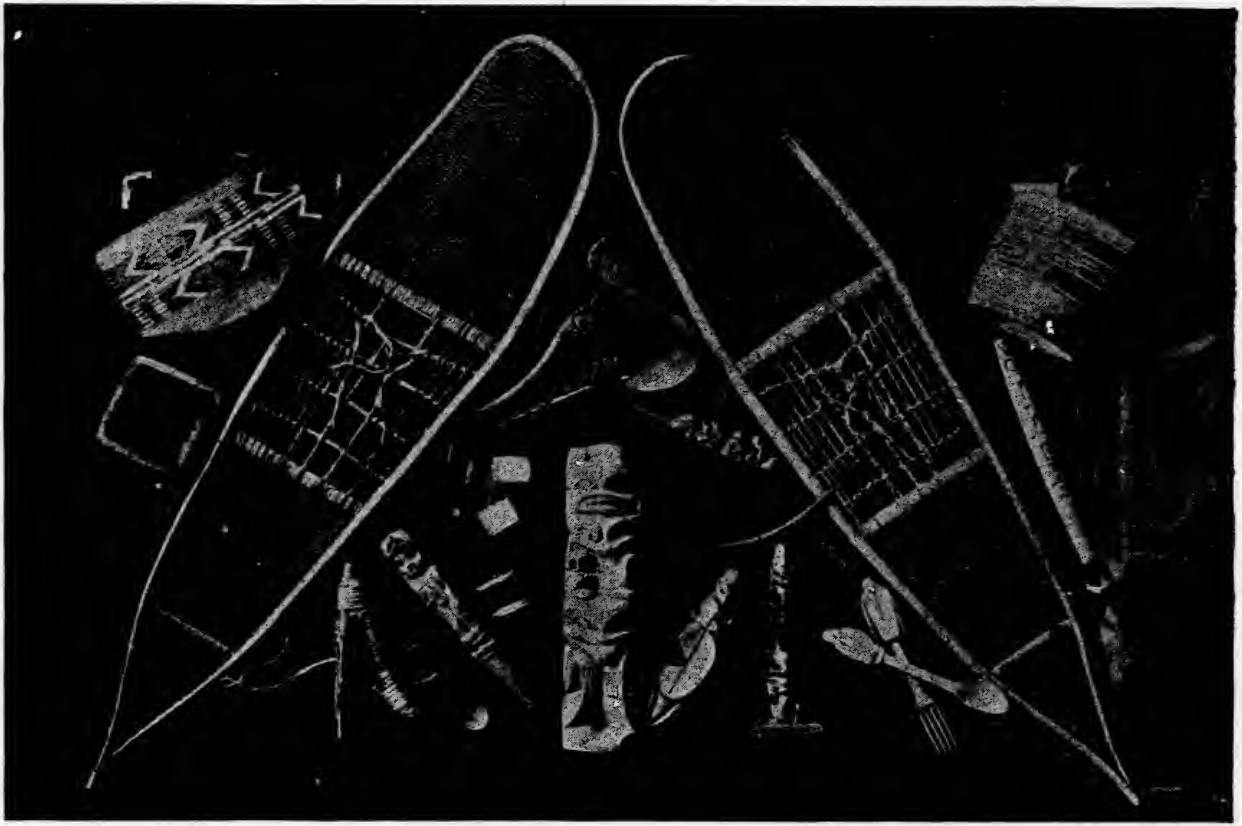
The acts of congress do not require that any notice shall be posted on the claim, only that one shall be recorded. But all rules and regulations of miners and the statutes of most states and territories do require the posting of such notice on the ground as well as its record in the proper office. The verification of the location notice must state the date of the location of the mine.

While the acts of congress do not expressly require a record of a mining location, they provide that all records, if such exist or are required by any mining regulation,

shall contain the name or names of the locators, the date of the location and such description of the claim located by reference to some natural object or permanent monument as will identify the claim. As has been stated, the miners in each district may enact additional requirements which shall nowise infringe on the laws of the state or nation. In all mining districts calls for meetings must be signed by at least six miners.

It is further provided in the statutes that any one running a tunnel for the development of a vein or for the discovery of mines, shall have the same right of possession of all veins or lodes on the line of each tunnel within three thousand feet of the face thereof, which shall be discovered on such tunnel and which were not previously known to exist, as if the discovery was made from the surface. If other parties shall, while such tunnel is being prosecuted with reasonable diligence, locate on the line of such tunnel, any vein not appearing on the surface, such location shall be invalid. A failure for six months to prosecute work on the tunnel constitutes an abandonment of all undiscovered veins on the line thereof.

The question of abandonment is principally one of intention, whether the ground was left by the locator without any intention of returning and making a future use of it. Forfeiture means the loss of a previously acquired right to mine certain ground, by a failure to perform certain acts or observe certain rules, and differs from abandonment in that it involves no question of intent. A failure to perform the annual work required by statute works a forfeiture of the mining claim, and the same



KLONDIKE INDIAN CURIOS.

becomes open to re-location, unless the original locators, heirs, assigns or legal representatives, resume work upon such claim before a re-location has been made. A failure to comply with local rules or customs works a forfeiture, if the local rules so provide. To suffer tailings to run away, without any effort to retain or confine them, constitutes an abandonment of them.

Where the owner of a mining claim has failed to comply with the statutory requirements, or the claim is forfeited by reason of non-observance of any local rule or custom, the same is subject to re-location.

Any person may then enter peaceably upon the claim for the purpose of making a location thereof, unless the original claimant has resumed work thereon.

A re-location is made in the same manner as an original location. And the re-locator of an abandoned mining claim has the same time to perform the acts required by law or custom as the original locator had. A re-location is an admission of the validity of the original claim, and also a claim of forfeiture, as to the original locator. A party may, under proper circumstances, re-locate his own claim, or that which he holds in common with others.

Priority of location confers the better title; where both parties rely on possession alone, priority of possession gives the better right.

Where veins intersect or cross each other, the prior locator shall be entitled to all ore or mineral contained within the space of intersection, the subsequent locator being entitled to a right of way through said space;

where two or more veins unite, the oldest location takes the vein below the point of union, including all the space of intersection.

Those who have created a mining district may change its size or boundaries if vested rights are not thereby affected. A mining corporation may be represented at meetings in mining districts by any of its officers or its agents.

One who has made location in accordance with law is entitled, so long as he complies with the laws of the United States and with State, territorial and local regulations not in conflict threewith, to the exclusive right of possession and enjoyment of all the surface included within the lines of his location, and all veins, lodes and ledges throughout their entire depth, the top or apex of which lies inside of such surface lines extended downward vertically, although such veins, lodes, or ledges may so far depart from a perpendicular in their downward course as to extend outside of the side lines of the location, but such rights shall not be extended beyond the end lines of the location projected in their own direction till they intersect the veins or ledges. This is called the apex rule.

Until a patent issues, the fee to mineral lands in the public domains remains in the United States. But any person coming within the provision of the acts of Congress acquires a right to purchase them from the government by complying with those acts.

The applicant for a patent must file an application under oath in the proper land office, showing a compli-

ance with the law, together with a plat and field notes, made by or under direction of the United States surveyor-general, of the claim or claims, and shall post a copy of the plat, together with a notice of the application, on the land; he must file an affidavit of the posting of such notice and a copy of the notice itself in the land office. The register of the land office shall post the notice in his office for sixty days, and shall publish it for the same period in the newspaper nearest to the claim.

The claimant must also file with the register the surveyor-general's certificate that $500 worth of labor has been expended or improvements made upon the claim by the applicant or his grantors.

At the end of sixty days the applicant shall be entitled to a patent upon payment of $5 an acre, if the claim is for a lode location, and $2.50 an acre if for a placer location, unless during said sixty days an adverse claim shall have been lodged with the register and receiver of the land office in which the application is filed; after which time no objection to the issuance of the patent made by third parties shall be heard. Any adverse claims must be filed within the sixty days, and must be under oath of the adverse claimant. Thereupon proceedings shall be stayed until the controversy shall have been settled by a court of competent jurisdiction.

The adverse claimant must, within thirty days after filing his adverse claim, commence proceedings in a court of competent jurisdiction to determine his rights, and prosecute the same, with reasonable diligence, to find judgment, or his claim will be deemed as void. The

party in whose favor judgment is rendered shall, upon filing a copy of the judgment roll with the register, and complying with the other provisions for obtaining a patent, be entitled to a patent for the claim or such portion thereof as the decision of the court shows him entitled to. These sections do not apply where a person, before the required publication has gone through all the regular proceedings required, to obtain a patent for mineral land and has received his patent.

The transferable character of mining locations has always been recognized by the courts and the title of the grantee enforced. It is not necessary that the transfer should be in writing, as a transfer of the possession is sufficient, except in those States that have statutes requiring that the conveyance must have the same form and solemnity as the conveyance of any other real estate. The patent is also assignable. There is no implied warranty in the sale of a mining claim.

The following definitions of mining terms are recognized by the statutes:

ORE—Minerals in natural condition.

LODE OR VEIN—A flattened mass of metallic or earthy matter, differing materially in its nature from the rocks or strata in which it occurs; a fissure in the earth's crust filled with mineral matter, or aggregations of mineral matter, containing ores in fissures. The term, as used in the acts of Congress, is applicable to any zone or belt of mineralized rock lying within boundaries clearly separating it from the neighboring rock. The words vein, lode and ledge are nearly synonymous.

A MINE is a way or passage underground, a subterranean duct course or passage, and is distinguished from a "quarry," which is a pit wrought from the surface.

FACE OF TUNNEL—This term, as used in section 2323 of the Revised Statutes, is held to be the first working face formed in the tunnel, and to signify the point at which the tunnel actually enters cover.

LOCATION AND MINING CLAIM—These terms do not always mean the same thing. A mining claim is a parcel of land containing precious metal in its soil or rock. A location is the act of appropriating such parcel according to certain established rules. But, in time, the location came to be considered among miners as synonomous with the mining claim originally appropriated. A mining claim may include one or several locations.

APEX—The end or edge of a vein nearest the surface.

LEVEL—The word, as used in mining, means a working, and is not necessarily a plane.

DIP—The direction or inclination towards the depth.

ALONG THE VEIN—Along the longitudinal course or strike.

PLACER CLAIM—Ground within defined boundaries which contains mineral in its earth, sand or gravel; ground that includes valuable deposits not in place—that is, not fixed in rock, but which are in a loose state, and may, in most cases, be collected by washing or amalgamation without milling.

The act approved May 17, 1884, providing a civil government for Alaska, has this language as to mines and mining privileges:

"The laws of the United States relating to mining claims and rights incidental thereto shall, on and after the passage of this act, be in full force and effect in said district of Alaska, subject to such regulations as may be made by the Secretary of the Interior and approved by the President."

"Parties who have located mines or mining privileges therein, under the United States laws applicable to the public domain, or have occupied or improved or exercised acts of ownership over such claims, shall not be disturbed therein, but shall be allowed to perfect title by payment so provided for."

In the Klondike country the claim is generally 500 feet for gulch diggings from rimrock to rimrock; but in some gulches not paying well an effort is being made to stake claims 1,320 feet long. Crowded creeks, too, are staked 300 feet to the claim, and no man is allowed to stake more than one claim in his own name, save the discoverer, who is allowed 1,000 feet.

As to the size and boundary of districts, it has been the custom along the Yukon to consider each tributary stream as a separate district, and for each such district one recorder is elected. He is paid for his services by the collection of fees. Formerly, the fee for each record made was $5, but this has recently been raised to $15.

CHAPTER X.

THE NATIVE POPULATION.

Dark-skinned People Found by the Miner in the Frozen North—Eskimo, Athabascan and Thlinget—Uncertainty About the Origin of the Innuits—The Language and Customs of a Curious Race—Strange Modes of Life Near the Arctic Circle—The Mysteries of the Totem Pole—Dead Houses of the Stick Indians—Miners of Gold who Knew the Klondike Field Long Before the White Man Entered the Land.

THE native population of Alaska has an interesting and romantic history, but much of it is shrouded in a mystery unusual, even in the case of a barbaric and ignorant race. It seems probable that the Innuits are of Asiatic origin, but authorities differ on this point. Professor Dall, in his work on the distribution and origin of the native races of the Northwestern territory, states his belief that the Alaska Innuits once inhabited the interior of America and that they slowly retreated to their present residence before the inroads of Southern tribes.

Mr. L. M. Turner, who spent many years among the islands of the Bering Sea and along the coast, in his report to the Smithsonian Institute takes the ground that the Innuits or Eskimo are of the same race as the natives of Greenland, and he finds no difficulty in tracing the relationship.

Professor Otis T. Mason, in common with many other

authorities, asserts that the Alaska Innuits are of Mongolian origin, as shown by their physical as well as mental developments.

Dr. Daniel G. Brinton, the well-known authority of Philadelphia, in commenting on the last stated view, says: "A favorite theory of some writers has been that they migrated out of Asia by way of Bering Sea, but those who have studied their culture on the spot do not advocate this opinion. These observers have, without exception, reached the conclusion that the Innuits were originally an inland people, that their migrations were toward the North and West, and that they have been gradually forced to the inhospitable climes they occupy by the pressure of foes. Dr. Rink, who passed many years among them, would look for their early home elsewhere in Alaska, but Mr. John Murdock and Dr. Franz Boas, two of our best authorities on this tribe, incline to the view that their primal home was to the south of Hudson Bay, whence they separated into three principal hordes, the one passing into Labrador and reaching Greenland, the second moving to the Arctic Sea and the third to Alaska. These form respectively the Chiglit, Greenland and Cadjak dialects of the common tongue."

The Alaska Innuits are, at this time, essentially a maritime and Arctic people, occupying the coast and adjacent islands from the Straits of Belle Isle, on the Atlantic, to Icy Bay, at the foot of Mount St. Elias, on the Pacific, and extending their wanderings and settlements as far up as 80 degrees north latitude, where they

are by far the northernmost inhabitants of the earth. From the reports of the early Norse explorers, and from the character of relics found on the Atlantic Coast, it does not seem improbable that they once extended as far south as the mouth of the Delaware River.

In appearance the Innuits of pure blood are of medium or slightly undersize, dark in color, the nose prominent and sometimes aquiline, hair dark brown or black, moderately strong on the face, and the eyes are dark brown and occasionally blue. The skull is generally long, but is subject to extensive variations, ranging from almost globular to exceptionally long and narrow specimens.

In spite of the hardships of their life, the Innuits are of a singularly placid and cheerful temperament, good-natured among themselves and much given to mirth and laughter. The ingenuity with which they have learned to overcome difficulties of their situation is quite surprising. In a country where wood and water are scarce, the temperature very low much of the time, and yielding for them no edible fruit or vegetable, they manage to live and thrive. Their principal source of supply is the sea. They build boats called kayaks, which are made from the bones of the walrus and seal skin. Their winter houses are of blocks of snow, laid up in arch shape to form a dome. In some instances they have been shrewd enough to form windows with sheet ice. These homes are warmed by means of stone lamps, fed with blubber oil. They clothe themselves in bird skins and furs, and they show much skill in the preparation of

a sort of leather. Dogs are plentiful among the Innuits, and are useful both as beasts of burden and for hunting. With their tools of bone and stone, the Indians fashion many curious and useful articles, displaying some inventive faculty and an eye not wholly devoid of artistic qualities. Most authorities regard their picture writing as far superior to other similar work found north of Mexico, in the delineation of objects of all kinds, and especially in the matter of animal forms.

In the winter, when the Indians are confined much to their houses, they amuse themselves with music and song, of which they are very fond. They also have a large stock of imaginative tales and some of the usual Indian legends. A gifted singer enjoys great popularity, as does the story-teller. Some of the poems known today among these Indians are believed to be of great antiquity. As is the case with other tribes of the Indian race, their singing is not regarded by the white man as melodious, but that is a matter of opinion. As a fact, showing how strong a hold song has upon the hearts of this strange tribe, it is told that when trouble occurs between these individuals or families, instead of settling differences by physical means, a kind of singing-bee is held. An evening is appointed, and the aggrieved parties sing at each other in the presence of an invited audience. At the close, the latter decides in favor of one or the other, and the verdict ends the trouble.

For their religion, these people have a belief in a Supreme being and in a great army of inferior spirits,

and also a long list of evil monsters. They worship the former and endeavor to propitiate the latter. They believe that each individual is endowed with two souls, one of which is irrevocably connected with this earth and passes from father to son. The other soul goes at death to either a good land within the earth or a bad one in the sky, thus reversing the usual order. The lights of the aurora borealis, so familiar to the Eskimo, are believed to be signs of the presence of spirits in the world beyond. These people have authorized priests, who occupy a place somewhat similar to the sorcerers and conjurers of the Orient. The language of these Indians is highly agglutinative, the affixes being joined to the end of the word. The verb is most complex, having over 3,000 modified forms, each one different from the others and all invariable. It is like the Greek in its three numbers—singular, dual and plural.

The Aleutian branch of this race occupies the long chain of islands of that name. It is now a certainty that this race here and elsewhere is dying out, There are now only 14,000 of them in Alaska, whereas in the last century the island district alone had some 30,000 souls. Statistics show that the average number of children resulting from each marriage is only two, and it requires double this number to keep a population stationary.

The Eskimo are by far the largest race of Indians in Alaska, but there are also two other important tribes, and these in turn are divided into several classes. The Athabascans, familiarly known as the Stick Indians, are

the interior inhabitants, and they number in all only 3,439. The Thlingets, numbering 4,737, occupy the southern coast country for the most part, but some of them have followed the gold seekers to the interior, as have also the Eskimo.

The Chilcoot Indians, who pack him over the pass bearing their name, are but an offspring of the Chilcats, one of the most powerful of the Thlinget tribe. After taking up the line of travel down the lakes, from Lindeman to the Yukon, the miner's only native companions are the Sticks. They predominate on the Yukon numerically and in every other way, inasmuch as the 1,500 Eskimos who inhabit its basin are a good deal more reserved, and do not care so much for the white man's society or his gold as do their Stick neighbors.

A writer who has some experience with these Indian packers says of them: "The Indians are even more capricious and uncertain than the weather. They have been reaping a harvest for several years by packing over the pass for the Yukoners, and they are very shrewd in barter, and they have naturally come to know the value of combination to sustain prices. Members of other tribes coming in to do packing are held in the same division as are 'scabs' by the labor unions in the States, and so far the Chilcats have been able to almost name their own prices for work.

"A Stick Indian, 'whose Boston name is Tom,' as his letter of recommendation had it, came with his squaw from the interior to do packing. He had made a bargain

with the geological party, who had waited several days, to pack from Sheep Camp to Lake Lindeman at $9 a hundred pounds, when the Chilcats held the price at $11. The Stick and his squaw had their bundles made up and were just ready to start, and one of the white men was to accompany them. A few other Indians were standing around scratching, which is a sign of absolute preoccupation of mind, and apparently taking no interest in the proceedings. Tom raised his load to adjust it to his back, and then suddenly put it down again. Without a word he took off his pack straps, put the goods back in the tent, and sat down, and no amount of questioning could get even a sign out of him. A partial explanation came when, twenty minutes later, a number of Chilcats from over the pass came into camp. They had a letter from the guide, advising the party to pay the price of 11 cents a pound, but it has ever since been a puzzle to us how Tom got the word before the Indians were within a mile of us."

The Thlingets, physically, are a strong and sometimes tall people, light in color, with black or slightly reddish hair; eyes horizontal and aquiline noses. They have developed an uncommon appreciation of property, which is usually taken to indicate a high order of intellect. Their aristocracy and the selection of their chiefs are entirely on a property basis. The richest obtain the highest places. Dr. Brinton says of them and their habits: "The Thlinget villages are permanent, the houses solidly constructed of wood, sometimes with

the additional protection of a palisade. The carving and painting upon them are elaborate, the subjects being caricatures of faces, men and animal forms. The chiefs erect, at one side of their doors, carved and painted 'totem posts,' some of which are nearly fifty feet high. Seaworthy canoes are hewn from the trunks of the red cedar, hides are dressed and the leather worked into a variety of articles; lamps, mortars and utensils were formerly chipped or ground out of stone, and they are handy in beating out ornaments of silver and copper. The Thlingets have always been active merchants, and when the first navigators visited their villages they were surprised to find them in possession of iron knives and other articles obtained by trade over East Cape or from the South. The usual currency was the dentalium shell, found along the coast. One of the staple articles of trade were slaves. They were bought from the neighboring tribes and treated with great cruelty.

"Thlinget mythology is rich, having a coherent creation and deluge myth, the principal figure in which is *Yelchs*, the raven. He is the Promethean fire-bringer, and sets free the sun, moon and stars from their prisons. The religious rites are in the hands of priests, who, as usual, exert a great and injurious influence."

The numerical strength of this once powerful tribe has been constantly declining, due very largely to epidemics of small-pox, black measles and grippe. The eleven tribes of this race were estimated by the Russians

as numbering 25,000. Halleck's estimate of 1869 puts the number at 12,000 or 15,000, and in the last thirty years they have been reduced much more than half. The word, Thlinget, is their name for "man" or "people." The Russians called them Koloschians, from the Aleut name Kaluska, little trough, because of the labrette worn in the lower lip. There are many legends among them of supernatural origin, floods, a sole surviving couple, and so on. They have no legend to point to an Asiatic origin, as has been claimed, but there is a tradition among them that they came from the South. Their propitiation of evil spirits, their belief in the transmigration of souls, their worshipful regard for the ashes of their ancestors and other customs, would seem to indicate Asiatic origin. Some of their myths, their carving and constructions, as well as many of their words, are Aino, while their methods, tools and postures at work are like the Japanese. The totem poles, for which they are famous, are like the New Zealand tiki, and there are many notes of resemblance in their rites to those of the Maori people. Their sun and nature worship with offerings to the wind and mountains, approach the Aztec customs. They have the same dances and masks as the Zunis, and their totem pole is also familiar in the history of the Delaware, Omaha and Huron Indians. The Thlinget people look down with contempt on their Stick brethren.

Totemism is the base of the Thlinget social organization, the tribal mark or totem distinguishing the dwelling

and all other belongings. Only animal totems occur, and they live under the guardianship of these creatures who are believed to have been the ancestors of the race. The crow and raven, representing the creative principle, and the wolf the fighting agent, are the great totems of the coast, and each one is subdivided into clans. Men may not marry women of their own totem, that bond being stronger than the one of the family or tribe. Men often elect individual totems, when inspired by dreams, during the fasts preceding their majority and initiation into the clan. These elective totems are added to the clan and family tokens, which accounts for the storied images on the poles. Contrary to the belief of many, these poles have no religious significance, and are not made the subject of idolatrous worship. The designs are displayed in much the same way as the nobility of civilization parade their coats of arms.

Thlinget language is the harshest of all coast tongues. Horatio Hale has noted that these harsh tongues cease at the Columbia River, where the climate changes so markedly. The common speech has been much corrupted by Russian, English and Chinook. Lieutenant Emmons has found among them evidences of an older language, a classic to all Thlingets. Mr. Charles Wa'cott notes "the Japanese idioms, constructions, honorific, separative and agglutinative particles." Like the Japanese, they cannot pronounce "l," and like the Chinese, they cannot use the "r." Captain Cook first noted the txl terminations of the Aztec. The country in

OLDEST HOUSE IN JUNEAU.

Oldest House in Juneau.

which they live is one of the rainiest parts of the earth, and these people spend their lives in canoes. The result is seen in their tongue, which has been compared to the speech of a man with a long-standing cold. It is full of hoarse, gutteral, clicking sounds, and the person who attempted to take it down by phonetic signs would be balked at every word.

In common with all the northwest coast people the Thlingets have inherited a magnificent development of the shoulders, chest and arms. This is undoubtedly the result of generations of canoe paddling. The rest of the body is, however, usually stunted and deformed. They are bow-legged and shambling in gait, moving much as aquatic birds do on land. It has never been the custom among them to flatten or elongate the skull, but they follow the barbarous practice of carrying large nose, lip and ear ornaments. The labrette was formerly the feminine badge of rank and age, but it is only seen on elderly women now. Young girls are still, as formerly, introduced socially at a certain age, just as their Caucasian sisters are. The debutante's lower lip was formerly pierced and a copper or silver pin worn there. After marriage the pin was replaced by a bone or wood stud, which gradually increased in size until dowagers wore a huge block, sometimes concealing most of the lower part of the face.

Painting and tattooing have been universal. They paint at present only for dances and potlatches, but continue to black their faces as a summer protection from

the sun and insects. This coating is a mixture of seal oil and soot. Governor Swineford found it desirable to forbid this face blackening, as it proved a hindrance to the enforcement of laws, offenders thereby hiding their identity. There are sometimes notable exceptions to the regulation heavy, flat jaws and high cheeked faces. Some of the women show strong faces of more regular mould. Woman is the family arbiter and indeed is supreme in every way, the family possessions descending through her. Polygamy is quite commonly practiced. Upon a man's death his widows pass to the oldest male in his mother's family. Younger brothers and nephews are allowed to escape the widows if they so desire by paying a good round sum in blankets.

The Thlingets have their political societies. All of the same totem contribute to the potlatches of their chief, working sometimes for years to make an extravagant display. The potlatch is usually given at the full of the moon, and the host's clan and totem do not accept gifts. The seating and serving of guests is as precisely arranged as at the dinner of a diplomat. Hospitalities are invariably returned in kind. They are inveterate dancers, and songs and dramatic representations go with everything from a feast to a funeral. They have many games of chance, the favorite being a fan-tan played with fifty-two cylindrical sticks differently marked. The sticks are either drawn and matched, or players guess the number, position and odd or even of those the dealer hides under a mass of cedar shreds. The dealer and players join in a chant.

In illness the Thlinget sends for his shaman or medicine man, who, continuing his fasts alone in the forests throughout life, continues to receive inspiration from his guardian spirit. He uses chants and other means for curing. The missionaries have done much to stop the old practice of cremation of the dead. Many of the tribes have long known the art of forging copper, and gold and silver are plentiful among them.

The Athabascan or Stick Indians, of the interior, rank intellectually below their neighbors. Their temperament is inclined to be gloomy and morose and, in spite of their apparent stolidity, they are much given to panics and temporary hallucinations. Their chiefs are chosen without formality, either on account of their daring in war or for the number of presents they distribute. Their entire number scattered over the Yukon and Klondike countries is only 3,439. They make excellent bark canoes and a few implements. They have come much in contact with the miner of late years and have caught the gold fever. Many of them are engaged in either helping the white miners or digging for gold themselves in a desultory way.

Some of the dead houses of the Sticks are exceedingly ornate with glass windows and some fanciful touches in carved and painted woodwork. The Sticks of the upper Yukon are cremationists, but are not very thorough in their work, as they want enough of the remains left to hold a satisfactory funeral over. Farther down the river the Indians are growing out of the cus-

tom of cremating their dead. The Tinnehs of the middle Yukon bury their dead off-hand in a coffin in a shallow grave, over which they then plant a tamarack tree. The roots of the tree encircle the coffin like the grasp of a hand, and are supposed to protect it against the ravages of wild beasts. The Eskimos place their departed ones in a rude box and then cover it over with a pile of stones, but usually this safeguard is not effective, and the ultimate casket of the deceased Eskimo is the polar bear that has jurisdiction over the district. The shamans, or medicine men, of the Eskimos, are allowed to choose their burial places, a privilege that is not accorded to every one, and they select ingeniously difficult places of access that their final sleep may be undisturbed; as, for instance, a rocky pinnacle, which can only be reached by their devoted followers at the imminent risk of their lives in carrying out the request.

CHAPTER XI.

RESOURCES OF ALASKA.

President Johnson's "ice-box"—Thirty-five years of Alaskan exports—Dense forests of spruce, cedar and pine—United States Department of Agriculture's Experimental station—Alaskan flora—Cranberries and other berries—Grain and grass growing—Bituminous coal—Marble—Big game of the interior—Bears the one-time terror of the Klondike—Foxes and other fur-coated Animals—The deer and their threatened extinction—Salmon six feet deep—The cod banks—Whaling.

TIME alone can demonstrate the full magnitude of Alaska's resources. When it first came under the jurisdiction of the United States, it was generally believed that the dictates of diplomacy and statecraft were alone responsible for its purchase, and few there were who imagined that, before the century had run its course, Alaska would have paid for itself many times over. It was even suggested to President Johnson that he visit "this land of snow and merchantable ice." During the first five years of our possession, it made a return of eight per cent. on the investment. The two tiny Seal Islands paid four per cent. on the original $7,200,000, and in their first lease returned a sum equal to the purchase money to the Treasury. The gold mines, not including that taken out this year, have produced over $8,000,000, and in six years, 1884 to 1890, the salmon industry yielded $7,500,000. The commerce of Alaska, in 1867, was reported to be $2,500,000; it is now ten times as great. In seals this country has received $35,000,000 in thirty years from

its northwestern dominions. These figures show what a tremendous factor Alaska is in the world's game of barter and trade. The industries thus far developed pertain mostly to the coast, but with the opening up of the Yukon country to the outside world, great things are naturally to be expected from that quarter. The following table gives in a concise form very close figures on the value of the eight leading Alaskan exports since the Territory passed into the hands of the United States:

Furs	$53,000,000
Canned Salmon	10,000,000
Whalebone	10,000,000
Gold and Silver	6,000,000
Whale Oil	3,000,000
Codfish	1,600,000
Salted Salmon	800,000
Ivory	160,000

In this table the gold exports do not include the product of this year's mining.

The day is not far distant when the Alaskan lumber regions will be famous. It is estimated that the available timber now standing in the Territory might alone meet the ordinary demand of this continent for half a century. Though the extreme northern part of Alaska is treeless, its southern shores, both of the islands and the mainlands, are covered with a dense forest growth, the Aleutian group excepted.

Southeastern Alaska is well timbered, the prevailing varieties being spruce and hemlock, red and yellow cedar, maple and birch. The spruce and hemlock found here are usually of large size, often a hundred feet high and

six and eight feet in diameter. Yellow cedar trees eight feet in diameter have been cut in the southeastern portion of Alaska. It must certainly be a cedar of magnificent proportions out of which the native Haidas can hew and construct a canoe seventy feet long, capable of carrying one hundred men.

This wood is a beautiful variety, admitting of high polish and especially adapted for the manufacture of furniture. The yellow cedar is fine for ship-building, and is torredo-proof; that is, it is impervious to that marine pest known as the boring worm. It may easily take the place of mahogany and other tropical and sub-tropical woods. The yellow cedar grows many feet in height, straight and clear, without any defect whatsoever. The wood, when polished, presents a beautiful yellowish hue and is hard and compact, though easily worked. Little is known of the extent of the yellow cedar in the interior, but no doubt explorations will discover considerable areas of this valuable wood.

These virgin forests of Alaska, which have never felt the stroke of a white man's axe, are truly magnificent. They present a growth exceedingly dense and peculiar, the branches of the tall trees being often draped with long black and white moss, dry and fine as hair which it resembles. This characteristic is similar to the effect produced by the Spanish moss in the thick woods of Louisiana. The fallen trees and stumps in these Alaskan forests are covered with a bright green moss ten inches in thickness, and in the tangle of creeping vines are seen the deep red clus-

ters of the bunchberry. Good judges say the timber is as fine in quality as that of Oregon and Washington.

From Sitka westward the forests become scrubby and the timber small in size, but alder and willow are found in many places. The timber line extends to a height of about 1,500 feet. The timber along the lower portion of the Yukon is composed principally of willow, alder and cottonwood. Towards Norton Sound it grows to a fair size. Spruce is also found, as a rule, on most streams emptying into the Yukon River and Behring Sea. The rivers entering the Arctic as far north as latitude sixty-seven degrees are more or less timbered with the same variety. Along Wood River there are some fine groves of large spruce timber, and back in the interior, and along the banks of the rivers on level stretches of country, fir timber is also found to a considerable extent. Dwarf spruce, cottonwood, alder and willow are also found in the Nashagak and Kuskoqum regions. The willow usually found along the coast west of Mt. St. Elias is scrubby, but in the moraines of that mountain and along the delta of the Copper River it grows to a height of fifteen feet or even higher. In the vicinity of the Noatuk River, in latitude sixty-seven degrees north, spruce, birch, and cottonwood are found of a stunted growth, fit only for firewood and the construction of log-houses. The spruce which is found near running water is usually good sized and vigorous.

It attains not unfrequently the height of fifty to one hundred feet, with a diameter of over three feet near the butt; but the most common size is thirty or forty feet, and

twelve to eighteen inches at the butt. It is quite durable. Many houses, twenty years old, built of this timber, when examined were found to contain a majority of sound logs; when used green, without proper seasoning, it will not last over fifteen years. These trees decrease in size and grow more sparingly near Fort Yukon, but are still large enough for most purposes.

Several kinds of poplar are to be found in Alaska. But as timber, it has little value; the extreme softness of the wood is often taken advantage of by the natives with their rude iron or stone axes, to make small boards or other articles for use in their lodges. They also rub up with charcoal the down from the seed-pods for tinder.

In the Yukon country, from Five Fingers all the way to Koserefski Mission, the timber growing along the banks is willow, alder, and spruce, the latter being the prevailing variety. It is generally scrubby, but many good-sized trees are to be found. The islands in the river from Five Fingers to the mouth are generally well-timbered, the larger islands being better wooded than the mainland.

The Alaskan timber lands are, for the most part, quite convenient to the numerous fine harbors which line the coast, and where ships could be readily loaded. The lumber exports for 1885 amounted to $50,000.

As far as definite information goes but little can be said about Alaska's future as a grain-growing, farming, and gardening country.

The United States Government, authorized by a special act of Congress, sent out during the past summer, an

expedition whose object is to gather preliminary data with reference to the contemplated establishment of one or more agricultural experiment stations in that Arctic province. Congress has appropriated $5,000 to pay for the investigation, and under existing law an institution of this sort would be entitled to a subsidy of $15,000 per annum from the government.

Botanist Allen, of the Department of Agriculture, and Dr. Killen, of the Oregon Agricultural College, with one or two others, compose the party. They will make a tour through the Sitkan region, and the Aleutian chain, looking for the most favorable place for the establishment of an experimental station. They will pay particular attention to the great island of Kadiak, which is of such size, ninety miles long by sixty broad, that alone it might be a granary for the whole of Alaska. Two-thirds of it is treeless, and the fertility of the soil is evidenced by the extraordinary luxuriance of the grasses with which its hills are covered. This wealth of wild grasses is equal to anything that can be seen on the prairies of Iowa or Minnesota.

The expedition will choose a location for at least one experimental station. When once it is started, the work of the establishment will be of a very elaborate and comprehensive description. It will be scientific farming, conducted with a view to finding out how the conditions of the region may be utilized to best advantage for the production of every possible field and garden crop. But this is not all, for it is desired to learn what domestic animals may be reared to advantage in Alaska. At the

present time there are practically no domestic animals in the territory, though the country is well adapted for sheep, pigs, and goats, and in the Sitkan region, as well as on the islands of the Aleutian chain, cattle will keep fat all the year around without much care, subsisting on the nutritious grasses. Further to the north it would be necessary to give them shelter during two or three months of severest winter weather. Poultry can be raised to great advantage in Alaska.

In short, Alaska is believed to be a country of great agricultural possibilities. The coastal belt and the lowlands of the Yukon region are covered as soon as spring arrives with a luxuriant growth of grass and flowers. Among the most valuable grasses is the familiar Kentucky blue grass, which grows as far north as Kotzebue Sound, and another is the blue-joint grass, reaching four or five feet in height. These make most excellent forage. Barley has been tried at Port Yukon in small patches, and has matured, though the straw was short. Rye and barley ought to succeed, inasmuch as these grains are grown in very high latitudes in Europe. The Island of Kadiak is in the same latitude, with temperature and rainfall about equal, as a part of Scotland which produces much barley and rye. Oats are hardy and will grow very far north.

The growth of plants in that far northern region is astonishingly rapid. The snow has hardly disappeared before a mass of herbage has sprung up, and spots which a few days before presented nothing but a white sheet are teeming with vegetation, producing leaves, flowers

and fruit in quick succession. Indeed, during the short and hot summer the vegetation attains an almost tropical luxuriance. Every plant is rushed as fast as possible to a ripening, in order that its seeds may be produced before the early frosts of autumn nip it. Plants, of course, are accustomed in temperate latitudes to sleep at night, and it is interesting to observe that the vegetation of Arctic Alaska pursues a similar habit for so many hours in each twenty-four, even though the sun is in the heavens for months together without sinking below the horizon, the somnolence being marked by drooping leaves.

A singular phenomenon is observed on the shores of Escholtz Bay, in Kotzebue Sound, where bluffs of solid ice thirty to sixty feet in height are covered with a layer of soil in which, to use the words of the famous botanist, Dr. Seeman, "herbs and shrubs are flourishing with a luxuriance only equalled in more favored climes." One question to be investigated by the Alaskan experiment station will relate to the modifications of the rules of ordinary agriculture, which must be made to suit the latitude. Such modifications are adopted in Finland, which is so wet that the grass has to be transformed into hay by letting the wind blow through it.

There are practically no tree fruits suitable for food in Alaska, though a wild crab-apple is found in the Sitkan region, but small fruits grow spontaneously in greater profusion than in any other part of the world. There are wild strawberries of exceptional size; also red and black currants, gooseberries, cranberries, raspberries, blueber-

ries, bearberries, dewberries, mossberries and roseberries. The last are the fruit of a species of rose called Rosa Cinnamomea. Wild roses quite generally produce fruits, which in some cases are edible, but the cultivated varieties are "doubled" to such an extent as to petals that the flowers are rarely fertilized. From many of the berries the Russians prepare most piquant and delicious preserves. Already the Alaskan cranberries are being brought in large quantities to the San Francisco market, being purchased by traders from the natives, who pick them.

These cranberries are bright scarlet in color, and about the size of a pea. They are highly prized by the Alaskan Indians, who depend to a considerable extent on these and other berries for food. The shrubs that bear blueberries form a large part of the forest undergrowth in the low country, and the fruit is collected in great quantities by natives, who preserve the berries, crushing and drying them. The salmonberry, the fruit of a spreading bush, is likewise much esteemed. It has the shape of a red raspberry, and is an inch long. The Indians crush it in a wooden bowl, and eat it with seal oil. This is one of the oldest gastronomic practices of the natives, who regard seal oil as the natural accompaniment of pretty nearly everything edible. They even eat strawberries with seal oil, as we would put sugar on them.

When small fruits grow wild in such surprising abundance, it is reasonable to suppose that they might be cultivated successfully. This is one of the problems to be taken up by the experts, who may be placed in charge

of the experiment station. They will try to find out how the fruits and vegetables also may best be preserved for winter use. The production of eggs, butter, and cheese will demand attention at their hands. Nothing could be more absurd than the present fact that the people who are pouring into Alaska are obliged to bring their food with them, because the country will not yield them a support. They are actually obliged to fetch what they need to eat from San Francisco or from Puget Sound. It is all because the resources of the country are undeveloped. Dr. Dall says that within a century from the present time Alaska will be exporting great quantities of ship timber, butter, cheese, wool, mutton, and beef. Very likely her berries will find a wide demand.

Turnips and radishes flourish in Southern Alaska. Potatoes do well, though the tubers do not attain a great size. Cabbages do not "head." Lettuce is successfully grown, though it does not ripen seed. The turnips, above referred to, reach a weight of five or six pounds, and have an excellent flavor; the Russians preserve the tops in vinegar for winter use. Wild peas grow in abundance on the Aleutian Islands. Along the coast of the mainland to the northwest of Sitka, and on some of the islands off shore, all of the cereals except corn can be grown to perfection. Kadiak, Afognak, and other islands possess a most fertile soil, with a milder and more equable climate than that of the Western States. Wild timothy grows luxuriantly in Southeast Alaska. There are large areas of excellent grazing lands, notably on the great islands of the Kadiak and Aleutian archipelagoes. There is no

reason why Alaska should not rival Montana or Wyoming in the raising of stock. All along the coast millions of cattle and sheep might subsist on the wild grasses, with a much less percentage of loss from winter cold than in the western part of the United States, the climate being far milder and more equable. Indeed, the climate of the Sitkan and Aleutian regions is not more severe than that of Maryland or Virginia, and exhibits fewer vicissitudes.

On the Upper Yukon the summer climate is delightful. In that region there is much arable land, with a soil from which farm and garden products of nearly every kind can be obtained. During the last spring and summer there were eighty-five days of "growing weather" in that country—equal to at least 120 days in the latitude of Ohio and Indiana, the sun shining throughout the twenty-four hours.

The most extensive efforts at gardening of all places in the interior have been carried on at Fort Selkirk for several years. Here they have raised potatoes, cabbage, turnips, and other vegetables. They have to irrigate the gardens to some extent by pumping water from the river, and it is necessary to blanket the plants early and also late in the season. For probably six weeks of midsummer the latter protection is not necessary. The soil is very fertile, and produces better after two or three years' cultivation. Although much care is entailed in raising a garden crop on the Yukon, it pays very well, as potatoes are easily worth $10 a bushel at any season

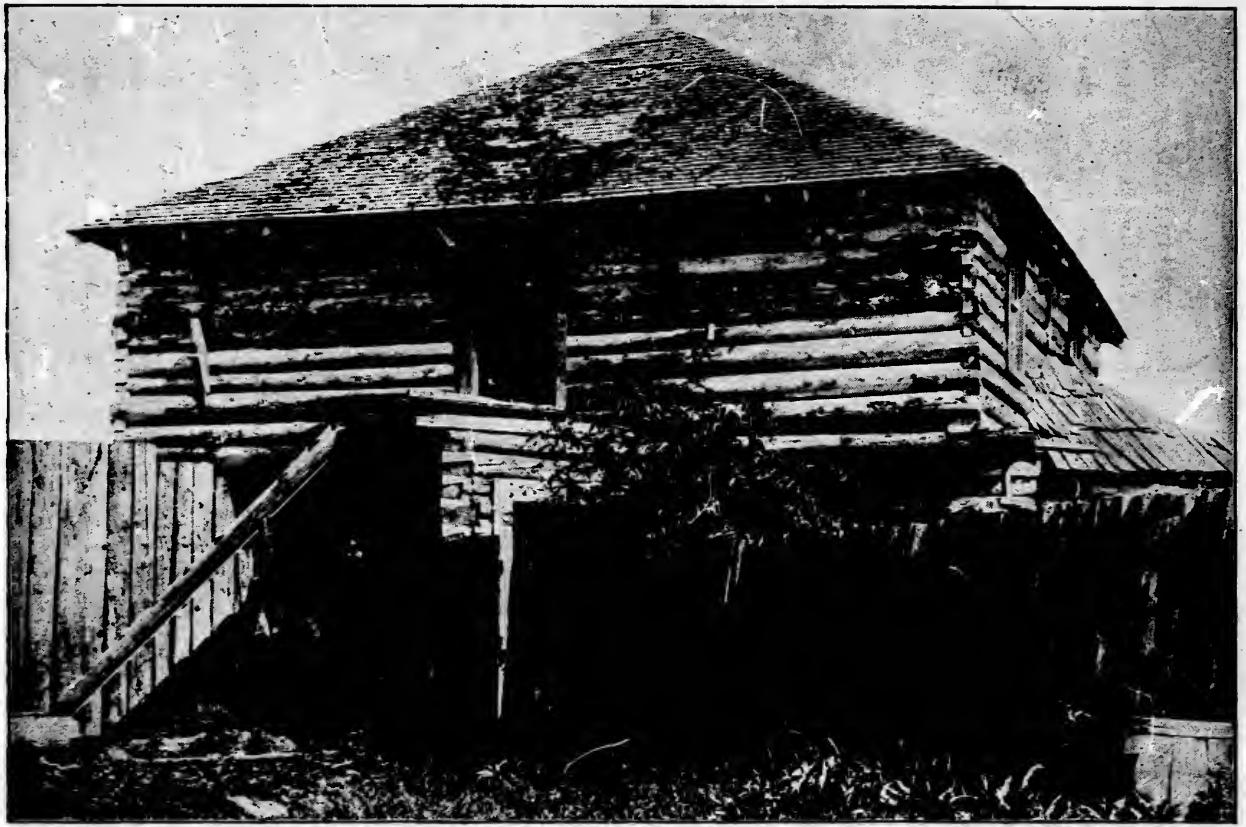
of the year. The potatoes grow to fair size, and an acre will produce two hundred bushels.

Omer Maris, who has spent a great deal of time in various parts of Alaska, has this to say as to the present condition of agriculture in the territory:

"The biggest real practical farm that I have seen is about 60 by 100 feet in size, but the owner of it is progressive, and is taking another strip fully as large; but in spite of his limitations it is said his sales already this season amount to hundreds of dollars, and the appearance of his lettuce and onion beds would seem to justify the statement.

"Up to this time there had never seemed any excuse for farming here. For the last few years grain and all kinds of produce have been very cheap on Puget Sound and in California. The shipping rates do not add very materially to the cost, and consequently food has been cheaper and more abundant than in the Eastern States. This, coupled with the fact that wages have always ruled high, has made farming impracticable. The only opportunity at present seems to be in the few garden products that will not stand a voyage of a week or two. If the necessity should ever arise, however, the country might certainly be made to produce about everything that is required, with the exception of grain.

"It is true that clearing the ground would be an almost desperate undertaking. To accomplish it in a season or two would be like mining, for something like four feet solid of big logs and wreckage would have to be removed, and, unlike a similar undertaking in the States, it would



OLD RUSSIAN STOCKADE ON THE YUKON, FOR DEFENCE IN CONFLICTS.

not be practical to burn it. But the land will not always be incumbered in that way. It will take many years to make a considerable showing, but it will naturally follow the cutting of the timber for lumber and fuel. The obvious rotation will be lumber-cutting, grazing and farming in the order named.

"Grass grows wherever the sun shines, and it is a kind of forage that cattle thrive exceedingly well on. As a practical instance, a dairyman took up a claim of twenty acres north of Juneau, where the timber had all been cut off. His cows make their way among the stumps and logs, and find plenty to eat. When the sun is let in, the wood decays rapidly, so in a few years the patient dairyman will have a smooth, clear tract of land without any heart-breaking effort. Though the soil is as fertile as is any in the world, it has been demonstrated that it improves in productiveness with a few seasons' cultivation.

"A few years ago a man started a cattle ranch at the mouth of Lemon Creek. There is a fine expanse of several hundred acres of tide-flats that produced grass of wonderful growth and quality. He brought in a herd of cattle that made good growth during the summer season. Nearly all new fields for enterprise have to go through an experimental stage, which generally entails more or less disappointment. In this case the obstacle encountered was in the curing of the hay. The season was wet at cutting time, the grass would not dry, and consequently spoiled. On this account the project was not regarded as feasible, and the cattle were disposed of at the approach of winter. Since then there have been

more favorable seasons, and a good deal of hay has been successfully cured. It has been found, however, that a surer way to save the forage is in a silo. Later experiments have been made in that direction, and ensilage is regarded as the most dependable winter food for stock.

"At Wrangel there have been several attempts made at raising apples, but for climatic reasons they were unsuccessful. The trees did not live. It is possible that other and hardier varieties may yet succeed. The Alaskan coast is the greatest of berry countries. Wild strawberries are as prolific and fine in quality as the best cultivated varieties in the States. There are kinds of small fruits here that are not found anywhere else. Among the products of the country that grow wild in great profusion are salmonberries and huckleberries, wild black currants, and high-bush cranberries. The Indians gather great quantities of the cranberries, and put them up—or down—in seal oil—a valuable suggestion for ambitious compilers of original bills of fare. There are also sarvisberries, blueberries, thimbleberries, and another fruit very like a dewberry, that grows singly on a little annual vine like a potato plant."

The coal resources of Alaska are lying dormant because the time does not seem to have arrived for the necessity of the opening up of the mines. A number of small veins or seams have been found on several of the islands in the Southeastern Alaskan country. Those which, perhaps, so far have attracted the most attention are on Chicagoff Island, near Killisnoo, where every indication promises an extensive deposit. All the coal

found in Alaska is bituminous, and of a very good quality. Deposits have been found on the headwaters of the Chilkat River, Lituya Bay, Cook Inlet, Unga Island, and Port Mollar. The most extensive coal fields or deposits are in the Cook Inlet country, cropping out on the beaches, and along many of the streams. Unga Island has three distinct veins of coal extending a distance of two miles upon the sides of the mountains, each of them being several feet thick. Some work has been done here within the last few years and government vessels have experimented with the coal, but find it contains a considerable amount of ash and clinker. Doubtless when a greater depth is reached it will improve in quality. North of Unga Island, about ten miles inland from Stepovak Bay, is a trail or portage about ten miles long leading to Herendeen Bay, at Port Mollar, on the Bering Sea side. An excellent quality of coal is found here in large quantities. The Alaska Commercial Company, the principal owners of the mine, have shipped considerable coal to their station at Unalaska; and its quality, both for steaming and house purposes, is found to be superior to that found at Unga.

Extensive coal fields exist at Cape Lisburne, on the Arctic side, extending for thirty or forty miles parallel with the coast, and for a number of miles back into the interior. It is of a lignite character, and the government vessels, Corwin and Thetis, have taken coal for steaming purposes from here, and have found an excess of ash and clinker, which seems to be the general fault with all coal thus far discovered in Alaska. Strong indications of

petroleum are found back from the coast a few miles, in this cold Arctic region, and also between Icy Bay and Cape Yaktaga. On the North Pacific coast, west of Yakutat Bay, there are thought to be extensive deposits of petroleum. Practically all the coal used by vessels navigating the Alaskan waters, and in the mills and towns of Alaska, is brought from the Puget Sound country and British Columbia. It is bought at the mines for about three dollars per ton, and the expense of shipping to the Southern Alaska ports is five or six dollars per ton. The expense of opening up a coal mine is so great that, until there is a large demand in Alaska, it is doubtful if any of the mines will be worked. Beds of white marble, of a very fine quality, are known to exist on Baranoff and Admiralty Islands.

In the interior of Alaska, moose, caribou, reindeer, bear, and other kinds of big game abound. However, the miner in passing through the country is liable to see very little of these animals. The natives have been so ruthless in their attacks upon them that they have for the most part retired to the mountain fastness or to the northward beyond the gold diggings. Occasionally a caribou will be seen along the upper Yukon lakes. The bighorn, or mountain sheep, and mountain goats—the ibex—can be found by climbing the mountains for several thousand feet above the lakes. Their wool is long and fine, and when nicely cleaned and tanned makes beautiful rugs. The horns of the sheep are made into bowls and ladles by the natives.

It is reported that it is entirely due to the bears that

the Klondike River was not long ago made to give up its golden treasures. These animals were very thick in this section of the interior at the time of the earlier discoveries, and on account of the trouble they gave the first prospectors the latter moved on to other diggings where they could work unmolested. Alaska affords several varieties of bears, including the polar or white bear, the brown bear, and the grizzly bear, known to science as the *Ursus horribilis*. In the colder months of the year droves of polar bears may be seen as far south as St. Matthew's Island, in Bering Sea, but when the ice begins to break up there, they strike out for the farthest north, as far as the Arctic Ocean. Their habits are of a maritime character; they are great swimmers; "they do not mind a swim of from 150 to 200 miles if they can find an occasional iceberg to rest on. They are ferocious, and have no fear of any enemy, so that the sportsman who is fond of adventures with a spice of danger in them can find genuine happiness in hunting the polar bear, which, however, it must be said, has a habit of killing and devouring such persons as may seek sport at its expense."

The brown bear of Alaska is a huge and shaggy bear, varying in length from six to twelve feet, and weighing from 800 to 1,500 pounds, and is a dangerous adversary, the terror of the natives. It is an expert fisher, with a good appetite for salmon in its season; and when the year's run of that dainty fish is over it takes to the hills, where small game awaits consumption. The brown bear has been particularly useful as a road-maker in Alaska,

treading the river-banks and plains in a purposeful manner, so that the traveler, by following its footsteps, will find the easiest routes to the hills, and to the best fording places. Its habitat is believed to run as far north as the Arctic Ocean. As to its ferocity, the natives have almost a monopoly of the stories. Yet there is an authentic report that some time ago two men killed seven brown bears in one day upon the mainland adjacent to the island of Unga, and exhibited the skins in proof of their good faith. This story ought to give encouragement to those sportsmen who like a spice of luck as well as of danger in their sport.

It is hard to tell whether the grizzly bear of Alaska is more ferocious than the polar bear or the brown bear of that part of America. But some of the men who have traveled near Mount St. Elias say that the grizzly found there is unequalled for ferocity, being fiercer even than the Rocky Mountain variety. The Indian will never attack it; he takes to flight at the sight of it. It has no fear of bullets. It is happy when it lays eyes on a human being; humanity is but provender for it. The natives believe that it possesses supernatural powers, and can hypnotize the man who goes out to kill it. Yet it is related that upon one occasion a party of two Americans in the Mount St. Elias region saw a grizzly at a distance eating fish upon the banks of a stream, and determined to try conclusions with it. They got reinforcements by which their party was raised to the number of six. The six men raised their rifles and poured a volley into the body of the enemy, which thereupon rushed toward the

firing party. As the animal approached they peppered it with their bullets until its life was extinct. The skinning of it was the next thing; and it was one of the members of the party of six who said: "When the skin was stretched out it looked to me bigger than the biggest bullock hide I had ever seen!"

That was an adventure for sportsmen who have no fear of danger, but rather like it. In truth, there is no part of the American continent where an adventurous hunter can get livelier experiences in bear hunting than those which are to be found in Alaska. He can take his choice between the polar bear, the brown bear, and the biggest grizzly on earth. He can hover about Mount St. Elias, take observations upon the mainland near Unga, or go stalking among the ice fields which border the Arctic Ocean, some distance this side of the North Pole.

Among the land animals sought after on account of their coats of fur the otter is the most widely distributed. It is found in all parts of Alaska in large numbers. Its hide is used for the making of an imitation seal-skin. Beavers, too, are to be found in many places, although not in such numbers as formerly. The species seems to have suffered a considerable thinning out on account of the recent severe winters. During the early days of the Hudson Bay Company's history a beaver skin was valued at about twenty-five cents, and all over the northwest country was used as the equivalent of an English shilling. Since the thinning out of these animals the price of their skins has appreciated, and to-day a single beaver skin is worth from six to twelve dollars. The tourists look upon

the flesh as a rare delicacy, and it forms the main dish at all social functions. The long incisors of the beaver are used by the natives for the manufacture of chisels, small adzes, and other wood and bone-making tools.

Of foxes, Alaska can boast of an enormous supply. Red foxes, black or silver foxes, and blue foxes are the chief varieties, although long, unrestricted, inter-mixture has given rise to a number of kinds of foxes which cannot be classified under these heads. The red fox varies in size and in the quality of its fur from a specimen as large as the high-priced Siberian fire-fox to the small, yellow turgid creature that is to be found in such numbers on the Aleutian Islands. He lives on fish, flesh, and fowl. Nothing in the animal kingdom seems too poor to afford him food, even going so far as to eat mollusks, and other shell-fish. His fur is of little value, and the natives rarely eat his flesh, and then only when driven to it by the pangs of hunger. Two or three dollars is about the price of a good, red-fox skin.

The black or silver fox is the most valuable of the vulpine family. He inhabits, for the most part, the higher country, and has his lair in the mountain fastness. He is of large size with long, soft, silky fur, varying in color from the silver tint to a deep jet black, the latter being the rarer and the most highly prized. The price of a fine skin sometimes goes as high as forty or fifty dollars. Black foxes of an inferior quality are found on the sea-coast, on the shores of Norton Sound, in the interior of Kotzebue Sound, along the Yukon, and on the Colville River. They are quite plentiful on Kadiak

Island and most of the Aleutian Islands; but they have been transplanted by man's agency to many of these points.

Along the southwestern coast there are many islands, removed from the shore a few miles, uninhabited and never visited by natives. In a number of instances white men have gathered a few pairs of blue, black, and silver foxes, when young, from the natives, and taken them to these islands and turned them adrift. They arrange with the natives to carry food to them at stated periods, and they become, in a measure, tame. They increase very rapidly, and in three or four years become a source of profitable industry for the projectors of the enterprise. On the seal islands the propagation of the blue fox has been carried on for some years, only a certain number being killed each year. The blue fox was first discovered on the Aleutian Islands in 1741. It has been protected against intermixture with other and inferior foxes, and the skins are of the finest quality and command a high price in the market.

A species of white fox is found along the continental coast of Alaska, from the mouth of the Kuskoquim River northward to Point Barrow. Its fur is snowy white, soft and long, but is not durable; hence it does not command a high price in the market. The white fox is fearless, and will enter villages and dwellings in search of food, or out of mere curiosity. It will eat anything to satisfy hunger, and in the depth of winter the natives find it unsafe to leave any article of clothing, dog-harness, or boat

material where these thieving little animals can find them.

Mink, lynxs, muskrats, and wolverines are also to be found in certain parts of Alaska. The skins of the latter are rarely exported, as a ready market is found at home. The natives of the Kuskokwin and coast districts prefer this shaggy, piebald fur to any other trimming for their wearing apparel. It is also prized highly among the Eskimo, as it serves as an excellent protection for their faces against the severe blasts of the north country when sewed in around their hoods.

The deer of the Arctic and sub-Arctic regions have been confounded with the reindeer of other localities. While they certainly belong to the same family, they are what is called the barren ground caribou, which differs from the upland caribou and domesticated reindeer in being smaller in body and horns. Owing to the ruthless manner in which they have been slaughtered their numbers have been greatly diminished during recent years. After a long winter in the interior, when their food supply has been exhausted, they will drift down to the coast in search of more favorable conditions. Here they are waylaid by the natives and slaughtered in great numbers for their hides. Deer forms one of the main food supplies of Alaska, and an effort is being made to make their killing unlawful for a term of years. Unless Congress authorizes this the extinction of the species will not be far off. They are hunted, in the rutting season, by a call made from a blade of grass placed between two strips of wood, which produces a very clever imitation

of the cry of the deer. This call leads them to the ambushed hunter; and so deceptive is it that it is not unusual to get a second shot should the first fail. The wolves play great havoc with the deer; and it is remarkable that they exist in such numbers among so many ruthless enemies.

Bald and gray eagles are numerous throughout Southeast Alaska, and are also found, to some extent, in the interior wherever there is large timber. The natives kill them in large numbers and pluck the feathers, leaving nothing but the down. When cleansed the skins are sewn together, about thirty of them being required to make a robe, which is, at once, rich and beautiful.

Humming birds in large numbers, having the delicate plumage of those found in warmer climates, flit from bush to bush in Southeast Alaska. Native boys tie small pieces of red flannel on a limb, and cover them thickly with pitch. The bright color attracts the tiny birds, which alight on the flannel. Their little feet adhere so tenaciously to the pitch that they cannot extricate themselves, so they become an easy prey to the youngsters who trap them, only to worry them to death with savage cruelty.

In all the waters of Alaska, whether in the southeastern country, the interior, or Arctic regions, ducks and geese in every variety are found in vast numbers. Alaska appears to be especially adapted as a natural breeding ground. The smaller varieties of land and timber birds are as numerous as the water-fowl, and the graceful swans are found in large numbers in many parts of the territory.

In Arctic Alaska the disappearance of the snow and ice is immediately followed by the arrival of birds from the south in large numbers, and, in a few weeks, the Eskimo revel in the variety and number of eggs found among the grass and tundra. Besides the wholesale robbing of nests for eggs the young fledglings are eaten by the Eskimos with a keen relish. Their stay is brief, however, for none, save the most hardy of the Arctic birds, remain to pass the long months of winter in this region.

Next in importance to the seals and the gold mines, on which this chapter does not touch, the salmon and cod fisheries must take rank in any account of Alaskan resources. Upon the authority of Prof. Brau, of the United States Fish Commission, it may be stated that more than one hundred varieties of fish are found in Alaskan waters.

Salmon is found in great numbers in the streams from the lower extremities of Southeast Alaska to the Arctic Ocean. The most favored varieties are those known as the red or silver salmon, weighing from eight to twelve or fifteen pounds each, and the king salmon often weighing as high as fifty pounds. The latter variety is found only in a few localities in Southeast Alaska and in the Yukon, many miles above its mouth. It is said that specimens have been caught weighing over one hundred and twenty pounds.

The first salmon cannery in Alaska was erected in 1878, and at the present time there are nearly fifty; most of them are in operation each season.

Two-thirds of the entire salmon pack of Alaska is furnished by the ten canneries on the Kadiak Islands, which are almost entirely supplied from the Karluk River. This stream, which is on the west coast of Kadiak, is only sixteen miles long, from 100 to 600 feet wide, and less than six feet deep. These figures give the dimensions of the almost solid mass of salmon that used to ascend the Karluk to a mountain lake above, before the canners began operations with traps and gill-nets in 1884. The largest cannery in the world is at Karluk. In these canneries, in 1890, there were 1,100 employés, and over 200,000 cases of 48 one-pound tins contained the 3,000,000 salmon packed that year. A single haul of the seine has beached 17,000 fish. The company which operates on the Karluk, is composed of San Francisco people, who own the boats which carry away the product and thus avoid paying license to the United States Government. The labor is altogether imported from the States. Only in a few small canneries are the natives employed.

After the salmon industry had taken hold in Alaska it increased so rapidly that it was soon found that the supply exceeded the demand. A sort of salmon trust was formed, some of the canneries were abandoned, and each cannery received its pro rata share of the proceeds of the canneries in operation. The total output for 1889 was over 700,000 cans.

Cod are found in large quantities along the Aleutian chain of islands, as far west as the Alexander archipelago, and in a general way they may be said to exist along the whole southern coast of Alaska.

In the vicinity of the Kadiak group of islands, and still further south to the Simeonoff, and at the Shumagin group, about the islands of Magipopf and Unga, cod are found in great abundance. In Bering Sea, towards the lower Siberian shore, they are also. Popoff Island, opposite Unga, is the headquarters for the cod-fishing fleet. There are large warehouses at Humboldt Harbor and Pirate Cove. Most of the cod are taken to California to be cured.

Halibut, which is found along the northern coast and to some extent in Bering Sea, is a staple article of diet with the natives. This is also true of the herring, which are to be found in large quantities.

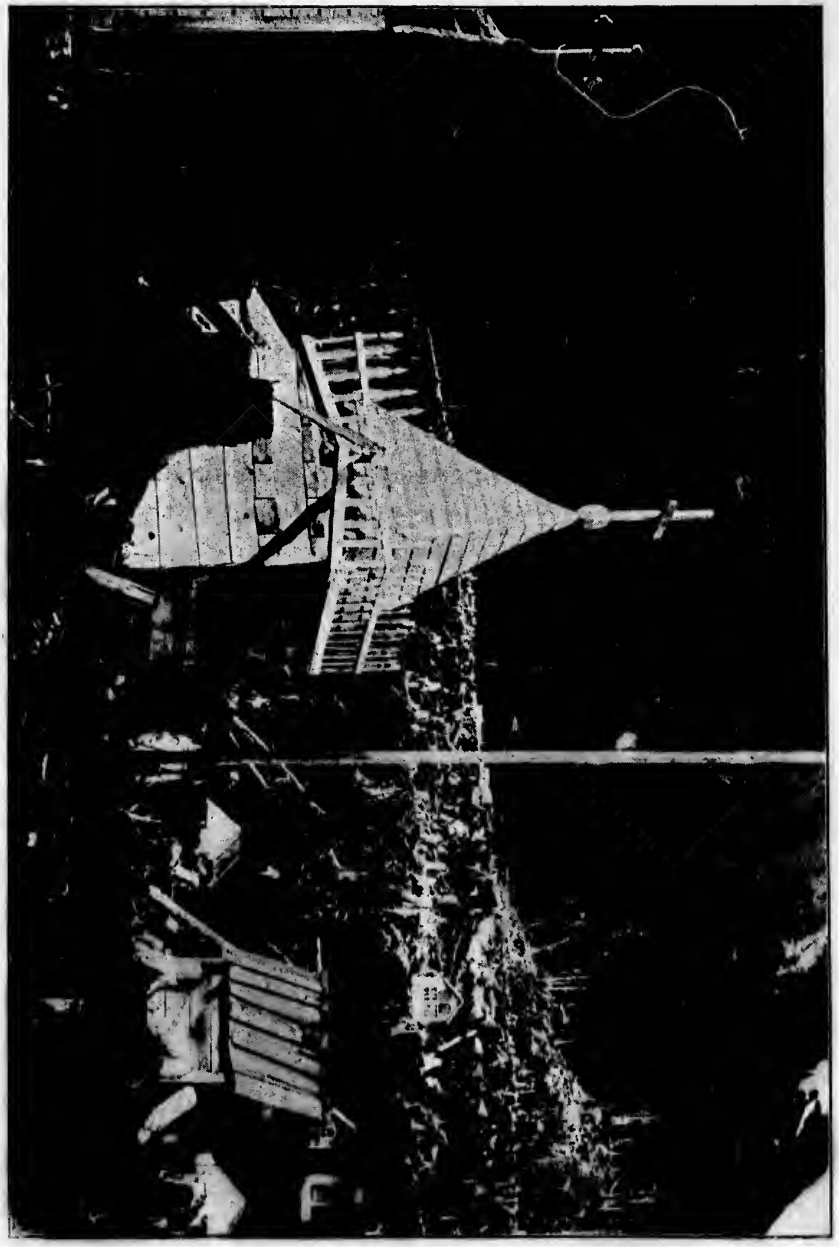
Whales are found in all the deep waters. Upwards of seventy-five vessels are now engaged in the whaling business, and they must penetrate several miles above Bering Strait before they encounter any of them. The business is hazardous, and great risks must be run. In the summer of 1877 nearly fifty vessels were lost, and a number of crews perished, preferring to remain on the vessels rather than risk making their way across the sea to land. This catastrophe led the government to establish a rescue station at Point Barrow, the most northern point of Alaska, which is provisioned with supplies sufficient to last one hundred men a year. It is in charge of a government official whose duty it is to render aid and succor to shipwrecked sailors.

CHAPTER XII.

CLIMATIC CONDITIONS.

The wide difference between the climate of the coast and interior—What gold-seekers will find in the way of weather—Mean temperature at various points compared—Influence of the Pacific currents—The highest and lowest points of the mercury—The topography of the country—Grandeur of scenery on mountain and plain—Remarkable tides of the ocean.

GENERAL statements as to climate applicable to Alaska as a whole are entirely out of the question, on account of the difference in conditions which obtain on the coast and in the interior, even thirty miles back from the sea. The climate of southeastern Alaska can be compared with that of southern Norway. It is much milder than the climate in the same latitude on the Atlantic coast. This is due to the warm current of the Pacific that sweeps up from the southwest, having the same effect that is produced by the flow of the Gulf Stream in the Atlantic. Summer weather on the coast is much more liable to be wet and cloudy than in the interior. May, June, and part of July are usually all one could desire, but from that on to the opening of winter disagreeable weather is the rule and not the exception. At St. Michael, during this period, rain falls four days in seven. In October the winds shear round from the southwest to the north and fine weather sets in. During the fall wind storms are of frequent occurrence.



INDIAN BURYING GROUND.

The mean temperature for the four seasons and the year, at four different points in the lower Yukon district, are given in the following table. The first point is Fort Get There, on St. Michael; the second, the Greek Mission at Cogmute, on the Yukon, 150 miles from its mouth; the third, at Nulato, a Roman Catholic Mission, several hundred miles further up the river, and the fourth at Fort Yukon:

Means.	St. Michael.	Cogmute.	Nulato.	Fort Yukon
Spring, ...	29.3	19.62	29.3	14.22
Summer, ...	53.0	59.32	60.0	59.67
Autumn, ...	26.3	39.05	36.0	17.37
Winter, ...	8.6	0.95	14.0	23.80
Year, ...	29.3	26.48	27.8	16.92

Chief Willis L. Moore, of the Weather Bureau, has furnished some interesting facts about the climatic conditions in Alaska, and touching particularly on the Klondike region.

The general conception of Alaskan climate is largely due to those who go down to the sea in ships, and this is not strange when we consider the vast extent of shore line—over 26,000 miles—possessed by that Territory. The climates of the coast and interior are unlike in many respects, and the differences are intensified in this, as perhaps in few other countries, by exceptional physical conditions. The natural contrast between land and sea is here tremendously increased by the current of warm water that impinges on the coast of British Columbia, one branch flowing northward toward Sitka, and thence westward to the Kadiak and Shumagin Islands.

The fringe of islands that separates the mainland from the Pacific Ocean from Dixon Sound northward and also a strip of the mainland for possibly twenty miles back from the sea, following the sweep of the coast, as it curves to the northwestward to the western extremity of Alaska, form a distinct climate division which may be termed temperate Alaska. The temperature rarely falls to zero; winter does not set in until December 1st, and by the last of May the snow has disappeared except on the mountains. The mean winter temperature of Sitka is 32.5, but little less than that of Washington, D. C. While Sitka is fully exposed to the sea influence, places farther inland, but not over the coast range of mountains, as Killisnoo and Juneau, have also mild temperatures, throughout the winter months. The temperature changes from month to month in temperate Alaska are small, not exceeding 25 degrees from midwinter to midsummer. The average temperature of July, the warmest month of summer, rarely reaches 55 degrees, and the highest temperature of a single day seldom reaches 75 degrees.

The rainfall of temperate Alaska is notorious the world over, not only as regards the quantity that falls, but also as to the manner of its falling, viz., in long and incessant rains and drizzles. Cloud and fog naturally abound, there being on an average but sixty-six clear days in the year.

Alaska is a land of striking contrasts, in climate as well as topography. When the sun shines the atmos-

phere is remarkably clear, the scenic effects are magnificent; all nature seems to be in holiday attire. But the scene may change very quickly; the sky becomes overcast; the winds increase in force; rain begins to fall; the evergreens sigh ominously, and utter desolation and loneliness prevail.

North of the Aleutian Islands the coast climate becomes more rigorous in winter, but in summer the difference is much less marked. Thus, at St. Michael, a short distance north of the mouth of the Yukon, the mean summer temperature is fifty degrees, but four degrees cooler than Sitka. The mean summer temperature of Point Barrow, the most northerly point in the United States, is 36.8 degrees, but four-tenths of a degree less than the temperature of the air flowing across the summit of Pike's Peak, Col.

The rainfall of the coast region north of the Yukon delta is small, diminishing to less than ten inches within the Arctic Circle.

The climate of the interior, including in that designation practically all of the country except a narrow fringe of coastal margin and the territory before referred to as temperate Alaska, is one of extreme rigor in winter, with a brief, but relatively hot, summer, especially when the sky is free from clouds.

In the Klondike region, in midwinter, the sun rises from 9.30 to 10 A. M., and sets from 2 to 3 P. M., the total length of daylight being about four hours. Remembering that the sun rises but a few degrees above the hori-

zon, and that it is wholly obscured on a great many days, the character of the winter months may easily be imagined.

We are indebted to the United States Coast and Geodetic Survey for a series of six months' observations on the Yukon, not far from the site of the present gold discoveries. The observations were made with standard instruments, and are wholly reliable. The mean temperature of the months October, 1889, to April, 1890, both inclusive, are as follows: October, 33 degrees; November, 8 degrees; December, 11 degrees below zero; January, 17 degrees below zero; February, 15 degrees below zero; March, 6 degrees above zero; April, 20 degrees above. The daily mean temperature fell and remained below the freezing point (32) from November 4th, 1889, to April, 21st, 1890, thus giving 168 days as the length of the closed season of 1889-90, assuming the out-door operations are controlled by temperature only.

The lowest temperatures registered during the winter were: 32 degrees below zero in November, 47 below in December, 59 below in January, 55 below in February, 45 below in March, 26 below in April.

The greatest continuous cold occurred in February, 1890, when the daily mean for five consecutive days was 47 degrees below zero. The weather moderated slightly about the 1st of March, but the temperature still remained below the freezing point. Generally, cloudy weather prevailed, there being but three consecutive

days in any month with clear weather during the whole winter. Snow fell on about one-third of the days in winter, and a less number in the early spring and late fall months.

Greater cold than that here noted has been experienced in the United States for a very short time, but never has it continued so very cold for so long a time. In the interior of Alaska the winter sets in as early as September, when snow storms may be expected in the mountains and passes. Headway during one of these storms is impossible, and the traveler who is overtaken by one of them is indeed fortunate if he escapes with his life. Snow storms of great severity may occur in any month from September to May, inclusive.

The changes of temperature from winter to summer are rapid, owing to the great increase in the length of the day. In May the sun rises at about 3 A. M. and sets about 9 P. M. In June it rises about 1.30 in the morning and sets at 10.30, giving about twenty hours of daylight and diffuse twilight the remainder of the time.

The mean summer temperature of the interior doubtless ranges between 60 and 70 degrees, according to elevation, being highest in the middle and lower Yukon valleys.

As a rule, in the coast country it is clear but a few days in the year. Usually, however, in June and July, the sun pierces the heavy clouds and brightens the whole landscape. The rains are not so cold and chilly as elsewhere even in southern latitudes.

Notwithstanding the marked variations in the climate, Alaska is essentially a healthy country. The only prevailing diseases are those of a bronchial nature, and in most cases these troubles can be directly traced to imprudent exposure.

The snow of the interior partakes much of the character of frost, sifting slowly down in intensely cold weather until it lies several inches deep, light and fluffy; but at times, in warm weather, it thaws and settles into a hard crust, affording excellent surface for sledding.

The great precipitation and humidity of the atmosphere in Southern Alaska cause the entire coast region to be clothed in a mantle of perennial green. Vegetation is dense and the forests magnificent. The soil is rich, though in the heavily timbered section it is shallow and from the most eastern point of the territory to Kadiak root crops are easily grown.

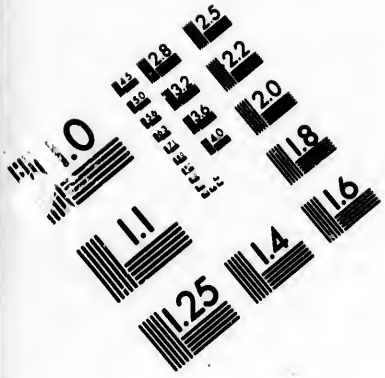
The remarkable labyrinth of islands which skirt the coast of Alaska, the great plains of the interior, intersected by deep rivers, gigantic snow-crowned mountains, the active volcanoes and the mighty ice fields, with many other singular, beautiful, and awe-inspiring gifts of nature, combine to make the country of the new gold fields one of notable grandeur and wonder.

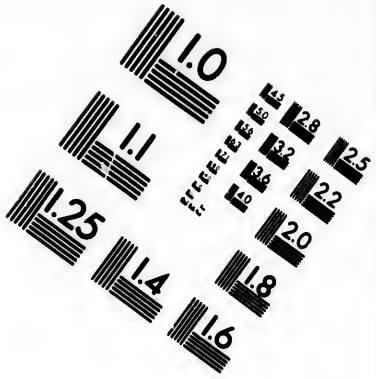
Alaska is, topographically speaking, naturally divided into two great divisions—Southeast and Western Alaska. Mt. St. Elias marks the dividing line between Western Alaska and Southeast Alaska, at 141 degrees west longitude, running north from this point to the

Arctic Ocean. For a number of years it was supposed that Mt. St. Elias was within American territory, but late surveys show most of its base to be just over the line in the Canadian Dominion.

Many of the islands in the inland, or tourist route, have the appearance of half-submerged mountains, and water two hundred fathoms deep is often found, where the breadth of the channel can be almost spanned, by the length of the ship.

Fiords are numerous, some of them winding in serpentine fashion a distance of twenty or more miles, into the islands or mainland. The great rivers of the interior drain immense valleys, with mountain ranges everywhere visible. Lakes are abundant, often surrounded by tundra or swamps, very frequently impenetrable, covered with brush, rank grasses, and other vegetation. After the interior is reached—and by this is meant after the coast mountains are crossed, in many places, only twenty or thirty miles from the coast—the soft earth and luxuriant vegetation of the coast country give place to frozen ground, and lichens and mosses on the mountain sides and in the valleys. But though the vast plains of the interior are completely within the grasp of the ice king for eight months of the year, with the advent of the long days of summer water runs, flowers bloom, and grasses spring into life as if by magic, and their growth is at once luxuriant and rapid, even though in many places the soil is never thawed beyond a few inches below the surface. In the far





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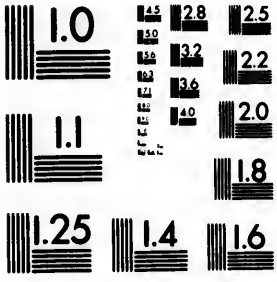

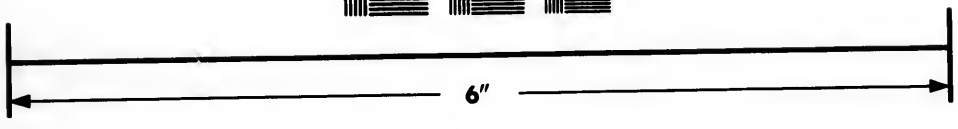

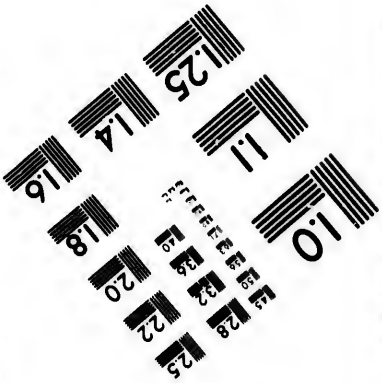

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north at St. Michael, and at Point Barrow, wells have been dug through sixty feet of solid ice, and the same condition has been noted on the Yukon, at Forty-Mile.

The Aleutian Islands, stretching far out into the North Pacific, surrounded by rocks scarred and battered for ages, by the boisterous waves, are without trees, but they are thickly covered with a low growth of luxuriant vegetation. Between the mountains and the sea are small plateaus or prairies, with soil enriched by vegetable mold, and suitable for domestic gardening. Grass grows abundantly here, sometimes to a height of six feet. It is cured by the natives, to feed a few small Siberian cattle, and they also braid it into useful and often ornamental articles, such as baskets, hats, and mats.

Many people familiar with Alaska deem Cook Inlet, which lies to the north of Kadiak, to be the pleasantest portion of the country for residence. Its skies are always bright in summer.

The guiding landmarks of Alaska may be said to be its grand mountains, volcanic peaks, and mammoth glaciers. Mt. St. Elias lifts its ermine top over 18,000 feet above the level of the sea. In the distance it seems to have its base on the very shore of the ocean, although in reality sixty miles distant. From the south side of Mt. St. Elias eleven glaciers slowly make their way oceanward, one of them, named Agassiz glacier, being estimated to be twenty miles in width and fifty in length, covering an area of one thousand square miles.

Mt. Fairweather, one hundred and fifty miles south of Mt. St. Elias, is about 15,500 feet high; Mt. Crillon, 15,000; Mt. Perouse, 14,300, and Mt. Wrangel is over 19,000.

There are thirty or more volcanoes in Alaska, six or eight of which are in an active state of eruption. Shishaldin, which is 9,000 feet high, is certainly burning, and its smoke may always be seen in clear weather. It is situated on Unimak island near the pass of the same name, usually followed by vessels in entering Bering Sea. Pavlof, about one hundred miles to the eastward, is another smoking mountain; the glow from its crater may be seen reflected against the heavens. Mt. Makushin, at the eastern extremity of Unalaska island, is about 5,500 feet in height, and gives evidence of being more or less active; while the tops of Pogrumnoi and Shishaldin, on Unimak island, serve as beacons at night or in foggy weather for vessels on their way into Bering Sea, as they can be seen distinctly, towering above the dense atmosphere. Akutan island has a smoking volcano, 4,000 feet high; and on Atka island there are several volcanoes, from 3,000 to 4,000 feet in height, which occasionally emit smoke.

Mt. Logan, the highest known mountain in North America, unless it may be Mt. Wrangel, has an elevation of 19,000 feet. Some surveyors claim that Wrangel is a loftier peak than Logan, but its exact height is unknown. Wrangel is clearly within Alaska, but Logan is a few miles east of the line, in Canadian territory.

Hot mineral springs abound all over the various groups of Alaska, especially those stretching from the Alaskan peninsula westward toward Asia. About fifteen miles south of Sitka hot springs are found which seem to contain remarkable curative properties. The Indians have for many generations used the health-giving waters, and the white man follows in his dark brother's track.

The aspect of the land about Bering Strait is mountainous but not remarkably precipitous. The strait is only forty-eight miles wide, and the narrow passage is partially filled by some islands. It is not without the range of probability that the day will come when a railroad around a large part of the circumference of the world will pass over this now silent strait.

It is considered physically impossible to span Bering Strait with a bridge, owing to the swift current and the vast quantities of ice which, in winter, are continually flowing through, and which would speedily demolish such a structure. It may be possible, however, that the strait could be tunneled, and it has been suggested that it could be filled in with rock, allowing sufficient openings for the waters to run through and for vessels to pass, thus forming an adamantine roadway between the extreme west and east, as represented by the United States and Siberia.

The mountains that mark the westernmost point of the continent at Cape Prince of Wales are rocky and barren, the ledges standing upon high pillars, with shat-

tered sides and uneven surfaces. Toward the base, facing Bering Strait, the slope is gradual, extending into a low sandy beach reaching out into the strait a mile or more and then bearing to the north. Endless quantities of rock could be taken from these mountains of solid stone and dumped into the strait, until a roadway, similar to the great wall of China, but deeper and broader and stronger, would rise from the bottom of the shallow waters. The expense, it is true, would be enormous—and no attempt is here made to discuss scientific difficulties in the way—but let it be remembered that all great engineering projects have been first ridiculed and denounced as chimerical, as witness the Suez Canal, Nicaragua Canal, the Panama Canal, and other great triumphs of engineering skill. The practicability of the Panama Canal, in which the French people invested tens of millions of dollars, though yet uncompleted, has been fully demonstrated. To carry so gigantic an enterprise to a successful completion unlimited capital and labor would be required. In the matter of labor, if white men could not be found, Eskimos could be utilized.

The tides of the Pacific coast of Alaska differ from those we are familiar with on the Atlantic seaboard. Lieutenant Ray, in reporting to the Hydrographic Office, speaks of them as "perplexing tidal irregularities." During the summer months of May, June, and July there occurs but one high and one low water during each twenty-four hours, high water at the full change of the moon occurring about midnight and varying but slightly

from that hour during the entire six months. The springs range from eight to ten feet, the neaps from four to five feet. The tides are almost stationary for two hours on either side of high and low water, unless affected by strong winds outside.

During August, September, and October, there are two high and low waters during twenty-four hours, a superior and an inferior tide. During the winter almost a reversal of these rules appears to take place. In November, December, and January the twelve-hour tides again occur, but the high water appears at noon, instead of midnight. In February, March, and April there are two tides, the superior high water occurring in the afternoon. Thus it may be said that in the summer the tides are low during the day, the highest occurring during the night, and in winter the opposite is the case. The tides during those months when two occur every day are far more irregular than at the time when there is but one. Another anomaly is that the greatest range frequently occurs at the first and last quarters, instead of at the full and change of the moon.

CHAPTER XIII.

CIVILIZED ALASKA.

The Government, Trade, and Cities of the Oldest Parts of the Northern Territory—Settlements of the Coast and how they are Supported—The Great Salmon Canneries. The Strong Hand of Uncle Sam—The Greek Church and its Work among the Natives—The Capital and Metropolis of the Territory—What the Intrepid Missionaries Have Done for Alaska.

SINCE the sending of Russian missionaries to Alaska more than a century ago, the march of civilization in that part of the frozen North has been steady, though somewhat slow. Perhaps no other element has contributed so much to the progress as those unselfish, determined missionaries and the ones who succeeded them. If they endured all manner of privations and hardships in their work, they nevertheless had the satisfaction which comes to all in viewing the successful issue of their labors. What has been accomplished for civilization is now to be seen on every side in the way of thriving towns and prosperous industries, which speak volumes for the glorious future of a country which, with all the evils of its climate and remote situation, is singularly blessed in many ways.

The hand of civilization has not as yet extended far from the coast in Alaska, but it is certain that with the new discoveries of gold, and the tide of population flowing into the interior, the pleasant conditions existing in

the towns of the southeast, the comforts and many of the luxuries, the schools and industries, the courts and other safeguards, will soon follow.

Sitka, while not the largest town in Alaska, that position being held by Juneau, is the capital of the Territory, and in addition to its being the seat of government territory, has other claims to the distinction of being regarded as the centre of its civilization. It is situated on Baranof Island, the best known of all the islands in the Archipelago. It is 120 miles long and 30 miles wide. Here Alexander Baranof, a Russian merchant, established a trading post as long ago as 1799. The present town is situated about three miles south of the site of that post. A fort was early established at Sitka and continued until the transfer of the territory to the United States. After the withdrawal of the Russian troops the natives destroyed much of the property and sacked the town, but order being restored again the town has grown steadily since then, though its population even now numbers something less than 3000.

Sitka is the official residence of the Governor of the territory, the United States District Judge, and other officers. It is also the home port of men-of-war and revenue vessels patrolling the surrounding waters. The town is built on level land at the mouth of the Indian River at the foot of Mt. Verstovi. Lincoln, which is the main street, extends from the government wharf to the old Russian sawmill, one of the ancient landmarks of the island. A large parade-ground fronts the harbor. A granite monument in the centre is the United States

Astronomical Station. Mail steamers remain at Sitka twenty-four hours, and others for a shorter time. The chief objects of interest are the "Castle," once occupied by the manager of the Russian Fur Company, the Greek Cathedral Church, the Indian village, the block house and Russian cemetery, and the museum and industrial school.

The barracks and custom-house are relics of the Russian dominion, and in the former is the territorial jail and offices of the Government. A long flight of steps leads to the "Castle," where the whites protected themselves from the natives in 1867. On this site Baranof first built his home. Later the Russian Governor erected a mansion there, which was destroyed by an earthquake in 1847, and rebuilt. It was a massive and in some respects a unique structure. Built of cedar logs, it was joined by copper boilts, and riveted to the rock foundation. It had a glass cupola, which was formerly the harbor light-house. The building was richly furnished and decorated, but was looted during 1867 after the departure of the Russian troops. In 1893 it was restored, but soon after wrecked by a fire.

Baranof built a small chapel at Sitka in 1816, but when Ivan Veniaminoff was made Bishop of Russian America he erected a cathedral in 1844. It occupies a quadrangle on Lincoln Street. The chime of six bells was sent from Moscow. The interior is richly decorated. The treasury contains rich and beautiful vestments. The chapel of St. Mary, nearby, is used for services in winter. The altar picture there of the Madonna and Child, shadowed

with heavy silver draperies, is much admired, as are some similar works elsewhere in the cathedral and chapel. So it will be seen that even in this far away land art is not forgotten. The Czar of Russia, as the head of the Greek Church, maintains the churches and chapels of Alaska, numbering some seventy. He transferred the Bishop's see from Sitka to San Francisco at one time, but removed it to Unalaska, and then back to Sitka. Thus some of the old glory of St. Michael's Cathedral has been restored. The Bishop occupies a long, green-roofed, comfortable mansion.

The Lutheran Church, built by Governor Etholin in 1840 for the Swedes and Finns employed in the foundries and shipyards, was the garrison church after the transfer, but was later abandoned and torn down.

One of the largest buildings in Sitka is the big log structure, now occupied by a general trading store, was formerly the chief office of the Russian-American Fur Company. There is an eminence in the northern part of the town, where a Russian race-track was formerly located, which has been reserved for the erection of an executive mansion either by the National Government or the Commonwealth when Alaska is admitted to the Union.

Sitka had at one time a large ice trade, the product being shipped down the coast to the cities of the Pacific seaboard, but the cheap method of making ice by machine has ruined this industry.

The "Blarney stone," a square block on the beach, is supposed to endow those who kiss it with a magic tongue.

CHILKOOT COAT.

The Sitka Mission and Industrial School was founded by the Presbyterians in 1878, and is a prosperous and useful institution. The native village fronting on the harbor north of the Sitka wharf has been transformed since 1880. Prior to that time the Indians lived in great communal dwellings surrounded by filth, but Captain Glass had the village cleaned at that time and the houses numbered for record and sanitary inspection. The enforcement of rigid rules and the stimulation of the Indian pride have wrought much change for the better. Mrs. Tom, who is sometimes called the queen, is by no means of princely lineage, but comes of the commonest Yakutat stock. She has shown a remarkable ability as a money-maker. She is one of the shrewdest traders in the territory, and owns lands and schooners worth a very nice fortune. The Sitkan Indians number about 1000. They are descended from wanderers and renegades of many tribes, and are regarded with contempt by almost all the other Indians of Alaska.

The fur trade has long been Sitka's chief industry, but the gold discoveries in the last thirty years have been very demoralizing to it. In 1871 Edward Doyle found float gold on the shores of Silver Bay near Sitka. He uncovered a quartz stringer on Round Mountain and another on Indian River. The Haley and Rogers lode on Salmon Creek was first worked by the garrison officers. The Stewart mill, on a neighboring claim, was built in 1877, and the Bald Mountain claims were soon after discovered. Governor Swineford's energy revived the languishing mining interest in 1885, and since then

a number of more or less valuable claims have been opened, and many of the citizens of Sitka are directly or indirectly interested in mining enterprises.

The government of Alaska as carried on at Sitka is the usual one applied to all the Territories of the United States, with some modifications necessary to adopt it to the peculiar conditions. The Governor and Secretary of the Territory are appointed by the President, and live and carry on their duties at Sitka. By far the most onerous duties, however, fall to the share of the court officers. At the head of the judicial branch is the United States Judge, appointed by the President. There are also the United States Marshal and the Commissioners, the former having deputies in various other towns. The active force at hand to carry on the work of government is at present small. The police force consists of the eight deputy marshals. There are in all eight Commissioners and eight deputies. In case of serious trouble the marshal could summon a posse of citizens to enforce order. The laws of the United States are rigidly enforced in Southeastern Alaska, but, of course, with so small a force at his disposal the marshal must largely depend on the citizens themselves to enforce order in the new gold-fields of the interior. There is also a land office at Sitka, and it is probable that two others will shortly be established at Circle City and Dawson.

Captain Ray, of the United States Army, and several officers of his command who are familiar with Alaska, are at present in the Territory, with a view to making a report on the necessities of the case there in the matter

of preserving the peace. It is not unlikely that one or more companies of the regular army will be ordered north in the spring.

The metropolis and gateway of our big northwest territory is Juneau, a town about twenty years old. In spite of the immensity of the couutry it is hard to find room enough on the coast to build a town on, and consequently Juneau is much crowded for space. The streets are hardly half the usual width, and the houses reach up the foot of the mountain as high as it is safe to build them on account of the risk from snow-slides.

As there is plenty of timber everywhere, all the houses, including the Federal building, are of wood. Even the Indians live in fairly good frame houses. The law, as far as it extends, is administered by the United States authorities. A Federal commissioner hears all cases that come up, disposing of the smaller ones and holding the more serious offenders to the United States Court. Most of the cases are for violation of the liquor regulations. For the most part the liquor laws are a dead letter. Dozens of saloons are run openly without paying any kind of license. An occasional arrest is made, but it does not serve as a check on the business, Public opinion is against the enforcement of the law. The only offence of this nature that is regarded seriously is the selling of liquor to the Indians. Public opinon condemns this, and there are occasional convictions for it.

The Indians give more or less trouble in their tribal relations. They seem to be unable to understand that

they cannot make and enforce their own savage laws as they once did.

A slight hill, or ridge, divides the business portion of Juneau from the Indian town. Standing on this ridge at any time in the day one may enjoy an animated picture on the beach below. The one important item in life to these Indians is their fishing. Their houses line the beach at a safe distance above high tide, and all the intermediate space is filled with the appurtenances of their craft. Their long boats, or kyacks, turned up at both ends, and which cut the water like a knife, are drawn up out of reach of the surf, and are generally covered over with skins or cloths to protect them from the weather. And of very good workmanship are these boats. Some of these are six feet across in the widest place, and may be twenty or thirty feet long, hewn from a solid piece of timber. From the care and accuracy bestowed upon them it looks as though it might easily take a good workman a year to make such a craft. These boats are very speedy, and the Indians fearlessly undertake any sort of a sea voyage in them. Sometimes the Alaskan Indians go all the way down to Puget Sound for the sake of a month's work during the hop-picking season and for the incident excitement. Their chief dependence is fishing.

Juneau is an ideal mining camp. Every building in the town, and every inhabitant, bears the aspect of activity and prosperity peculiar to live mining camps.

With but few exceptions, the inhabitants have not found time to clear their lots of the stumps or gnarled roots that litter as well as make a rustic ornament for

every door-yard. But there are a number of handsome residences and neat business houses; and a system of water works that draws its supply from the purest of mountain streams, and an electric light plant which for four months of the year gives way to the brilliant light of heaven's sun, taking its turn again for four months in the winter, excepting only a few hours at midday.

All roads lead to Rome, it is said, and all routes in Alaska lead to Juneau. The Yukon miner comes here to outfit for his long and hazardous trip into the interior; all travellers who come to Alaska, whether for business or pleasure, and even the Uuited States Court, if in session at Sitka, the capital, comes here for nineteen-twentieths of its jurors, without whom it could not transact business. Juneau is rightly called the metropolis. Whether she will retain this prestige remains to be seen. If so, one of two things must occur. She must plane down the sides of her mountains or erect sky-scraping buildings with elevators to accommodate her populace, for nearly every foot of available ground is already occupied.

The population of Juneau numbers about three thousand souls; and the enterprise of the people and volume of business are shown by the support given to the three newspapers here published: The *Mining Record*, the oldest paper published here, is devoted especially to the mining interests of the country; the *Searchlight*, a metropolitan-appearing journal, and the *News*.

Juneau was founded in the winter of 1880–'81, six months after the discovery of gold (August 15, 1880),

by Joseph Juneau and Richard Harris. It went under the name of Harrisburg at first, and afterward was called Rockwell, but the miners, at a meeting about a year after its foundation, decided to rechristen it in honor of the discoverer of gold.

Fort Wrangel is an important station, on an island by that name, off the mouth of the Stikine river. It was the second settlement in Alaska, and commands a broad, mountain-walled harbor that lies eighty miles in from the ocean. This gives it a warmer and a drier climate than places on the outer coast. The thermometer often reaches 90° in the summer, and extreme cold is almost unknown. Admiral Wrangel founded the first settlement on the island. United States troops occupied a fort there for the ten years following 1867, but they were then withdrawn. With the decrease in the mining interest on the Stikine river, Fort Wrangel's trade was almost lost, and the little village is now supported almost entirely by the lumber trade. It is destined to see much of a revival now, however, for it is on one of the main routes to the Klondike country, and all the boats stop there.

The Metlakatlan Indians, who emigrated to Alaska from British Columbia, have an interesting settlement on the Annette islands in the Alexander archipelago, and a few white people live among them and direct their labors, which are devoted largely to canning salmon. Some 8000 cases of salmon are shipped away annually. These people publish a newspaper. They have a photograph gallery, jewelry making stores, schools, and vari-

ous other establishments. There are many salmon-canning settlements along the coast, but the largest establishment is at Loring, at the entrance of Naha bay. The canning industry represents an investment of several million dollars, and the output of all Alaska amounts at present to over half a million cases.

Killisnoo, on Kenanow Island, is the site of large oil and guano works. There is a post-office, a government school, and a Russian chapel.

Fort Kenai is located on Cook's inlet, which extends 160 miles inland between the Chignik range and the mountainous Kenai peninsula. This inlet and the settlements along its shores have long figured prominently in the talk of the gold-fields of the north. Sheltered on all sides, its shores enjoy a mild climate. The warm, dry summers won for it the name of "Summer Land" from the Russians. Fort Kenai was garrisoned by the United States troops for some years, but it is only a trading-post now. There are three canneries on the inlet. Gold was found there as early as 1855, and prospectors are now camped in large numbers along the shores.

St. Paul, with a population of 500, is on the northeast shore of Kadiak island, and was the first headquarters of the Shelikoff and Baranof fur trade. Furs to the value of $300,000 are shipped yearly.

On the island of Unalaska is the town of Iliuhuk, "the curving beach," better known as Unalaska, which is a port of entry for all ships passing in or out of Bering Sea. It is the metropolis of the west, though its popula-

tion is less than 500. A United States commissioner and deputy collector of revenue reside there. The Greek Church is the second in size in Alaska. Beside the Russian parish school there is a government day school and a Methodist mission. It is the headquarters for the Alaska Commercial Company. The ships of the Pacific-Arctic whaling fleet call there for supplies, and during the *modus vivendi* in the early nineties it was the headquarters of the American and British fleets. There is direct communication with Sitka, 1250 miles distant, by monthly mail steamers, and frequent communication with San Francisco, 2100 miles away.

To Dr. Sheldon Jackson, who first visited Alaska in 1884, is due, in a large measure, the present excellent condition of the Alaska school system. While the missionaries had been working faithfully to ameliorate the condition of the natives since late in the last century, their progress had been slow. Through Dr. Jackson's efforts, Mrs. A. R. McFarland, an energetic, capable woman, took up the work at Fort Wrangel, where a native teacher had long sought unaided to elevate the moral status of his people. Mrs. McFarland became nurse, doctor, undertaker, preacher, and teacher. No marriage ceremony then existed among the natives, and polygamy, slavery, and devil dances were common. Her untiring efforts did much to eradicate these evils and further substantial progress. She left Fort Wrangel a few years later, and is now engaged in the same work at the lower portion of Prince of Wales Island, where she is loved and respected by the natives.

In 1885 Congress made an appropriation for the Alaska public school system, and Dr. Jackson was appointed General Agent of Education for the Territory. In this capacity he has established schools in the most advantageous points throughout the whole Territory, and the apportionment of the public moneys among the already established church denominations has made the missionary work of Alaska a mighty bulwark of religious strength for the welfare of the natives. Dr. Jackson is truly a pioneer Christian worker. After many years of arduous duty in a number of the Western Territories he sought a new field in the great Alaskan Territory. He was confronted by the totally unorganized state of the country, devoid of laws or government; but his indomitable spirit was not held down by difficulties—he gained the ear of the powers at Washington—and his earnest, fervent faith is daily proved by his works. To Dr. Jackson also belongs the credit of importing reindeer from Siberia to Arctic Alaska. While in search of new fields for missionary and school work he discovered that the Eskimos were starving. He at once interested Government in the cause, and to-day the industry of domesticating reindeer in that section is an assured fact.

In this connection it is proper to add that this humane proposition was at first met with severe criticism and opposition on the ground that it was impracticable and a useless expenditure of public money. And were it not that Mr. Harris, United States Commissioner of Education, gave it his hearty support and encouragement, the most beneficent act ever extended to a worthy and

starving people would not have become as it has, an assured success. And to this broad-minded and worthy official, who has stood faithfully by the cause of education in Alaska, is also largely due the credit of its advancement in this far-off Territory.

The first school in Alaska was organized at Kadiak by Gregory Shelikoff in 1784. And the first church building was also there erected; it still exists, but the school has been extinct for a quarter of a century.

The Indian industrial training schools have proved excellent institutions. Among these three deserve especial mention. They are located at Sitka, Koserefski, on the Yukon, and at New Metlakahtla. The founder and director of the latter is Mr. William Duncan, to whose work reference is made elsewhere in this volume. The school at Sitka is partially aided by this government, and is under the management of the Presbyterian Board of Home Missions, and that of Koserefski is under Roman Catholic supervision.

In these schools the boys are taught painting, carpentry, shoemaking, and other trades. The girls are instructed in cooking, baking, sewing, and all branches of plain housekeeping, the purpose, in short, of these schools, being to civilize and christianize the native children.

The number of private schools, supported by various religious denominations, is nineteen, while the number supported by the government is sixteen. The Russian church, established so long ago, has many communicants, but many of them retain their belief in witchcraft, polygamy, and kindred barbarous practices.

The indefatigable efforts of teachers and missionaries, their absolute devotion to the work of civilization and Christianizing the natives of Alaska has been of incalculable benefit to this hitherto neglected people. There has been mental, moral, and physical growth, whose influence is far-reaching, and which should command the hearty sympathy and support of all humanitarians, irrespective of class or creed.

The Greek Church, so early in the field, had a few priests who did good work for the natives.

Father Tosi, of the Roman Catholic faith, has labored long years with devotion on the Yukon. Father Althoff, after sixteen years of Alaskan labor, has been appointed to work in Vancouver, British Columbia. He opened the mission work in Juneau, founded there the school and hospital of St. Ann's and the Roman Catholic Church. Through many discouragements and uncertainties, Father Althoff and the good sisters labored at Juneau, receiving nothing for their services save their their frugal board and modest apparel.

There are three principal Episcopal missions—St. James, Fort Yukon, and Circle City—that administer to about 2000 natives, 1300 of whom are baptismal members of the church, and there are several other stations besides these. Much painstaking work has been done in offering them the Scripture in a way that they can understand. Many of the Indians can read in their own language, which, as printed, consists of a literature of translations of the Bible, Prayer-book, and Hymn-book. These Indians seem particularly susceptible to religious

teaching. A little education seems to show more quickly when applied to an Indian than it does on any other race. It shows on the surface. It smooths out the wrinkles on his forehead, as if the tangled threads of life had been set aright. He looks much better, and no doubt the effect is far reaching.

A thousand miles is as nothing in the jurisdiction of Bishop Rowe, of the Episcopal Church. It is more than that far from Anvik to Circle City, and yet they are spoken of as neighbors. The Rev. J. L. Prevost has charge spiritually of the few hundred miles of the river, which includes the mining towns and the post at the mouth of Tanana river, which latter place is called Fort Adams although the mission is designated St. James. Mr. Prevost has made that station his residence for two or three years. They have a boarding-school for natives there, and among other enlightening influences he has started a small newspaper, which is now issued from the press twice a year, and it is a very interesting little paper, for it contains the news of the country—something of all that is going on—from Herschel Island to the mines, and from Bering Sea to Mackenzie River. Mr. Prevost will have a small steamboat at his disposal next year, and will be enabled to move thoroughly over his field. The work of religious teaching at Fort Yukon for the most part has been deputed to a native catechist.

Other Protestant denominations have missions on the Yukon and along the coast of Alaska, notably the Presbyterians and the Methodists.

The work of the Protestant missionaries will be facilitated by the introduction of the little Siberian reindeer, provided the experiment proves a success, which now seems likely, although it will be rather slow in practical benefits. The Eskimos will need to be patiently taught new traits. Their natural inclination is to kill and eat. This likewise is the ruling passion of their dogs, and both must be trained and restrained.

The majority of the Protestant missionaries are married, and, of course, have their families with them. There are those, especially of the Church of England missions, who have almost grown old in this particular field. Bishop Bompass, of the Selkirk diocese, has been in the country since the establishment of the mission, thirty years ago. It is said he can take a slab of dried salmon in each pocket, and for a few days out-travel an Indian courier. And the worthy bishop, while extending the sway of the Gospel, has taken some thought at odd times of worldly matters. His wealth is estimated at $250,000. The Jesuits enter the field, of course, to stay.

Supported distinctively by the American Province of the Moravian Church, the mission in Alaska dates from the year 1884, when in response to the invitation of Dr. Sheldon Jackson, A. Hartmann and William H. Wienland were sent on a tour of exploration to the Nushagak and Kuskoquim Rivers in northwestern Alaska. The first permanent missionaries, William H. Weinland and John H. Kilbuck and their wives, together with Hans Torgersen, who was to go out temporarily to aid in erecting

the needful houses, landed at the mouth of the Kuskoquim River, on June 19, 1885. On August 10 Torgersen was drowned whilst sailing up the river with supplies for Bethel, as they named the station they founded. The first converts were received into Church fellowship on September 10, 1888. A second station was founded at Carmel, on the Nushagak, by Frank E. Wolff, in 1887, who was accompanied by his wife and Mary Huber.

CHAPTER XIV.

NOTES FROM ALASKAN HISTORY.

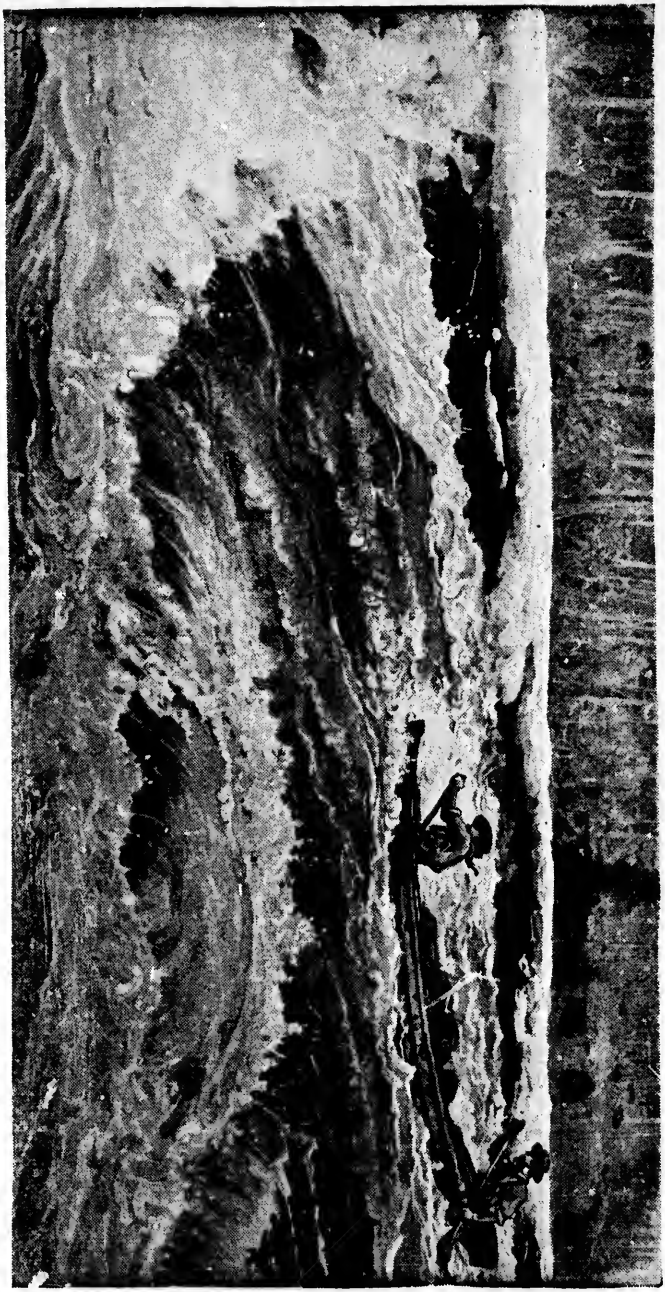
Vitus Bering, an emissary of Peter the Great—Discovery of Mount St. Elias—Fourteen lost sailors—Alexander Baranof and the inception of the Russian American Company—Spanish attempts to possess Alaska—Russian oppression and cruelty—An idyll of Baranof Castle—Purchase by the United States—A blood-stained flag—The naming of the territory—Military occupation and civil government—Governors past and present—Proposed legislation.

THE history of our northwest possessions begins with the voyages of discovery by Vitus Bering, an officer in the Russian navy. In 1728, bearing a commission from Peter the Great, he found the strait, between Siberia and America, which bears his name. In 1741, at the behest of the Empress Anne, he started to find Vasco de Gama's fabled land. After encountering and weathering a severe storm he reached Kayak Island on St. Elias Day, July 17th, 1741, saw and named the great mountain that to-day is one of the monuments which set the line between the American and British possessions. A few days later this intrepid old sea-dog was shipwrecked on the Comandorski Islands and lost his life. His scurvy-stricken crew put back into a Siberian port, carrying with them a few skins of seals whose flesh had kept them from starvation. Immediately Russian traders sent out expeditions to get more of these rich furs. Tschirikow was in command of one of these parties, and arriving on the coast near the present site of Sitka, sent a boat's

crew to make a survey of the bay. They failed to come back, and a second crew was dispatched to make search. After waiting for three weeks Tschirikow sailed for home short of fourteen men and a number of boats. This experience put a damper on Alaskan exploration, and there was but little activity in this direction until 1783, when Gregory Shelikoff, a rich Siberian merchant, established a post on Kadiak Island. He took into partnership with him Alexander Baranof, a Russian merchant, who had been ruined by the loss of his caravans. They seem to have been a very energetic firm, and did much to establish their business on a firm basis. In May, 1799, Baranof built a stockaded post on the island which bears his name, three miles north of the present city of Sitka. That same year Emperor Paul VIII granted a charter to the Russian American Fur Company. This corporation was the result of a consolidation of nine rival Siberian trading concerns, and had a number of the imperial family as stockholders. Up to this time the Romanoffs had given but little attention to their American domains. The new company was given absolute control of the country for a period of twenty years, and Baranof was made the resident manager.

In the meantime the news of Tschirikow's discoveries had reached Spain and had aroused the cupidity and interest of the reigning monarch.

Spain took alarm at the apparently important nature of the Russian explorations. In order to neutralize what she evidently considered an encroachment on her



SHOOTING THE RAPIDS, ENROUTE TO KLONDIKE.

claimed rights to all territory not chartered, Spain, through her cabinet, ordered an exploring expedition to proceed along the coast to the northward of California.

This expedition, which was under Perez, added somewhat to the then slight knowledge regarding the Alaskan peninsula. Perez sighted and mapped two capes, to which he gave the names of Santa Margarita and Santa Magdalena. The Perez expedition did not land at Santa Margarita, and the observations of the Alaskan territory recorded by the leader of the expedition were based upon his experience at Santa Magdalena.

Unquestionably the mapping of the coast by Perez was crude and faulty, and it would scarcely call forth comment but for the fact that some of the members of his expedition rescued from the hands of the natives an old bayonet and other implements of a civilization of which the Alaskans were not supposed to have cognizance. The conjecture of the pilot of the expedition that these relics were but grewsome mementos of the lost sailors of the Tschirikow expedition was doubtless well founded. The suggestion of cannibalism, which here intrudes itself has no other basis than conjecture.

Another Spanish expedition was sent out in 1775, and a landing made. The whole territory was claimed for the Spanish crown, but the Castilian government failed to follow it up very actively. In 1787 the Viceroy of Mexico was instructed to dispatch an expedition with a view to exploring the northwestern coast for the purpose of finding if possible desirable locations for settle-

ment. An expedition was sent from Mexico and anchored at Pueilo des Flores, where they took possession and remained for a time in friendly intercourse with the natives. From this point they proceeded to Kaclich, where the chief of the colony impressed upon the Spanish commander the fact that the Czar had firmly established his title to this domain as far south as 52° of latitude. At this time the Russians in Alaska were represented by six settlements colonized by about 400 men, who were in control of six vessels.

Shortly thereafter the Russian empress ordered Jacobi to report on the best means of finally establishing Russian dominion over the islands of the Eastern ocean and the northwest coast of America, and the best system of government for the same. In an exhaustive report Jacobi, among other things, recommended the dispatch of a fleet from the Baltic to protect navigation in the Pacific.

Though constant quarrels between rival trading companies constituted a drawback to the colonization of the new region, it had thus far been attended by a fair amount of success.

In the year 1783 the Siberian merchants increased their facilities for operating on a larger scale in the new country. They sent to Alaska a company of 192 men, which was the largest force that had been sent from the Siberian coast at any one time. Another party sent to the new colony at this time encountered forces of hostile natives, and after severe fighting a number of them were killed. These were the conditions which led up to the

chartering of the Russian American Fur Company as above set forth.

The history of this company's rule is one of oppression and cruelty. The natives were pressed into the service of the company, and forced oftentimes to work without remuneration, except as the scanty food and clothing furnished them might be looked upon as such. The resident managers and their assistants led lives marked by debauchery and crime. New Archangel, named after Russia's great Arctic port, and which at a later date was given the name of Sitka, was the principal settlement, but the company had about forty stations. They exported annually 25,000 skins of the seal, sea-otter, beaver, etc., besides about 20,000 sea-horse teeth.

The company's charter was renewed in 1819 and again in 1839. In 1863 the Russian American Fur Company closed its career, the last charter having run its course. Neither party to the agreement seemed anxious for a continuance.

It was about this time that negotiations looking toward a purchase by the United States began. So great was the popular opposition to the scheme that it would certainly never have been consummated had it not been for the steadfastness of Secretary of State Seward. In view of the steady growth of the territory under United States government, and particularly in the light of recent developments, some of his utterances at the time seem almost prophetic. To accomplish the transfer was his heart's desire. He was ably seconded in his aims by

Charles Sumner, whose speech in the Senate on "the cession of Russian America" was one of the finest oratorical efforts of his career.

Conjecture is never idle, and various reasons have been assigned why Russia disposed of her vast possessions on this continent.

It has been said that the United States commenced the negotiation to remunerate Russia, under the guise of purchase, for her friendly attitude toward us during the civil war. Many also believe that Russia sought to dispose of this territory to the United States that England might not, in some way, absorb it, and so strengthen her already powerful hold on this continent. The most reasonable solution of the question, however, is, that she wished to be relieved of the care and protection which her subjects so constantly required of her in maintaining the semblance of a government on this continent, so far removed from her own shores. This view is also strengthened by the fact that Russia at no time from the earliest acquisition of the territory manifested any special interest in its development, and that the motives that actuated her in holding her possessions were largely influenced by the Russian American Fur Company.

In the earlier negotiations during the presidency of Franklin Pierce, $5,000,000 was informally suggested to the Russia government as a fair price for the territory. The Romanoffs seemed to think that this sum doubled would be more equitable. Seven million two hundred thousand dollars was the price finally agreed upon.

The treaty between Russia and the United States was signed March 30th, 1867, and finally ratified by the Senate on June 20th of the same year. The ceremony of the transfer was very simple. Had one been in Sitka a certain bright October afternoon in 1867 he would have seen beautiful Sitka Bay gay with the fluttering Stars and Stripes on three United States warships, the "Ossipee," the "Jamestown," and the "Resaca," while from every staff and roof of the village waved the emblem of Russia's power. In front of the old castle on its lofty natural elevation were drawn the troops of both countries, silently awaiting the first salute from one of the United States ships, at which signal the order was given to lower the castle's Russian flag. Scarcely had the sound of the American guns lost themselves in echo when the Russian batteries boomed forth, and the American flag gayly mounted to the top, while both countries' guns sounded a duet, after which the Russian governor formally resigned his badge of office to America's representative, and the land belonged to Uncle Sam. That night there was a banquet and ball at the castle, and then the Russian families, many of whom were cultured, educated people, prepared to leave the country in possession of the new owner, so that in a few months the natives and United States troops, together with unscrupulous adventurers, were the sole occupants. Gradually the latter class were superseded by honest prospectors and rugged pioneers whose accounts of the beauty of the land attracted the tourists who now an-

nually flood the coast region where some of the grandest scenery in the world is displayed.

Joseph T. Keefer, who lived at 608 Thirteenth Street, Washington, D. C., was present at this ceremony. He accompanied the Seward State Department expedition to Alaska in 1867, as aid-de-camp to Capt. T. E. Ketchum. The flag that was unfurled by which Alaska was officially and formally taken possession of was the first ever hoisted over Russian America. As far as can be learned Mr. Keefer is the only surviving member of the famous expedition, having been at the time the trip was made into the far North a mere lad of seventeen, while the other members of the party were well advanced in years.

According to the best records obtainable the last member of the party to perish was Jo. Rothrock, a young photographer, who died about ten years ago in a Philadelphia insane asylum. The poor fellow could never get warm after making a second trip to Alaska, and while dying he was wrapped in blankets and placed by the furnace, although the heat of the summer was almost unbearable to the ordinary person. No explanation was ever offered for his strange condition.

In 1894 Mr. Keefer was prompted to institute a search for the historic bit of bunting which carried him to Alaska. Greatly to his satisfaction the flag was found in a box behind the original Declaration of Independence, in the State Department. Upon being unfurled it was discovered that a large portion of the blue field had been entirely destroyed by moths, while the remainder of the

ensign was in comparatively perfect condition. It seems that the portion of the flag which had been destroyed was once saturated with human blood. The story behind this blood stain is harrowing, but will afford much satisfaction to all those patriotically inclined. As told by Mr. Keefer, it is as follows:

"When the United States took possession of Alaska it was inhabited by a low class of people, and aside from the half-civilized natives, there were numerous ticket-of-leave men and ex-convicts from Russia. This latter class knew very well that when Americans came upon the scene they would have to seek other climes, and therefore tried to make our lot as hard a one as possible. They told the credulous natives that we were coming to make slaves of them; that having purchased the country we had almost bought in all the inhabitants. These wild stories made some of the Indians feel resentful toward us, and they did everything to bother and hamper our work. We first hoisted the Stars and Stripes on the old custom-house in Sitka, and afterward floated it to the breeze from a Fort Cosmos flagpole. While the feeling was running strong against us, a native happened by the fort, and before we knew it had torn down the precious piece of bunting. As he was about to stamp on it a rifle shot rang out, the native whirled about and fell across the starry field, his life-blood oozing from a wound in the temple. After this occurrence there were no more attempts at flag destruction."

Prince Demetrius Maksontoff was the last military

governor of Russian America, and was the last subject of the Czar to disburse hospitality in the historic castle. Baranof Castle was built in 1813.

It was situated on the top of a hill and commanded a view of the broad expanse of the ocean and of the beautiful harbor, which was studded with many small islands covered with the freshest of evergreen trees and a profusion of the loveliest and brightest verdure. The channels between these islands admit of the passage of the largest ocean steamers, and on a sunshiny day the view is most charming.

The castle, an imposing structure, built of logs of huge dimensions, was divided into capacious rooms. On one side was a banquet hall running the whole length of the building, and here, during the occupancy of the Russians, many wild scenes of revelry were enacted. In order to preserve this structure from decay, our government expended $11,000 three years ago, but just after the work was completed it took fire through some mysterious cause and was burned to the ground.

Many stories are told, some of them replete with wild romance and crime of early days when Russian barons and beautiful princesses passed days and nights within the castle in joyous living. It is said that Olga Arbuzoff, a niece of Governor Mooraveff, committed suicide by thrusting a dagger into her heart on the 5th day of March, 1826, the very day of her marriage to Count Nicholas Vassileff. The count was old, ugly, and of coarse morals, and the lovely princess very naturally

hated him. Her uncle, however, compelled her to marry him, though she insisted that she would take her life if he persisted in his demands. The princess was very much in love with a young midshipman named Demetrius Davidoff, who was young, handsome, and an accomplished gentleman, and whom the governor, when he found they were in love with each other, sent away on a six months' cruise. In the meantime the nuptials between the princess and the count were hurried to a consummation. The very night of the wedding the young lover returned and went immediately to the castle. As soon as the princess saw him she uttered a cry, and rushing into his arms, snatched his dagger from its sheath and plunging it into her breast, fell to the floor dead. The horror-stricken youth immediately drove it into his own heart and fell dead by the side of his sweetheart. The following day they were both buried in the same grave. From one of the windows in the banquet hall their last resting place is pointed out, a single Greek cross marking a single mound.

Having been known as Russian America up to this time, a new name had to be found. "American Siberia," "Zero Islands," and other appellations were suggested, but the present name was finally chosen on the solicitation of Sumner. It means the "great land," and was the native name for the southern peninsula.

The most informal military occupation was the only sign of the new order of things in Alaska until in 1870 it was made a collection district with the port of entry

at Sitka, the ancient as well as the modern seat of government.

A civil form of government was not provided for the territory until May 17th, 1884. The administration of the law was then put into the hands of a governor. John H. Kinkead was the first governor from 1884 to 1885. Then followed Alfred P. Swineford, 1885 to 1889; Lyman E. Knapp, 1889 to 1893; James Sheakley 1893 to 1897, and President McKinley has just sent out Mr. J. G. Brady, of Indiana, to hold the office during what will be the most exciting period Alaskan history has known.

The territory has never been represented in the United States Congress and the only recognition she has received from the Federal government indicative of an equal standing with other Territories was an invitation to be represented at the World's Fair. Both the Republican and Democratic National Conventions have received and seated delegates from Alaska.

In 1889 the Republicans of the territory drafted a memorial to the Republican members of the United States Senate and House of Representatives, and as it shows what all parties in Alaska want in the shape of legislation from the Federal government it is interesting. It reads as follows:

"We, the Republicans of Alaska in convention assembled, respectfully represent to your honorable body, that on this the fifth day of November, 1889, a day when the Republicans in the various States and Territories of

the Union are contesting for the principles of our great party, we are denied that sacred privilege.

"Among the great territories of the West we alone stand a monument representing complete and utter isolation and non-representation. With an area sufficient to form a dozen States, with resources unnumbered and unlimited, with no manner of expressing our just needs or to demand our just rights, with a population of upwards of ten thousand whites and fifty thousand natives, among whom are many intelligent and industrious, we come to you for relief.

"With no means of acquiring title to property in which our capital is invested and our labor is expended, we ask the passage of such laws as will afford us relief in this direction.

"With many of our people desirous of securing land upon which they can engage in farming, stock-raising, dairying, and other pursuits of husbandry, we ask that the homestead laws be extended in such manner as will open up this domain for that class of our citizens.

"With hundreds of thousands of dollars invested in the fish industry we ask the passage of such laws as will secure titles to their property, and encourage the development of one of our greatest resources, and one which is fast becoming valuable to the nation at large.

"With vast forests extending throughout the territory we ask that the present laws relative to the cutting of timber be so modified as to allow it to be used for domestic purposes by the canneries in the packing and

exportation of their fish, and by parties actually engaged in manufacturing enterprises within the territory, and the exportation of furniture and other wooden-wares, etc., etc., and manufactured from our native timber.

"The judiciary of Alaska is anomalous, lying between and dependent upon the general laws of the United States and the general laws of the State of Oregon, and having no true basis from which it can be interpreted. Therefore we ask that a code of laws be enacted for the District of Alaska, suitable to our wants and circumstances and made applicable to our growing industries and communities.

"To-day Alaska stands alone among the great territories of the West without a representative upon the floor of Congress, and we deem it unjust that a longer denial of the rights accorded other portions of our country should be imposed upon us."

In the fall of 1894 this paper was indorsed by a people's convention, held in Juneau, and Thomas S. Nowell was chosen delegate to Congress.

Very few people in the United States, even among the more intelligent and educated classes, fully appreciate the immensity of the territory which was added to the public domain by the purchase of Alaska. The total area of the United States proper, including the fully organized territories, is 2,970,000 square miles. Alaska proper in the mainland contains an area of 530,107 square miles; the islands of Alexander Archipelago, off the southeastern coast, contain 31,205 square miles, and

the Aleutian Islands, 6,391 square miles. In other words Alaska with its adjacent islands embraces more square miles of territory than twenty-one States of the Union east of the Mississippi River; that is, all the New England States, Delaware, Indiana, Kentucky, Maryland, Michigan, Mississippi, New Jersey, New York, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, Virginia, and West Virginia—States that are represented in Congress by forty-two Senators and two hundred representatives. The numerous islands, creeks, and inlets of Alaska lengthen out its coast line to 7,860 miles, an extent greater than that of the eastern coast line of the United States.

CHAPTER XV.

THE BOUNDARY DISPUTE.

Two Ends of the International Dispute—Mt. St. Elias a Settled Point—The Passage of 141st Meridian Through the Gold Fields—The Olney-Pauncefote Treaty—The Evidence of Old Time Treaties—Behm or Portland Canal?—Canadian Claims to Territory Administered by the United States—Changes in Canadian Map—The Removal of the Metlakatla Indians from Canadian to United States Territory—The Possession of Juneau and Dyea.

THERE are two distinct and separate features in the discussion which has been carried on during recent years between the United States Department of State and the British Foreign Office anent the Alaska boundary. It is difficult to decide which of these issues is the more important. The one refers to the location of the 141st meridian in its passage from Mt. St. Elias to the Arctic Ocean. The Yukon gold fields lie about midway between the two extremities of this part of the Alaskan boundary line, and in view of the greatly enhanced value of this territory both nations will insist on the greatest accuracy being observed in its location. Inasmuch as the 141st meridian is an imaginary line, indisputably defined as to its direction by astronomical considerations and rules, its final placing is only a question of time and the accuracy which is brought to bear in placing the defining monuments by the engineers making up the dual com-

mission which will eventually be appointed by the high contending parties to carry on the work.

The other main feature of this Anglo-American dispute refers to the boundary line in its passage from the peak of Mt. St. Elias in a southeasterly direction down the coast to Portland Canal, as the United States claims, or only to Behm Canal, as Canada proposes. This side of the contention gains its importance from the fact that upon its settlement rests the jurisdiction over Dyea, which controls the entrances to the Chilcat and Chilkoot Passes and the gold fields of the Yukon, and many other points of commercial vantage on and near the coast.

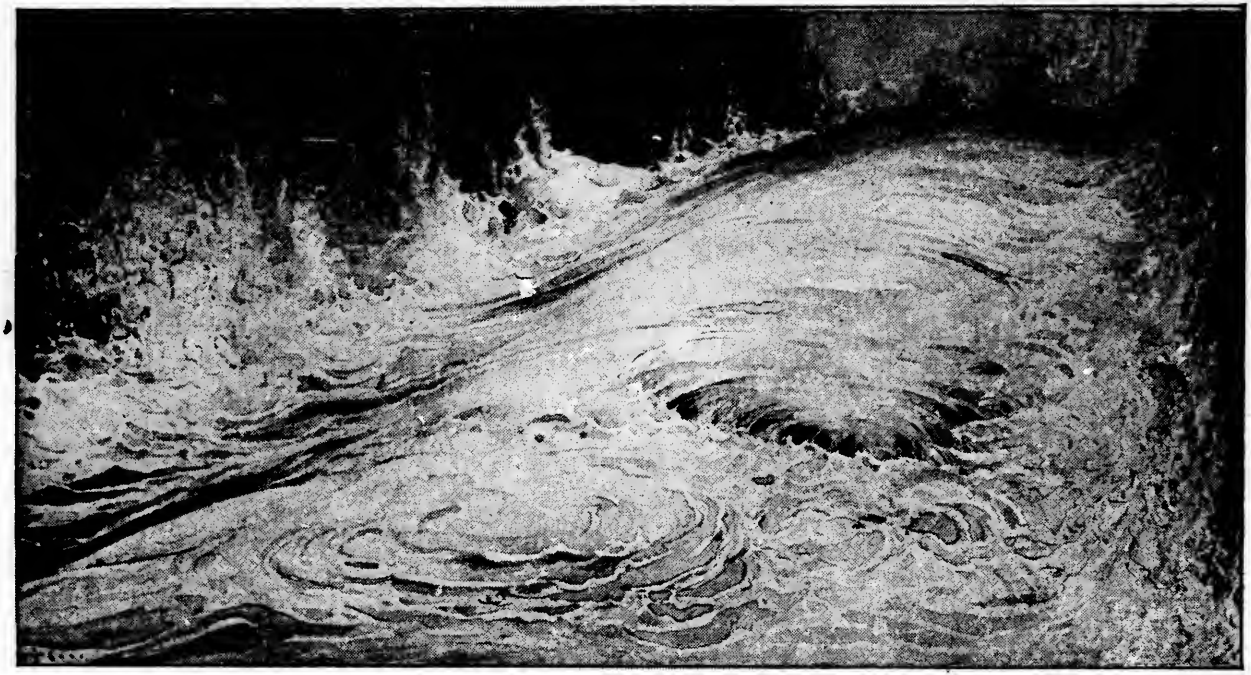
DISPUTED BOUNDARY LINE.

With the intention of definitely clearing up the northern end of the boundary dispute, ex-Secretary Olney and Sir Julian Pauncefote, the British Ambassador at Washington, drew up a treaty which was to provide for the location of the 141st meridian, and the same was laid before the Senate on February 23d of the present year. That the time is ripe for a definite adjustment of these differences may be seen from the fact that in the most recent map published by the Dominion Government, both Miller and Glacier Creeks are claimed for the British empire. If this claim should be allowed to Great Britain, it would mean that the major part of the diggings on Forty-Mile Creek, and nearly all on Sixty-Mile Creek would be on Canadian soil, and the owners

thereof would be subject to the onerous laws which have recently been enacted by the Dominion Government. But fortunately for the American miner on the Yukon and its tributaries, the home government does not propose to accept this Canadian dictum. A recent report of the United States Surveyors, as to the boundary line in this region, said: "In substance, these determinations throw the diggings at the mouth of Forty-Mile Creek within the territory of the United States. The whole valley of Birch Creek, another most valuable gold-producing part of the country, is also in the territory of the United States. Most of the gold is to the west of the crossing of the 141st meridian, at Forty-Mile Creek. If we produce the 141st meridian on a chart, the mouth of Miller's Creek, a tributary of Sixty-Mile Creek, and a valuable gold region, is five miles west in an air line, or seven miles according to the windings of the stream—all within the territory of the United States. In substance, the only places in the Yukon region where gold in quantities has been found, are, therefore, all to the west of the boundary line between Canada and the United States."

These words were written, of course, before the discoveries in the Klondike valley, which is indisputably far within the Canadian territory.

This official utterance shows that the United States believes itself to have jurisdiction over nearly all of the gold-bearing country of the far north that has been thus far discovered, except Klondike River.



ENTERING THE RAPIDS, OVERLAND ROUTE TO THE MINES.

Congress adjourned without ratifying the treaty above referred to, so that until it reconvenes there is no chance of further light being thrown upon the subject, except through surveys made by private parties, which latter, of course, will have to be proven and ratified before they can become a part of an international understanding. On the proposed treaty being gone over by the Senate's Committee on Foreign Relations, it was feared that the clause in which Great Britain gives us Mt. St. Elias in most gracious condescension might be a catch by which our acceptance of the mountain might be taken as an abandonment of our claim to a southeastern boundary within "ten marine leagues of the windings of the coast." Mt. St. Elias is within twenty-eight miles of the coast, and hence it is contended it is American territory anyhow. In view of this the Senate Committee on Foreign Affairs, as a precautionary measure, recommended that the treaty be amended so as to declare specifically that the acceptance of the peak as a boundary mark in determining the 141st meridian shall not be construed as a concession of any territory which the United States may claim under its purchase from Russia along the sea-coast.

THE AMENDED TREATY.

The following is a full text of the treaty, as sent to the United States Senate and British Privy Council for ratification:

ARTICLE 1.—Each Government shall appoint one com-

missioner, with whom may be associated such surveyors, astronomers, and other assistants as each Government may elect.

The commissioners shall at as early a period as practical proceed to trace and mark under their joint direction, and by joint operations in the field, so much of the 141st meridian of west longitude as is necessary to be defined for the purpose of determining the exact limits of the territory ceded to the United States by the treaty between the United States and Russia, of March 30, 1867.

Inasmuch as the summit of Mt. St. Elias, although not ascertained to be in fact upon said 141st meridian, is so nearly concident therewith that it may conveniently be taken as a visible landmark whereby the initial part of said meridian shall be established, it is agreed that the Commissioners, should they conclude that it is advisable so to do, may deflect the most southerly portion of said line so as to make it range with the summit of Mt. St. Elias, such deflection not to extend more than twenty geographical miles northwardly from the initial point.

ARTICLE 2.—The data relating to determinations already made at this time by either of the two Governments concerned, of points on or near the 141st meridian for the purpose of fixing its position, shall be submitted by each Government to the Commissioners, who shall decide which of the results of the determination shall be adopted by them.

In case of disagreement between the Commissioners as to the correct geographical co-ordinates of one and

the same point determined by either of the two Governments, separately, a position midway between the two locations in question, of the 141st meridian, shall be adopted, provided the discrepancy between them shall not exceed 1,000 feet.

In case of a greater discrepancy a new joint determination shall be made by the Commissioners.

ARTICLE 3.—The location of the 141st meridian as determined hereunder shall be marked by intervisible objects, natural or artificial, at such distances apart as the Commissioners shall agree upon, and by such additional marks as they shall deem necessary, and the line when and where thus marked, in whole or in part, shall be deemed to permanently define for all international purposes the 141st meridian mentioned in the treaty of March 30, 1867, between the United States and Russia, and in the treaty of February 28–16,* 1825, between Great Britain and Russia.

WORK OF THE COMMISSIONERS.

The location of the marks shall be described by such views, maps, and other means as the Commissioners shall decide upon, and duplicate records of these descriptions shall be attested by the Commissioners jointly and be by them deposited with their respective Governments, together with their final report hereinafter mentioned.

* That is, February 16, old style, the Russians at that time not using the reformed calendar.

ARTICLE 4.—Each Government shall bear the expenses incident to the employment of its own appointees and of the operations conducted by them, but the cost of material used in permanently marking the meridian, and of its transportation, shall be borne jointly and equally by the two Governments.

ARTICLE 5.—The Commissioners shall diligently prosecute the work to its completion and they shall submit to their respective Governments from time to time, and at least once in every calendar year, a joint report of progress, and a final comprehensive report upon the completion of the whole work.

The present convention shall be duly ratified by the President of the United States of America, by and with the advice and consent of the Senate thereof, and by her Britannic Majesty, and the ratifications shall be exchanged at Washington or in London as soon as possible within twelve months from the date hereof.

In faith whereof, we, the respective plenipotentiaries, have signed this convention and have hereunto affixed our seals.

Done in duplicate in Washington, the thirtieth day of January, one thousand eight hundred and ninety-seven.

RICHARD OLNEY. [Seal.]
JULIAN PAUNCEFOTE. [Seal.]

Up to 1884 both countries were practically at one as to the boundary line from Mt. St. Elias to the southeast.

According to the terms of the treaty between Russia and Great Britain, the United States, in purchasing Alaska in 1867, acquired all of Russia's rights. In describing the southeastern boundary the Anglo-Russian treaty reads:

TERMS OF THE TREATY.

"The line of demarkation between the possessions of the high contracting parties upon the coast of the continent and the islands of America to the northwest shall be drawn in the following manner: Commencing from the southernmost point of the island called Prince of Wales Island, which point lies in the parallel of 54 degrees 40 minutes north latitude, and between the 131st degree and the 133d degree of west longitude, the same line shall ascend to the north along the channel called Portland Channel, as far as the point of the continent where it strikes the 56th degree of north latitude; from this last-mentioned point the line of demarkation shall follow the summit of the mountains situated parallel to the coast as far as the point of intersection of the 141st degree of west longitude (of the same meridian), and finally, from the said point of intersection, the said meridian line of the 141st degree, in its prolongation as far as the frozen ocean, shall form the limit between the Russian and British possessions on the continent of America to the northwest.

LIMIT OF BRITISH POSSESSIONS.

"Whenever the summit of the mountains which extend in a direction parallel to the coast from the 56th

degree of north latitude to the point of intersection of the 141st degree of west longitude shall prove to be at the distance of more than ten marine leagues from the ocean, the limit between the British possessions and the line of coast which is to belong to Russia, as above mentioned (that is to say, the limit to the possessions ceded by this convention), shall be formed by a line parallel to the winding of the coast, and which shall never exceed the distance of ten marine leagues therefrom."

On all maps from 1825 down to 1884 the boundary line had been shown as, in general terms, parallel to the winding of the coast and thirty-five miles from it.

Now, however, the Canadians claim that as there is no chain of mountains "parallel to the coast" from the head of Portland Canal, northwest, that the language of the treaty calls for the placing of this line on the summits of those mountains that are nearest to it; this would bring the line fairly down to the ocean itself, and hardly leave more than a suggestion of mainland possession for the United States.

That claim is very properly disputed by our people. It seems to me quite clear that the Russians, when they developed this boundary in 1825, having full knowledge of the country, which the British did not, made that ten-marine league limit to insure themselves against being cut off from absolute control of the coast in question; that control they were bound to have, and they easily secured it in this treaty; they also exercised it. The Russians knew that no continuous mountain chain was

there, although the only good charts of that region in 1825, were Vancouver's, and indicated such a range. These maps of Vancouver were the ones studied in framing the convention, and guided the British.

The first suggestion on the part of Canada that we did not hold this "thirty mile strip," was during the Cassiar mining rush up the Stickeen River from the coast, in 1876–77. A Canadian customs house was hastily put up at the mouth of that river, and duties were levied; but our miners denied the levy—declared that it was made on American territory, and the Canadians then moved their custom house up to a point full thirty miles above the mouth; there they were secure, and the duties were collected.

The object of the Canadians in pushing this claim is to have control of the mouths of the Stickeen, Chilkaht and Tahko Rivers, and the control of the deep-water ocean inlets between the foot of Mt. St. Elias and Ft. Simpson. As it is, we command all practical ingress and egress from that British American region above the 56th degree of north latitude, from and to the sea.

American prospectors have evidence of great mineral wealth in the ravines and ledges of this "thirty-mile strip," which belongs to Alaskan territory; they have been pushing the State Department for several years to settle definitely the boundary line. The Canadians have thus far outgeneraled our people by staving off the settlement, and getting a joint commission appointed, in 1892, which was not permitted to define the line, but to

gather data. This commission was appointed in August, 1892, and it was terminated on the 1st day of January, 1895.

In this way Canadian engineers have been permitted to accurately inspect and survey every foot of our coast line in that "thirty-mile strip," and locate every topographical feature of its mountains, hills, plains and valleys. This gives them a great advantage not hitherto possessed by them.

The Canadians, with great shrewdness, in 1884, began to work upon an interpretation of Article I, of that Treaty of Cession from Russia to the United States, March 13, 1867, which defines the limits of the regions conveyed. That boundary between the British possessions and Alaska, as specified in this Treaty of Cession, is precisely word for word as defined in that convention between Russia and Great Britain of February 28, 1825, as given above.

In 1884 an official Canadian map showed a marked deflection in this line at its south end. Instead of passing up Portland Canal (as the Portland "Channel" mentioned above is now always called), this Canadian map showed the boundary as passing up Behm Canal, an arm of the sea some sixty or seventy miles due west of Portland Canal, this change having been made on the bare assertion that the words "Portland Channel," as inserted, were an error. By this change the line and an area of American territory about equal in size to Connecticut was transferred to British territory.

There are three facts which militate against this seizure. In the first place, the British Admiralty, when surveying the northern limit of the British Columbian possessions in 1868, one year after the cession of Alaska, surveyed Portland Canal and not Behm Canal, thus by implication admitted this canal as the boundary line. (2) The region now claimed by British Columbia was at that time occupied by a military post of the United States without objection or protest on the part of British Columbia. (3) Annette Island, in the middle of this region, was, by an Act of Congress four years ago, set apart as a reservation for the use of the Metlakatla Indians, who sought asylum under the American flag to escape annoyances experienced under the Canadian government, and the British government did not enter any protest.

THE GRAB AT LYNN CANAL.

Of vastly more importance than the preceding is the grab made at Lynn Canal, the northernmost extension of the Alexander Archipelago, which runs north of Juneau, and is the land outlet for the Yukon trade. The official Canadian map of 1884 carried the boundary line around the head of this canal; another Canadian map three years later carried the line across the head of the canal in such a manner as to throw its head-waters into British territory; still later, Canadian maps carry the line not across the head of the canal, but cross near its mouth, some sixty or seventy miles south of the former line so as to practically take in Juneau, or, at least, all the

land immediately back of it. And the very latest official map, just published at Ottawa, while it runs no line at all southeast of Alaska, prints the legend "British Columbia" over portions of the Lynn Canal that are now administered by the United States. In fact, the

It must be remembered, however, that these aggressions of Great Britain, or rather Canada acting for Great Britain, are largely on paper, as the United States, while negligent of Alaska, has never abandoned its three marine leagues claim, and hence the grabs have not yet been incorporated in Canadian territory. The probable futility of these ten years of effort since 1887 is shown in the fact that Dyea, which Secretary Gage designated the other day as a sub-port of entry in the Juneau district, is well within the lines of Canada, according to British claims in 1887 and in 1897, and yet they have done nothing to molest United States administration there nor United States control of Lynn Canal, nor of the Chilkoot Pass.

CHAPTER XVI.

THE PRIBYLOV, OR FUR SEAL ISLANDS OF ALASKA.

Chase of the Sea Otter—Pribylov's Discovery—The Seal Island—Educating the Young—System of Reproduction—Movements of Seal Herds—Male Seals Fighting—Killing Bachelor Seals—Shooting and Spearing—Killing Young Males Only—Blaine's Plan—Blunders—Vain Efforts at Pension—The Boundary Question.

ONE of the most interesting and valuable features of the Russian-American purchase by our government in 1867, was that fur seal industry of Alaska, as embodied then, on the Pribylov Islands in Bering Sea; and it is remarkable that, at the time of the transfer of this territory, very little or nothing was known of it in this country, even to a single soul.

It was my fortune to land on the Seal Islands in April, 1872, as the agent of the Smithsonian Institution and the Treasury Department, for the special purpose of making a study of these animals and collections. During the seasons of 1872–'74 and '76 inclusive, I gave the rookeries my undivided attention, and again in 1890, by the authority of Congress, I again visited them. I have, therefore, by the accident of my life, been the first to publish a succinct and connected life history of these animals and their habitat; this study of the fur seal put forth by me in 1874–'82, has been confirmed and unchanged by the review of many naturalists who have come after me.

But, while the life and nature of the fur seal have not varied in its details, yet the condition of the herds on the Pribylov Islands has altered so much since the date of my earliest work, as to be fairly described by a single word to-day, "ruined". The fierce greed of man has well nigh ruined the industry—it will do so, as matters are now in hand at Washington and Ottawa.

The fact that I have been fortunate enough to see these Pribylov fur seal herds before they were decimated by the hand of man, and to have made indelible records of their fine form and condition at that time, recurs with great pleasure to me whenever I now take the subject up.

The chase of the sea otter by Russian and Cossack "promyshlineks" or hunters, opened Kamschatka to them, and then Alaska was discovered in turn by Bering, during 1741–'42: a horde of eager sea otter hunters followed him, so that by 1762 they had located the Aleutian Islands and progressed as far east as Kodiak. By 1780, the abundant supply of sea otter in Alaskan waters ceased, and the Russian fur hunters began seriously to consider what was next in order. They found that the Chinese market made a good demand for fur seal skins, and that as many as could be secured at any one season never affected the price. The manager of the Oonalaskan district of the Aleutian Chain, for one of the several trading companies, determined to search for the landing place of these animals, either in the Bering Sea north of the Aleutian passes or south in the Pacific; he noted the fact, that every June and July great numbers of fur seals were seen swimming north through these passes,

and every October and November they swam back again through these same channels into the broad waste of the Pacific Ocean out of the Sea of Bering.

The old Aleut shamans also had a legend that the fur seals bred on an island in Bering Sea, somewhere north of the Islands of Oomnak and Oonalaska, but where, they could not say. So, thus stimulated, Russian search was made with great energy, chiefly in the Ocean, south, rather than in Bering Sea, north, for these Islands upon which the fur seal must breed, as its antarctic brother did in the southern hemisphere.

Finally, after six years of steady search, Captain Gearman Pribylov, commanding a small sloop, the "Saint George", ran upon the object of his desire in a thick fog one close, dull day in July, 1786. He had discovered the breeding islets of the Alaskan fur seal, and the group has ever since been known under his name. The discovery of Pribylov could not be kept secret; a dozen vessels sailed with hunters, in his wake, and from 1787 until 1804, the butchery and waste of life on these islands was something brutal and greedy beyond all record.

The whole Russian-American territory passed by order of the Emperor Paul into the hands of a single corporation in 1799: by 1804, the iron-hand of old Baranov was laid upon the Pribylov Islands, and this cruel killing was then and there checked.

Very soon these seal islands of Alaska became the sole solid financial backing of the Russian-American Company; but, as the business of the company grew more and more embarrassed by bad management at

Sitka, even these sources of revenue failed to float the corporation.

The Pribylov group of seal islands consists of two small islands, St. Paul and St. George, with two islets, Otter and Walrus Islands, which are ranged around St. Paul, the former six miles south and the latter six miles east. St. Paul, which has only thirty-three square miles of superficial area, with forty-two miles of shore, is the largest of the quartette; St. George has twenty-seven square miles of superficial area and twenty-nine miles of coast line; Otter Island about one square mile, and Walrus Islet a mere rock of less than five acres of surface just elevated above the surf line.

St. Paul is the chief resort of the fur seal; it held in 1872–74 just seventeen-eighteenths of the entire number of 4,500,000 fur seals of all ages which I ascertained to be on the fifteen different "rookeries" or breeding grounds that are well known on the islands. This group of seal islands is, in round numbers, 200 miles distant from the nearest point of the mainland of Alaska, Cape Newenham, Bristol Bay; and Oonalaska Island of the Aleutian Chain, is about the same distance from it in the south, while St. Matthew Island, almost equidistant, in the north. The Russian Seal Islands are 750 miles directly to the westward, and they, in turn, are situated about 100 miles off the Kamschatkan coast in this same sea of Bering.

On the Pribylov Islands the fur seal found, ages ago, that perfect isolation from deadly enemies like men and polar bears, which combined with a cool, moist, sunless

climate, makes its existence secure on this earth. Its intelligence prevented its landing to breed and rest even for an hour on any other land in all Alaska or the lower Northwest coast. But, since man finally discovered its retreat in 1786, the fur seal has had several close calls to utter extermination. One is now pending at this hour.

The fur seal is the best organized of all amphibians; it is equally at home on land or in the sea. But it draws all its sustenance by fishing and repairs to the land for the chief purpose of breeding. It cannot bring forth its young in the water; the new born fur seal cannot swim, and requires a land residence of three to four months after birth, before it can go to sea. Indeed, it cannot swim when it first blunders into the water. It has to apply itself diligently to learning how to keep its head above the surface by many successive lessons before it succeeds. These lessons are, however, self-imposed. The little fellow's instinct tells it that this must be accomplished. When he once becomes able to master his body so as to sport easily in the water, the young seal rapidly reaches the perfect stroke, and becomes the most skillful of all watermen.

The fur seals are born about equal in number as to sex: the males and females grow for the first year with little difference in size, shape or color. Then the males begin to lengthen out and increase their weight far in excess of the females. When the male is mature at six years, he will weigh 400 to 500 pounds, have a length of six-and-one-half to seven feet, while the female is adult at three years, and weighs but eighty or ninety

pounds, with a length of body scarcely exceeding three-and-a-half feet.

The order and system of reproduction of the fur seal on the Pribylov rookeries or breeding grounds is a very remarkable and interesting one. No other wild animal has the elaborate and regular method about its movements during its breeding season that is characteristic of the fur seal; and, with the single exception of those immense herds of the buffalo on our western plains as seen by our pioneers sixty or seventy years ago, no other mammal of a high organization ever massed itself in such great numbers that the knowledge of a naturalist can cite.

The Pribylov Islands of Alaska, the Commander group of Kamschatka, and a small rock in the Okotsk Sea are the only known breeding places of the fur seal in the Northern Hemisphere. In the Antarctic there are over twenty well-known islands which were during 1786 and 1814 visited as fur seal resorts, until by 1860–62 they were practically swept clean of this seal life by the greed of human butchers, and to this day the Antarctic rookeries are desolate—only a scattered band or so of tens and hundreds now is found there, in place of those hundreds of thousands and millions that originally existed.

Let us follow the movements of the fur seal as it boldly and quietly orders them on the Pribylov Islands. The breeding season closes, and the pups are all weaned by the middle or end of October, then the fur seals all leave the islands. Striking out due south directly for the Pacific Ocean through the large passes of the Aleutian

PASSING THE MINERS OVER CHILKOOT PASS.

Chain; they journey in the open ocean south-east by east, so that by the middle or end of December, their advance agents are in sight, off the California, Oregon, and Washington coasts; then the herd turns up along the trend of the northwest coast, back into Bering Sea, so as to return as a body by the 4th to 15th of July; the old males are all on the islands as early as the 1st of June, and all classes are back by the 20th of July.

In this order of progression, the fur seal never lands on any land, inlet, rocks, or reef, while going from and returning to the islands of its birth; it makes an oceanic transit of over five thousand miles in this migration, and subsists upon pelagic fishes and squid and crustaceans while out in the deep sea; then, when going up the coast on soundings, it feeds fat upon the runs of herring, cod, sculpin, salmon, and numerous other piscine forms.

The adult male fur seal lands first of all his kind, and alone; he "hauls out" on the breeding ground, or "rookery", as early as the 6th of May, and all of his class are there by the 1st of June. The first females never arrive before the 4th to 10th of June, and the great body of their kind do not put in an appearance until the 10th to 20th of July.

The normal ratio of males to females on these breeding grounds is about fifteen or twenty of the latter to one of the former. This makes the fur seal an eminent polygamist. The breeding grounds rise on rocky slopes directly from the waters edge, above tide and surf wash, and are barred from all approach to the young males or "bachelors" by the determined opposition of the adult

and old males, or "seacatchie." The adult male only, can hold his own in fighting with his species. He must attain the age of six years and have a weight of at least 350 pounds, before he can ever presume to successfully battle with an older male.

From the hour that the male fur seal hauls out onto his station early in May until the end of the breeding season early in August, he never leaves his post on that ground for a single moment, day or night. In other words he presents the anomalous spectacle of enduring a fast of three consecutive months and sustaining himself during this long period without food or water, by the absorption of his own fat. During this period he is seldom asleep; he is incessantly on the move, and until the arrival of the females in June and July, he is busy a large portion of the time in fierce fighting with his rivals which occupy the posts around him.

The females land in obedience to the necessity of giving birth to their offspring on land, and they seldom come ashore until the hour of their delivery is close at hand. They give birth to but one pup, twins having never been recorded. The time of the gestation is almost exactly twelve months. After the pup is born, the mother seal rests a few days, suckles her young one, then goes off to sea to feed on fishing grounds, often 100 to 180 miles distant. She will be absent two or four days before returning; she singles out her own pup and permits no other to nurse from her nipples. Again she remains only a few days, ere she puts off to the feeding grounds at sea, to return as before. This going and coming to

feed and nurse the pup, continues with that mother seal until she weans her offspring in October or November. She weans it by abruptly abandoning it to its own devices.

The young males from one year old up to six, are obliged to keep away from the rookeries by their fear of the consequences of meeting their old sires. They haul out on the sand beaches and the uplands between the breeding grounds in troops of hundreds and thousands by themselves; they also, like the females, feed at frequent intervals and do not sustain any protracted fasting as the breeding males do.

Until the development of the open water or "pelagic" hunting of fur seals in 1886 was made, the killing of these Alaskan animals was confined to a selection of 100,000 young "bachelors" on these islands annually: but, when the pelagic fleet, chiefly Canadian hunters, fairly got to work, the pressure of death on this fur seal herd of the Pribylov Islands, was too great. The industry has been ruined, and to-day, the seals are not one tenth of their number, as I found it in 1872–'74.

The practice of killing on land was to select out of the herds of young males only the best grades, *i. e.* the two, three, and four year-old males; those younger did not possess as good fur on their skins: while the older ones had that fur harsh and ragged on their necks or withers, where it grows roughly like the mane on a horse, and is known as a "wig" in sealing parlance.

Two or three thousand of these young males were daily driven up to the killing grounds, near the salt houses on the islands, during the season, June 1st to

July 20th, killed and skinned there, and the pelts cured in large kenches or salt bins; then these skins were rolled into bundles of two skins each, corded up securely, and so shipped to London, via San Francisco and New York. The pelagic catch goes also to London, via Victoria and New York.

If the killing is properly conducted on land it is a discriminate and legitimate operation; it will not injure the regular supply of fresh male life for service in the rookeries, and no females are ever disturbed, much less destroyed by this method. That this land killing can be and has been abused is true; but that is the fault of the supervision, and not of the system.

The pelagic killing is done by shooting and spearing fur seals in the open waters of the ocean as these animals are feeding or sleeping. A peculiarity of the fur seal is that it rests as comfortably in the water sleeping on its back, with its flippers folded onto its breast and abdomen, as it does on the land. When so resting at sea, if a hunter drifts down upon it with care as to wind, so as to come up to it from the leeward, he can get near enough to hurl a spear into its body and secure its skin. The seals also when traveling at sea or feeding, always rise at intervals to put their heads and necks high out above water for several moments to breathe and to survey. This is the moment that the hunter enjoys to shoot them in. He uses a rifle, but generally a shot gun with buckshot. A great many wild shots are made necessarily, as the weather and the water combine to toss the boat, and much loss of life must ensue that is not tallied by the seal skins secured.

The present order of killing on land so as to kill nothing but young males has been in vogue ever since 1835; the pelagic system of hunting fur seals has been understood ever since 1874, but not actively prosecuted by white men until 1886.

The combined work of killing on land and in the water, therefore, since 1886, has rapidly diminished the numbers of these unhappy animals; so much so that their whole massing on the islands this year will not equal the tenth part of their fine form and condition which I recorded them as possessing in 1872–74. There were 4,500,000 of them then.

In 1887, amidst a general discord in the ranks of our people as to whether we really had any exclusive rights to shut up the open waters of Bering Sea, and so prevent pelagic hunting, three small Canadian schooners were seized some forty or sixty miles distant from the nearest land in Bering Sea. They were taken because they were engaged in the hunting of fur seals without a license from the Secretary of the United States Treasury, agreeably to provisions of Section 1956, Revised Statutes of the United States.

After much discussion our best lawyers said the seizure was a violation of international law: that Bering Sea was not a *mare clausum*, and so Secretary Bayard released the schooners and began to try and secure an international agreement with Great Britain, so as to regulate and check this hunting of fur seals in the open sea. Bayard was unable to carry out his plan before his term of office ended, and on the 4th of March, 1889, Mr. Blaine suc-

ceeded him. Instead of taking up the course of Bayard as it was left to him, Blaine resolved to try another plan of settlement: he revamped that claim of jurisdiction in the high seas only so as to cover the killing of seals, and invented his argument of *contra bonos mores*. The Canadian's took advantage of Mr. Blaine's want of precise and accurate knowledge as to seal life details, and they furnished a reply to his letter that simply crushed him.

In 1890, the writer of this sketch returned November 17th, from an investigation into the condition of the Alaskan fur seal herds, having been sent up again, as in 1874, by order of a special Act of Congress. He urged Mr. Blaine to drop all legal arguments into the jurisdiction question, together with those based on the idea of having a property right in a wild animal, and take up instead the case of saving the seals alone, by an agreement with Great Britain. He devised a *modus vivendi* by which all killing of seals on the Pribylov Islands should be prohibited for a term of seven years, and all open water sealing at the same time in the Bering Sea, to be declared illegal by Great Britain. Then, this done, to have a joint commission of experienced men to visit the islands and report fairly on the subject.

This proposition was bitterly opposed by the Canadians and also by the lessees on our side, but the sense and decency of this settlement, when it was made known by its author, was so strongly endorsed by public opinion in Great Britain and this country, that it was put into operation June 15, 1891.

From this moment a series of wretched and humiliating blunders have been made by the officers of our government, who have been in charge of the business. The case of the United States as made up in Washington contained all of those idle legal claims of jurisdiction and property right. They were openly opposed by our ablest lawyers in this country, and by the consensus of the press. Then, our sealing argument was basely murdered by being brought down to the low level of making an uninterrupted plea that no harm was ever done or would be done to the seals by the method of land killing, while all the most extravagant vaporing about the work of pelagic sealing was soberly incorporated. This sad mistake on our side, gave the Canadians their opportunity: and they improved it so well, that they secured the victory. Thus, they have proved anew the truth of that old saying, that "having the strongest end of a controversy does not signify, if your opponents have the brighter men to cope with you."

The award of the Bering Sea Tribunal was made on August 15, 1893; it decided against our claims of jurisdiction in the open waters of Bering Sea; it denied our claims of a property right in a wild animal like the fur seal; it then queerly split the difference between the claims of our agents for the land butchers and those of the British for the pelagic butchers. In short, under the regulations, ordered by the Court, the *modus vivendi*, by Elliott, which is superseded by them, is a real protection, while the new articles simply facilitate the destruction of the herd. Yet, at the time these idle and costly regula-

tions were ordered by this Tribunal, our agents at Paris declared that they had won a great victory, and had saved the seals from pelagic hunting!

These regulations of the Tribunal were first put into effect in the season of 1894. The result of their operation was to demonstrate their utter worthlessness as a means of saving the fur seal from indecent and cruel slaughter. More seals were killed at sea under their license than ever before in the history of the business. This was demonstrated by those figures of the catch beyond the shadow of a doubt. Then, ever since, our government has been trying to secure a revision of the regulations: but, up to the writing of this chapter, nothing has been effected. Inexperienced naturalists and ignorant officials have, on our side, so bungled the case, that the Canadians have easily kept the lead and still hold the whip hand, and it is safe to predict, that as matters are being directed, they will retain the great advantage which they secured at Paris, in 1893. Therefore, as long as fur seals exist on the Pribylov Islands, the Canadian hunter will hunt them at sea: and as far as a source of revenue to the public treasury of the United States goes, these fur bearing rookeries of the Pribylov group have ceased to be. They are now and have been ever since 1890, a large annual bill of expense to the government, without a dollar of revenue to balance the books.

Unless we free ourselves from the present management of our fur seal case, which degrades our position in British eyes to the same level of seal-skinning and gain that we charge the Canadian case with, the com-

plete extermination of the industry on the Pribylov Islands is right at hand; indeed, the rookeries have been commercially ruined, and it would require at least ten consecutive years of complete prohibition of seal killing on the islands and in Bering Sea, from date, if they are to be restored.

There has been an undue amount of talk about what we may demand of Great Britain in the way of revising these regulations; we have no ground, moral or legal, to make any demands on Great Britain. What we had, we lost entirely and forever, at Paris, in 1893; we fairly forced that settlement, and we are bound to lay in the bed of our making. That we were beaten at Paris, is humiliating and galling, because we had the best ground for argument, but we frittered away our credit and our property by putting the business of making up our case for the Tribunal into incompetent hands—so incompetent that they did not know that they were beaten at each and every point when the award was made.

CHAPTER XVII.

REINDEER IN ALASKA.

Alaskan Dogs Must Go—Introduction of Reindeer by Rev. Dr. Sheldon Jackson—Both Food and Raiment—Purchasing Station in Siberia—Distribution in Alaska—Fleet of Foot and Easily Supported—Reindeer Train Service to the Klondike—Reindeer Milk for Yucon Babies—A Siberian Moneymaker—Reindeer to Harness—Character of the Fur—Some Figures on the Reindeer Industry in Finland.

THE discovery of gold far back in the interior of Alaska puts an entirely new face on the introduction of domestic reindeer into that country. The movement was undertaken almost entirely with the object of affording an adequate food supply to the natives of the interior, whose ranks during recent years have been very much depleted through starvation and the conditions which lead to it. Now, however, a new use has been found for the reindeer in Alaska, or rather these little animals will be made useful in a way that was not anticipated. In Finland and Siberian Russia they perform the same duties which dogs do in Alaska. It is now proposed to supersede the dogs with reindeer. The camps of the Klondike and its neighboring streams are inaccessible during eight or nine months of the year except by overland journey, and when they have been visited during the closed season it has been by couriers attended by a dog-train. Dogs are unreliable and treacherous, and, above all, require considerable food for their

support, which latter must be carried along with them in some shape or another. The reindeer, on the contrary, is a gentle, tractable animal, and one requiring but little food; the main article of their diet consists of such mosses and sprouts as are to be found in the Yukon district all the year round. For this reason they will be intensely valuable to a miner, and already scores of orders for reindeer have been placed with the government by Klondikers.

As the years pass by it becomes more and more evident that the introduction of the reindeer into Alaska is a complete success. At the outset Dr. Sheldon Jackson's proposition to introduce the domestic reindeer of Siberia as a new source of food supply for the famished Eskimo of Arctic Alaska was received by so much doubt and disfavor that Congress refused to furnish the necessary appropriation. Private individuals advanced a sum, however, to put the project on its feet. With this sum, about $2000, Dr. Jackson procured 16 reindeer in 1891 and 171 in 1892. Congress appropriated $6000 for the fiscal year ending June, 1894, to carry on the work. This was increased the next year to $7500, and the following year a like sum granted. Nearly 400 head have been purchased in Siberia, and through the birth of fawns the number on Alaskan soil has been increased to over a thousand. Heretofore the purchasing of the reindeer has been done by Russians, who received a commission at so much per head.

The Secretary of State has recently communicated with the Czar of Russia, requesting permission for the

Bureau of Education to station a purchasing agent with one or two herdsmen at some suitable point on the coast of Siberia adjacent to Alaska. It is presumed that this request will be granted, and this year the Bureau of Education will probably be able to send its own agents into the field.

Herds of reindeer are now located at five places in Arctic Alaska—Port Clarence, the main station, under the management of a superintendent appointed by the Bureau of Education; Cape Prince of Wales, a mission of the Congregational Church; Cape Nome, in charge of three experienced native Alaskan apprentices; the Swedish mission, at Golovin Bay, and St. James's Episcopal mission, on the Yukon. The number of reindeer at these stations is now 1100 head. At the main station, called the Teller Station, during the year 22 deer were broken to harness, making in all 52 sled deer in the herd, and much time was given to the training of these deer for freighting and travelling purposes. In the general plan of distribution it has been the purpose to supply the mission stations in the order of their proximity to the central herd. Some little difficulty was experienced with the natives, among whom the report was current that only the whites were to receive any benefit from the reindeer. It was hard to disabuse their minds of this notion, and this was finally accomplished only by lending several of the more advanced of the native herders about 100 head of deer. Many natives are now coming into possession of reindeer of their own, and they take great pride in their care. In the future it

is proposed that from two central herding stations, one at Port Clarence, near Bering's Strait, and another on the Kuskokwim River, north of Bristol Bay, herds of 100 deer, with native herders, shall be distributed to the various mission stations. A continuous line of herds will then be placed for the entire distance to the important stations at St. Michael's, near the mouth of the Yukon River. A line of stations might also be established along the Yukon to the gold stations at Forty-Mile Creek. If two herds of 1500 each could be established at the two main distributing points, experience shows that the annual increase of the herd, if well cared for, would furnish three herds of 200 each year.

There is much that is interesting in regard to the plan of reaching the Yukon gold district by means of reindeer. As has been said, in the original plan for the purchase and distribution of reindeer, reference was mainly had to securing a new food-supply for the famishing Eskimos, but it is now found that the reindeer are as essential to the white man as to the Eskimos. The placer mines of the Yukon region are from 25 to 100 miles from the Yukon River. The provisions brought from the south by the five steamers now in that region and landed upon the banks of the river are transported with great difficulty to the mines. So great was the extremity last winter that mongrel Indian dogs cost from $100 to $200 each for transportation purposes, and the freight charges from the river to the mines, thirty miles distant, ranged from 15 to 20 cents a pound. The difficulty experienced in providing the miners with the necessaries of life has

demonstrated the necessity of reindeer transportation. Back from the rivers in Alaska there are no roads, and, to a great extent, no transportation facilities whatever. In the limited travelling of the past dogs have been used, but dog-teams are slow, and must be burdened with the food for their own maintenance. This food is now put up in cans in large quantities by several Chicago houses, and consists of the refuse meat from the slaughter-houses, prepared in a way which preserves it. Although this food is not so expensive as other meats, the cost is high when immense freighting charges must be paid by the miners. On the other hand, trained reindeer will make in a day two or three times the distance covered by a dog-team, and at the end can be turned loose to gather their support from the moss, which is always accessible. They obtain this by digging away the overlying snow with their hoofs and horns. It is believed that the snow-covered fields of Alaska will furnish support to millions of these gentle, fleet-footed little animals. Reindeer cannot be kept anywhere near the Alaskan dog, for the latter kill them with the greatest ease.

As a food-supply nothing better adapted to the country can be imagined. Reindeer meat, either fresh or cured, is considered a great delicacy. The skin is soft and warm, and can be used for both clothes and shoes. Then there is the milk, which is as good as any we buy in the city at 8 cents a quart. They are more docile than the horse, and are better adapted than any other animal for transportation in the climate of Alaska.

Thus we have embodied in one little animal, aver-

aging in size from three to five feet in height, meat, drink, shoes, clothing, and the means of transportation —not to mention his possibilities as a commercial commodity, for his hoofs and horns make the best glue known, and his hair has a buoyant quality which makes it valuable for life-saving apparatus. In addition to all this, he is the only useful animal that can live upon such frugal fare as the Alaskan climate affords. Dogs must carry their food on their backs, but reindeer feed from the soil which they traverse; and it is estimated that the territory of Alaska is capable of sustaining 9,200,000 of the latter animals, a number which will support 287,000 people.

The only difficulty in the matter is the fact that the reindeer have to be imported. Through Dr. Jackson's efforts something less than a thousand have already been brought from Siberia, and because of the prevailing ignorance as to the care and herding of the strange little beasts six families of Laps were imported along with them. A central station was established, and some of the most intelligent of the natives taken as apprentices. These are doing well, and many are now capable of taking charge of herds themselves.

Some of the difficulties which Dr. Jackson encountered would be amusing if they did not cause so much trouble. He had to contend with the superstitions and the business interests of the natives of Siberia, and was only able to collect small herds at different places. The Siberians depend largely for sustenance upon bartering the products of the reindeer. They are afraid that they

will be cut off from this if the Alaskans have reindeer, too. Beside that, the people never use money, so that it was necessary for the agent to be provided with the various things which the natives were glad to get in exchange.

The richest native of the village of Indian Point, Siberia, does $100,000 worth of business every year without using a single coin, or a single bank-note, nor are any books kept. He can neither read nor write, nor can any of those belonging to him.

The reindeer, with their feet tied together, are loaded into small boats on the Siberian side and carried to the schooners, which convey them across to the Teller Station at Port Clarence. The herders drive the deer which are already on the Alaskan shore down to the beach, and when the men in the boats reach shallow water, they turn their load of reindeer out into the water and let them swim to shore themselves—which they readily do when they see the other reindeer there.

The herding of the reindeer imposes a nomadic life those who attempt it, as the herds constantly change their position in search of fresh food. During the first year or so in the vicinity of the Teller Station the herders slept in single canvas tents during the entire winter, and they suffered great hardships, as may well be imagined. Now they build log huts wherever it is possible.

At the landing station sledges and harness are made, the latter being simply made, and may be put on and secured by two motions, touching the deer as little as possible.

About a year ago 130 deer were driven from the central station to Golovin Bay. Mr. N. O. Hultburg, the missionary there, writes: "At first the herd was kept five or six miles north of the station, where there was moss in abundance. As we had a number of steers my thought fell on how to get them trained. I ordered the boys to work with the deer each day, but it proved to be too hard work for them, as they are all very lazy. I then ordered the herd to be moved further off. So it was moved to about thirty miles northwest of the station. Each of the boys then had to go home once a week for his own provisions, and if he came with an old deer (one that had been trained before) he had to go back again with an empty sled. In this way we broke eleven new deer before spring."

Mr. G. T. Howard, of the St. James Episcopal Mission, who accompanied Mr. Hultberg and the others when they took the herd to Golovin Bay, writes of his experience in reindeer driving as follows:

"With many misgivings I finally perched myself on top of the loaded sled behind the deer which I was to drive. At first there was no trouble, but as soon as I attempted to guide the deer my efforts were treated with contempt. No matter how hard nor how often I pulled on the line, or longee, as the Laps call it, he paid no attention to it, except by occasionally coming to a full stop and turning round to look at me in a manner that made me feel rather uncomfortable—for the front hoofs of the deer are formidable weapons that can be used with remarkable rapidity—but he made no hostile

demonstration, and, after trying to stare me out of countenance for a moment would suddenly wheel around, and with a bound that would almost land me on my head behind the sled would be off."

Mr. Howard was finally reduced to the expedient of tying his deer behind another sledge, after which matters went very smoothly. That method is often adopted, and enables one man to drive many sledges of deer at the same time. When there is a steep hill to descend the deer is taken to the back of the sledge, to which he is tied by the longee, braces his feet, and really pulls backward. The descent is very rapid, and as sled and deer fly along they are almost obscured by the whirling snow.

A herd of deer can be very easily driven. They bunch together like sheep, and one man and a dog can easily handle a large herd.

In appearance they are almost the same as the American caribou. Both male and female have large branching horns. They can stand almost any degree of cold, and have the domestic instinct to a remarkable degree. They are not able to carry very heavy loads on their backs, but in summer often carry women, children, or household effects in this way. They can pull as much as 300 pounds—though a limit of 190 or 200 pounds is generally made—at a rate of nine or ten miles an hour for ten hours without fatigue.

M. N. Bruci, who was in charge of the Teller Station when it was first put in operation, speaks as follows about the hide of the reindeer:

"The color of the fur of the reindeer is varied. Perhaps the most common is the seal-brown, and when free from other shades is decidedly rich in appearance. The fur, for such it may properly be called, after it has taken on its summer coat, is soft and glossy, and about the length of that of the fur-seal. When taken at this season, if properly dressed, it sheds very little. The skin is soft and pliable, and but little thicker than that of the fur-seal. The reindeer skin was at one time the only one used by the natives for their clothing, tents, and everything else, but now the seal and ground squirrel skins play an important part. Reindeer skins have become a matter of luxury with the natives, and only those who deny themselves other things that they need for their comfort wear reindeer clothing. In the country about Kotzebue Sound occasionally a skin is secured from a wild reindeer, but is so rare that it assumes somewhat the nature of a curiosity. Thus it will be seen that, practically, all the reindeer skins used by the Alaskan Eskimo come from Siberia."

Lapland, with 400,000 reindeer, supplies the grocery stores of Northern Europe with smoked reindeer hams at 10 cents a pound; with smoked tongues at 10 cents each; with dried hides at from $1.25 to $1.75 each; with tanned hides at from $2 to $3 each, and with 23,000 carcasses to the butcher-shops, in addition to what is consumed by the Laps themselves. Fresh reindeer meat is considered a great delicacy, and Russia exports it frozen in carloads to Germany. The tanned skins and hair are of great value commercially, and the best glue

made to-day comes from reindeer horns. On the same basis, Alaska with its capacity for 9,000,000 head of reindeer, could supply the markets of America with 500,000 carcasses annually, tons of hams and tongues, and the finest of leather. There is on the face of it a chance for the reindeer forming the basis of a great industry in the not far distant future.

FORTY MILE CREEK.

CHAPTER XVIII.

THE GOLD FINDS OF HISTORY.

Gold in the days of Abraham—Solomon's expeditions to Ophir—Edomites as Argonauts—Cortez in Mexico and Pizarro in Peru—Early attempts by the English to find gold in America—North Carolina an "Eldorado"—The Georgian "intrusion"—The days of the Forty-niners—John Marshall and his end—Australian and Klondike nuggets compared—The Frazer River craze—The "Kaffer circus"—South African mines capitalized at $1,500,000,000—Four hundred years of gold digging—The gold kings of the world.

CENTURIES upon centuries have come and gone since the stories of fabulous gold finds first fired the hearts and imaginations of men. Our records probably do not go back far enough to include the earliest of these.

That there were such epochs of gold discovery in ancient history it is impossible to doubt, though transportation was so difficult in those days that rushes of gold seekers to the diggings must have been limited. It is hardly to be supposed that the vast quantities of gold which were in existence in Judea, at Babylon, in India, in Persia, and in Egypt were gradually accumulated by the working of lean sands; the bulk must have been the yield of discoveries of rich deposits. Gold figures as an article of exchange and merchandise as far back as the time of Abraham, and when Solomon came to the throne he fairly plastered the temple with gold.

Nor could it have been rare in other parts of Asia. At Babylon, where, in the time of Belshazzar, they had

gods of gold, and gold vessels for every guest of the king to drink out of; or in Persia, where the king had beds of gold and goblets of gold; or in Hindostan, where the king sat on a throne of gold, and Nadir Shah took fifty millions of treasure from the single city of Delhi. It was safe to infer that before these great masses of gold were gathered together there must have been startling discoveries of gold deposits somewhere, causing rushes of gold seekers to the new camps, just like the present rush to Klondike; and, considering the undeveloped condition of the mining industry at that time, it may also be inferred that the gold found was always alluvial. Where it was found we have no means of knowing. There are no records of gold discoveries in the ancient books.

Ophir is the first "El Dorado" of which we have any record, and this includes little but the bare fact that it was a gold-producing country. There are no data by which it may be even approximately located.

That Solomon received the tip about the riches of Ophir before the diggings were worked out is well attested by biblical records. He was in the habit of receiving gold from other sources. The King of Tyre sent him 120 talents, the equivalent of about $250,000; and his friend, the Queen of Sheba, gave him about $200,000 at the time he was fixing up the temple at Jerusalem. He was not satisfied with this, and sent frequent expeditions to Ophir. The ships were sent out from ports on the Red Sea, and it is easy to imagine that desire to accompany them was fully as strong among the Edomites in those early days as is the present-day anxiety

on the part of thousands of people to be off for the Klondike and its hidden treasures. Solomon obtained about $500,000 from the Ophir mines.

The first rush of gold seekers to a land of promise, of which we have authentic historical record, took place from Spain to the countries discovered by Columbus. On the islands he visited and those portions of the continent on which he landed there are and were then no gold mines. But the natives he met wore ornaments of gold obtained mostly from South America, and Cortez found a good deal of it, though neither he nor his people undertook to mine. When Montezuma surrendered the treasure in gold which fell to the share of the conquerors it amounted to 162,000 pieces of eight, equivalent, according to Mr. Prescott, to $6,300,000, a small sum if contrasted with the yield of modern mining camps, but more, perhaps, than the contents of the coffers of any European monarch of that day, and quite enough to disturb values throughout the world.

It was less than the sum secured a few years later by Pizarro in Peru. At Cuzco he divided among his men 580,200 pieces of eight, and the ineffectual ransom of Atahualpa cost the unfortunate Inca a sum exceeding $15,000,000 of our money. The Spanish army in Peru received and sent home four times as much as the followers of Cortez sent from Mexico. It is diverting to observe how the ill-gotten gains operated precisely as the discovery of a bonanza does in a mining camp. The chronicler says: "Every article rose in value. A quire of paper sold for ten pieces of eight, a bottle of wine

for sixty, a sword for forty or fifty, a cloak for a hundred, a pair of shoes for thirty or forty, and a horse for twenty-five hundred." A piece of eight was equivalent to an ounce of gold.

It will be noted that none of the gold obtained by Pizarro and Cortez and their followers was obtained directly from the mines. Numerous expeditions were undertaken during the first century of the New World's history for the avowed object of finding the precious metal, and yet remarkable as it may seem, gold was not discovered within the boundaries of the present United States, nor ever anywhere north of the Rio Grande, until 300 years after Columbus had finished his earthly labors. The lust for gold drove hundreds of adventurers across the Atlantic to brave the dangers of the unknown wilds in their attempts to find the land of gold, the Eldorado of which the Indians had told, and of which the most romantic tales were being circulated in Europe. The adventurers were of all the seafaring nations of the civilized world. The Spaniards, through the massacring of the nations and the plundering of their temples, proved successful, while the English, on the other hand, were unsuccessful throughout.

Sir Walter Raleigh's expeditions were dismal failures. He suffered with his life for his ill-fortune. The Eldorado, which had been sought in South America, had not been found. The attention of adventurers was now turned to the opposite direction, and the imaginary land of gold was now placed in the north of America. This idea became so strong that, in 1576, Martin Frobisher

set out from England for the Northwest, seeking a passage to India north of Hudson's Strait. He came to an island which he named Meta Incognita, and on his return took with him a stone which the English refiners declared to contain gold. London was greatly excited. But when a second expedition returned and brought with it a lot of valueless dirt, the disappointment set the populace wild with rage. But the public was ready to be imposed upon again. As early as 1605 Captain John Smith heard from the Indians reports of rich gold mines in Virginia. The same statements were repeated by other explorers after him, and soon adventurers flocked to the new settlements on the Virginia coast. The second lot of emigrants to Jamestown consisted chiefly of vagabond gentlemen and goldsmiths, who, in spite of the remonstrances of Smith, believed they had discovered grains of gold in the glittering earth. There was now nothing done but digging for gold, washing gold, refining gold. Newport, the commander, believed himself immeasurably rich as he embarked for England with a freight of worthless earth.

Gradually the hope of ever finding Eldorado vanished, and for 200 years the golden phantom did not appear. Not till this century were the gold treasures of North America taken from the bosom of the earth. They were found primarily, as the result of accident, not of mad, thoughtless quest.

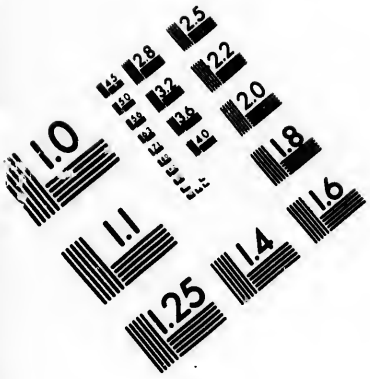
It was in the second year of this century, when the report spread as rapidly as was possible in those early days, through the Eastern States, that gold, real gold,

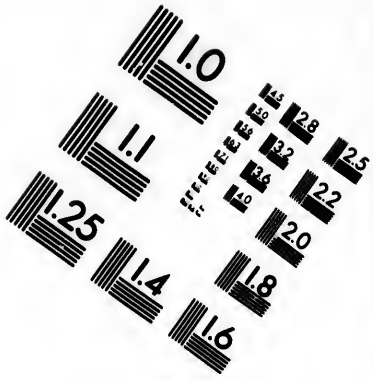
had been discovered in North Carolina. At first people shook their heads and doubted the news. Had not the discoverers of the country ransacked every nook and corner for the precious metal and not found as much as an ounce? But the report was soon verified, and before long, nuggets of bright gold reached the larger towns and were seen and wondered at by the curious people. With the gold came the story of the discovery, and the wise-acres nodded their heads and said: "How simple." And when it became known that the owner of the gold mine was one of those Hessians who had fought against the patriots the gossip-mongers remarked, with a sneer of disgust: "The ignorant Dutchman." This is the story which was soon told all over the land.

John Reed, one of the unfortunates whom the Elector of Hesse had pressed into service to fight for the English in America, had, after the war, settled on a farm in Cabarrus County, North Carolina, where the German element predominated. He was said to be grossly ignorant, having been but a poor peasant boy when forcibly transported to America. One sunny summer day, in the year 1799, Conrad Reed, John's twelve-year-old son, accompanied by a sister and a younger brother, went to a small stream, called Meadow Creek, for the purpose of shooting fish with bow and arrow, as the Indians were wont to do. While bending over the water's brink, Conrad spied a yellow substance glistening in the creek. He waded into the water, picked it up, and found it to be some kind of metal. Though unconscious of its nature and value, but with the curiosity of a child, the youngster

carried his find home and showed it to his father, who had just returned from church. The parent examined the piece of metal, but was as ignorant as to its character as the boy. The next time he brought vegetables to market at Concord, he took the yellow stone, which was about the size of a small smoothing iron, with him to town and showed it to William Atkinson, a silversmith. This worthy, whose experience seems to have been sadly limited, knew not what to call it. So Reed, who unknowingly seems to have suspected the value of his son's find, carried the piece of metal home again. For three years it lay on the floor of the farmhouse, used for the purpose of keeping the door from shutting. In the year 1802 the old farmer had occasion to go to market at Fayetteville. He took the piece of metal with him and showed it to a jeweler. The latter immediately recognized it as gold, and asked Reed to leave it with him, saying that he would flux it.

The old farmer did accordingly. On his next visit to town the jeweler showed him a large bar of gold, six or eight inches long, and asked him at what price he would let him have it. Reed, not knowing the value of gold, but still desirous of profiting as much as possible by his son's find, named what he thought a "big price," namely, $3.50. The jeweler paid him the price named and chuckled over his bargain. After returning home, Reed looked over the ground where the gold had been picked up and found nuggets of the precious metal all along the brink of the creek. He associated with himself three of his neighbors, also Germans, Frederick Kisor (Kaiser),





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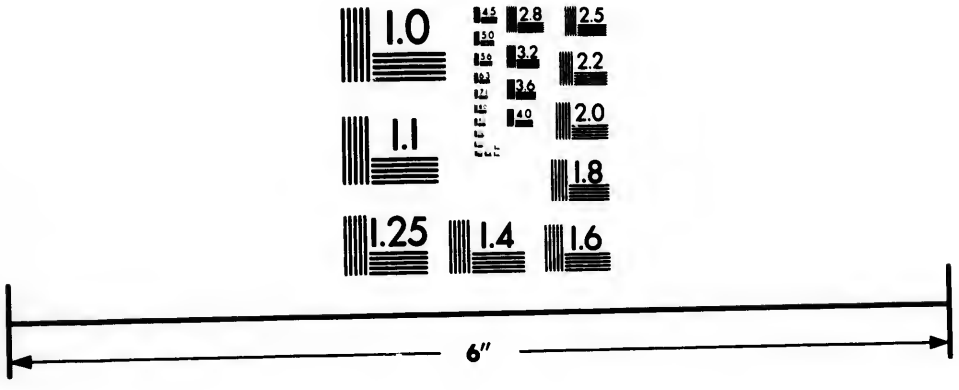

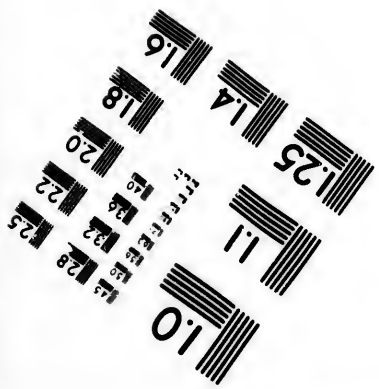

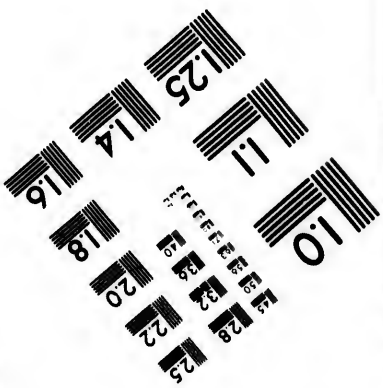

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James Love (Loew), and Martin Phifer (Pfeifer), and in the year 1803 they found a piece of gold that weighed twenty-eight pounds. Numerous large nuggets of the metal were found thereafter, of various sizes and values. The whole surface of the ground along the creek's bank for nearly a mile was rich in gold. In 1831 quartz veins were discovered which yielded large quantities of gold. From 1803 to 1835, 115 pounds of gold were found on one spot. In 1840 the output of the gold mines in Carrabus County, North Carolina, was estimated at $3,500. Reed profited by his discoveries and died about the year 1848 a wealthy man.

As might have been expected, the discovery of gold excited so much attention that exploration was begun extensively. The gold was traced southward as far as the borders of the Cherokee territory in Northern Georgia. In Rowan County, North Carolina, mining operations were commenced at Gold Hill in September, 1842. Some very rich veins were opened. From January, 1843, to July, 1851, gold to the value of $801,665 was found at this spot.

For awhile, as has always been the case during the prevalence of gold fever, gold was discovered everywhere. Reports of rich finds came from South Carolina, Georgia, Virginia, Maryland, Pennsylvania, New Jersey, New York, Massachusetts, Vermont, Lower Canada, and other parts of the continent. In Georgia, especially, great excitement prevailed for some time. The richest finds were reported from the Cherokee Reservation. Prospectors began to encroach on the domain of the red

CAMPING OUT ON THE CHILKOOT MOUNTAINS.

men. Protests naturally followed, and Georgia sent a large police force to keep back the invaders, but it was of little avail. Reckless, dissipated men from all quarters of the country flocked in, prowled about the woods, set up log huts and shanty groceries on all the streams, and even the Federal troops were powerless to keep the lawless hordes west of the Chestatee. These days are known as the period of the "Intrusion"—one of the two dates from which the mountaineers reckon all events, the other being "the late war." Finding that no protection of the Indians by police measures was feasible, the State in 1830 adopted the Indians, reservation and all, and constituted the region a county. Then the mineral lands were divided up into forty-acre lots, and put up at lottery by the State. It soon came to be found here, as elsewhere, that gold was not to be picked up in lumps every day. The worthless, lazy and dissolute majority of the early horde of invaders gradually drifted away, while only the small minority of newcomers remained. The population, like the dirt, was slowly panned out, and the current of events carried the dross away.

DISCOVERED IN GEORGIA.

In Habersham County, Georgia, gold was discovered in 1831 by a man named Wilpero, who, observing the resemblance of the surface and of the foliage and the streams of the region with the gold section of North Carolina, dug for the precious metal and found it in considerable quantities.

In Virginia gold was mined for many years. The

largest masses of the metal were found in or near rivulets or runs of water. On a brook at the Whitehall Mine gold of the value of $10,000 was found in the course of a few days in a space of about twenty feet square.

The gold fever in the South had almost died out, when from the farthest quarter of the United States, the recently acquired California, came the news of gold finds far more remarkable and productive than those heretofore made. Not that gold was new to California. For three centuries there had been wild talk about fabulous mineral wealth in the region of the Sierras. In the '20's and '30's of this century small nuggets of gold had been repeatedly obtained from the Indians. One day a laborer in the employ of the Russian-American Company in California came to the commandant with the story that he had seen gold up the bed of a stream and advised that a party be sent to examine it. The man was told to mind his own business. Although such rumors of the existence of gold in California had occasionally been heard, still they had never been verified or traced to any reliable source, and they were regarded as we now regard the fabulous stories of the golden sands of Gold Lake or those of Silver Planches, which are said to exist in the inaccessible deserts of Arizona.

At first there was little excitement, due doubtless to a lack of definite news. But when the gold from the new Eldorado began pouring into Valparaiso, Panama and New York, in the latter part of the winter of 1848–49, an end was put to all doubts, and in the spring there was a rush of peaceful emigration such as the world had never

seen. In 1849 25,000—according to one authority, 50,000—immigrants went by land, and 23,000 by sea from the regions east of the Rocky Mountains, and by sea perhaps 40,000 from other parts of the world, adding twelvefold to the population and fiftyfold to the productive capacity of the Territory.

By January, 1849, ninety vessels, carrying 8,000 passengers, had sailed from various ports, bound for San Francisco, and seventy more were advertised to sail. Pulpits resounded with warnings against riches as the source of all evil, but the preachers, when they could, took ship for the land of gold like other people. Early in 1849 the population of San Francisco swelled from 2,000 to 14,000. Four hundred sailing vessels were abandoned by their crews at their anchorage in the bay. Labor was $10 a day. In that year (1849) 549 vessels entered the Golden Gate. In the same year the yield of the mines was probably not less than $18,000,000. The present annual yield is about $72,000,000, and in the years since the California fields were opened about a billion and a half dollars have been taken out.

Everybody knows that gold was first discovered in California by James W. Marshall, a native of New Jersey, who built a mill in the Sacramento Valley on property owned by John A. Sutter. It was entirely by accident that he discovered the gold, and became sponsor for the wild days of the "Forty-niners." The saw-mill at Coloma was built and managed by this Jerseyman, and for four months he worked with a gang of men until the race had been dug and the dam made. On the morning of Mon-

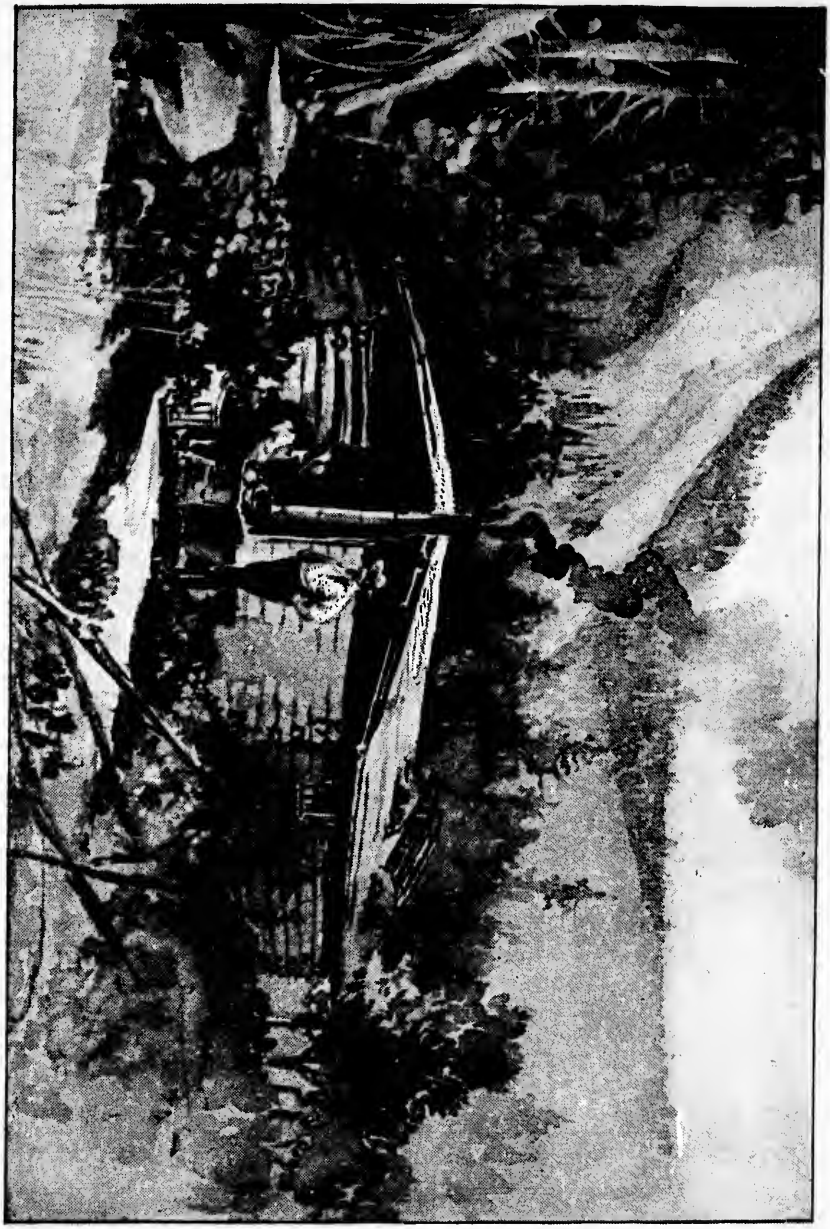
day, January 24, 1848, Marshall was walking in the tail-race, when the rush of water was carrying away the loose dirt and gravel, and saw on its rotten granite bed-rock some yellow particles, and picked up several of them. The largest were about the size of grains of wheat. They were smooth, bright, and in color much like brass. He thought they were gold, and went to the mill, where he told the men that he had found a gold mine.

At the time he was laughed at, and no importance attached to his statement. But Marshall hammered his new metal, tried it in the kitchen fire, and was the more convinced that he had found gold. Next morning he picked up more specimens in the tail-race, put a spoonful in the crown of his slouch hat, and showed the find again at the mill. Led by Marshall, the laborers all hastened down to the mill-race, and soon were absorbed in picking from the streams and crevices of the rock the precious yellow metal.

On the evening of February 2, 1848, Marshall rode into the fort, his horse foaming and spattered with mud. Taking Sutter aside he showed him about half a thimbleful of yellow grains of metal. Sutter applied aqua-fortis and established the fact that the metal was solid gold.

The first record of the discovery, and the only one made on the day of its occurrence, was in the diary of Henry W. Bigler, one of the mill hands. He wrote January 24th: "This day some kind of metal was found in the tail-race that looks like goald."

Although Sutter tried to keep the discovery of gold



THIRD HOUSE BUILT IN DAWSON CITY.

a secret until he could get in his harvest, it was impossible, and, as Parton says: "Sutter's harvest was never gathered. His oxen, hogs and sheep were stolen by hungry men and devoured. No hands could be procured to run the mill. His lands were squatted on and dug over, and he wasted his remaining substance in fruitless litigations to recover them. To carry on the legal warfare, he was compelled to sacrifice or mortgage the parts of his estates not seized by the gold diggers, until, little by little, his magnificent property melted away, leaving him all but destitute. For one item he paid, in ten years, for counsel fees and legal expenses, $125,000." The Legislature of California granted him a pension of $250 a month. In 1864 his homestead was burned, and in 1873 he removed to Lititz, Pa. He died in Washington, D. C., June 17, 1880, a poor man.

Marshall, the discoverer of gold, did not fare more prosperously. His property and stock were seized, his land was divided into town lots, and he became reduced to extreme poverty. His discovery, which in one year alone resulted in a product of $65,000,000 and for seventeen years brought on an average of $25,600,000, netted him neither fame nor profit.

Marshall's troubles began with the very first stampede of gold-seekers. He cursed Mrs. Wimmer, his cook, who first spread the news of his find, and he declared he would have the law protect his rights. While his employés joined in digging and washing gold, Marshall swore and growled. For a few months he made every man on the scene pay him a dollar for his discovery. But when the

throngs increased he seldom got a dollar, and then only from a good-natured man. He claimed that he and Sutter owned the land on which the miners came and got their gold. Of course, there was justice in the assertion that the miners had trespassed upon Sutter's and Marshall's acres, but the lawless, wild gold seekers cared precious little for legal rights in those days, and there was neither United States nor Mexican law in California from some time in 1847 until the summer of 1850, when the Territory began to get ready for admission as a State. Marshall became disliked for his belligerency, and he was in continual disputes and quarreling. Several times he barely escaped serious physical punishment from a camp of reckless, intoxicated miners whom he had threatened with legal processes because of their encroachments on his land. He never did any mining himself, for he claimed he owned all the gold that had been taken out at Coloma, and he would some day have the courts give him back all the riches that had been stolen from him.

He was a spiritualist, and had visions and messages from the spirit land that told him what to do. He went often to 'Frisco and Sacramento. By 1851 he became reconciled to his fate, and abandoned all claims to the mining property on his lands. In 1857 he bought a plot of land at Coloma, near the site of his saw-mill. There he planted a vineyard. He did odd jobs about the town and made wine. He became a hard drinker and everyone knew him as a chronic growler. In 1869 he started out to lecture on "How I Found Gold in California." He was very poor, and for a few nights he did a good

business. Then he went to Stockton, and there his love for whiskey overcame him, and he fell by the way. In 1872 the Legislature of California granted him a pension of $200 a month for two years. It was subsequently renewed for seven years at $100 a month. He spent almost every dollar of it in saloons, and on a lot of parasites. That was why the first pension was cut down one-half. He died alone in a ramshackle, desolate cabin in the little hamlet of Kelsey, in El Dorado County, on August 9, 1885. He had been dead a day before his remains were found.

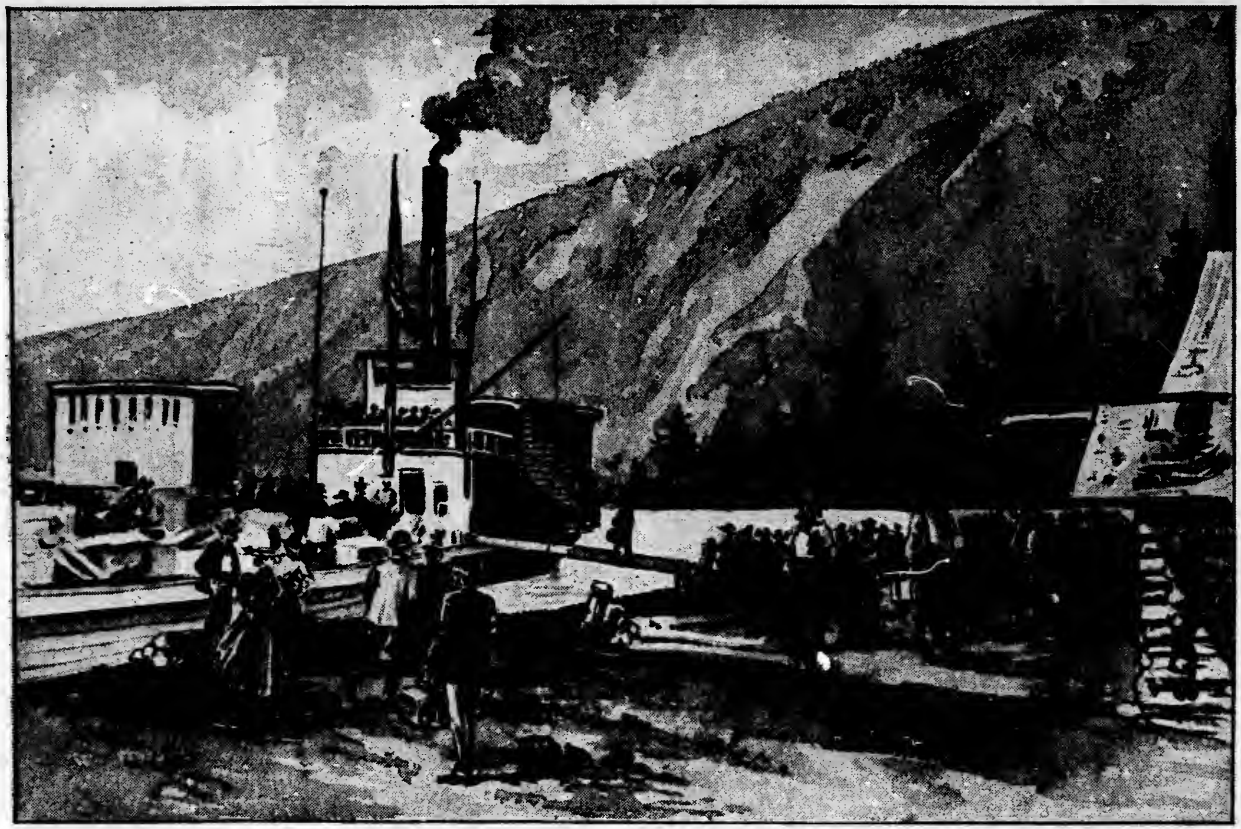
These discoveries and the rush of population to California gave rise to lively times. Lots in San Francisco were said to be worth gold coin enough to carpet them. Speculation ran wild. All forms of gambling were recognized as legitimate business, while adventurers and criminals flocked in. Society became chaotic, and at length self-preservation required the organization of the celebrated "vigilance committees" to enforce order.

Gold mining was neither novel nor rare, but the unexampled combination of wonderful richness, highly favorable geographical conditions, and great freedom in the political institutions of California led to such a rush of people and such an immense production of gold, that the whole world was shaken, The older placers of Brazil and Siberia, and the later ones of Australia and South Africa, had a much smaller influence on general commerce and manufactures. The discovery of these mines was an American achievement. It was the result of an American conquest from Mexico and of preparation for American

immigrants. They were Americans, as were the first miners, who subsequently invented the sluice and the hydraulic process of placer washing, and who planned and constructed the great ditches, flumes and dams that gave a distinctive character to the placer mining of California. Marshall's find did not limit its great influences to our continent. It profoundly agitated all the countries of the world, and threw a belt of steam around the globe. It educated Hargreaves, and taught him where to find and how to open up the gold deposits of Australia. It built the Panama road. It opened Japan to the traffic of Christendom. Directly and indirectly, it added nearly four billions of dollars to the stock of the precious metals, and by giving the distinction of this vast scene to English-speaking nations added much to their great industrial and intellectual influence.

Before three years elapsed the discoveries in California were duplicated in Australia. Some years before Sir Roderick Murchison had predicted that gold would be found in the quartz, and in 1851 Hargreaves, who had been at the diggings in California, looked for it in the Bathurst of New South Wales, and found what he was looking for. His discovery was at first received with incredulity, but when Dr. Kerr found on the Turon a lump of gold worth $21,000, and a nugget was taken to Sydney which sold for $6,200, there could be no question of the facts.

It is interesting in this connection to know something of the size of the Klondike nuggets, although large nuggets are not necessarily the accompaniment of rich



UNLOADING SUPPLIES FOR THE MINERS AT DAWSON CITY.

A Steamer and Barge that made the Trip up the Yukon from St. Michaels. On the right is shown the first L g House built in the New Mining Town.

fields. There were four nuggets of the size of duck eggs, and a dozen as large as walnuts, in the gold brought down this summer from Alaska. The big ones are worth about $375 each, and the small ones about $140. There are many thousands of golden bits of the size of watermelon seeds that are worth $1 each, and hundreds of the size of common gravel-stones.

After the news of the Australian discoveries had been circulated workmen of all classes deserted their callings to hunt for gold, and they were so successful that in the fall of 1851 the average earnings of prospectors rose to $5 a day. Simultaneously, all articles of commerce advanced; wheat quadrupled in value; potatoes rose from 7 shillings to 21 shillings a hundred weight; and freight from Sydney to the mines from $12 to $150 a ton. When the news reached Europe thousands of adventurers embarked for Australia, declaring that its treasures cast into the shade those of California.

Melbourne was jealous of Sydney, and a generous reward was offered for the discovery of a gold field within the province of Victoria. The result was the discovery, in August, 1851, of the diggings of Ballarat. Ten thousand adventurers flocked to the spot, which maintained its reputation as the greatest gold camp in the world till Mount Alexander and Bendigo Creek were discovered. Before New Year's it was said that there were 50,000 miners at Bendigo, and Melbourne was depopulated. Flour, which was worth $100 a ton at the seaboard, was in demand at $1,000 a ton at the mines; oats rose eightfold; mining tools sold for anything the dealers chose to

UNLOADING SUPPLIES FOR THE MINERS AT DAWSON CITY.
A Steamer and Barge that made the Trip up the Yukon from St. Michaels. On the right is shown the first L g House built in the New Mining Town.

ask. In that winter it was said that an average of 15,000 adventurers arrived each month at Melbourne, and carpenters and masons were getting $10 a day.

The finder of one of the richest veins was a man who had been prospecting in the bush for a long time without success, and was returning to Perth disconsolate. One night on his way he encamped in a wilderness, when his horse got restless toward morning and plunged and kicked about. The man went out to quiet the animal, when he knocked his foot against what he took to be a big stone, but which, on examination, he found to be a huge and almost solid mass of pure gold. To "peg" out his claim did not take long, and in a month six men, working with the roughest tools, took $250,000 worth of gold.

The "Hannans Broomhill" and the "Great Boulder," in the Hannans field of the West Australian district, are the two biggest gold mines the world is likely to see. It is no question of stock exchange when it comes to digging out day by day ore which seems to consist almost entirely of gold. In the storehouse of the Hannans Broomhill there has been at one time between twenty and thirty tons of gold.

So this gold find, brought about entirely by accident, proved to be no flash in the pan.

The yield has swelled month by month and year by year, until, in 1856, the export from Melbourne alone, without taking Sydney into account, was over $60,000,000. In the same year the mint at Sydney received $7,500,000

in gold from the mines and New Zealand produced $10,000,000.

In Australia's heyday, just as the yield of the California placers had declined to such a degree that some of the most famous diggings were given over to Chinamen. Rumors, which gradually gathered strength, reached San Francisco that gold had been discovered in the bed of the Fraser River. The first finds were made in 1856; it was not until the spring of 1858 that Fraser River gold began to appear at the money-changers' establishments on Montgomery Street. An exodus set in for Victoria, just such a one as there is now for Juneau. By June, 1858, 10,000 miners were at work between Langley and the forks of the river, and every bar for 140 miles of the Fraser's course, and along the Thompson, was being prospected. Two flourishing towns, Yale and Hope, sprang up on the river banks, and before snow fell 20,000 adventurers are said to have left California for the new camps. Of these, the great bulk endured untold hardships, and found no gold. They returned to San Francisco discouraged and penniless, and denounced Fraser River as a humbug, just as some of the unlucky Yukon adventurers may possibly be denouncing the Klondike next year.

But Fraser River was a real find, which added, in the course of twenty-odd years, more than twice as much gold to the world's supply as Spain had obtained from the Americas in the same space of time. Estimates of the yield of 1858 vary so widely that it is difficult to ascertain the truth. Good, the Canadian Minister of

Mines, reckoned that the output of that year was not over $500,000, but McDonald, figuring from the reports of bankers and express companies, set it down at $2,150,000. This was chiefly scale gold, comminuted by hammering between boulders into fine flat scales, and mixed with considerable flour gold. The yield increased in 1859 and again in 1860; for the three years the total output was probably something like $6,000,000 or $7,000,000. It did not convulse trade or set the world crazy, as the discoveries in California and Australia had done, because the discouraging reports set afloat by returning miners in 1858 cooled popular ardor, and threw a bucket of cold water on the spirits of the adventurous.

The furore was rekindled in 1861 by fresh discoveries in the Cariboo Mountain country, at Quesnel Forks diggings, and at the head-waters of the Fraser and Thompson rivers. Here the gold found in the streams was coarse, and the mountains generally consisted of slates, which, in lower latitudes, had been found to be auriferous. The best fields for mining were the beds of buried rivers below the level of the modern streams, as in the Sierra counties of California. In the deposit on the beds of these prehistoric rivers were found richly concentrated gold leads, which were reached by shafts and levels. It was from these that the chief wealth of the Cariboo was extracted. In 1861 $2,000,000 of gold was shipped; as much more in 1862; an increased quantity in 1863; and though after that year the excitement subsided, the influx of gold seekers ceased, and many miners abandoned the country. Mr. Bancroft estimates the total yield of the

region in twenty years at somewhere between $30,000,000 and $40,000,000. It will average $4,000,000 a year to-day.

But liberal as the output of Cariboo was, it created no stir throughout the world, and from 1861 to 1881 the mining population only averaged about 1,500. In the beginning it witnessed the inflation usual in new mining camps; miners got $10 and $12 a day, and flour was $1 a pound; but afterward, though the actual yield was larger than it had been in the early days, and Antler and William Creeks were pouring out the precious metal by the pound, things settled down to a steady, business-like basis.

Before the boom of Fraser River another mining find had aroused the attention of financiers, and would have given rise to a boom if it had occurred anywhere but in Russia. Russia has always been a gold producer. From time immemorial the débris of the talcose schists on the eastern slopes of the Ural, where they are intersected by quartz veins, have been washed for gold with success. In 1830 the gravel of the rivers in Siberia was found to carry considerable gold in spots. The government laid hands on the most fruitful diggings. Gold was obtained from Meningsk, and from the borders of the Altai; from Nerchinsk, on the Oleqma, and from several streams emptying into the Amoor. But the richest diggings were on the great river of Siberia, the Venisei, which is 2,500 miles long, and empties into the Kara Sea.

Nerchinsk has lately been yielding $2,000,000 a year or more, and the Yenisei as much as $10,000,000. No

excitement marked the discovery. In Russia popular movements are discouraged. There has never been any rush to the diggings. Residents on the river are allowed to prospect for gold, but the most productive spots are exploited for the State. There is a good deal of similarity between the gold region of Siberia and the gold region of Alaska. The ground is water-soaked, and has been frozen to a depth of four or five feet from time immemorial. During the brief summer the fierce heat thaws out the surface, but does not strike deep enough to affect the substratum of frozen earth. On the Yenisei the alluvium is washed for gold with hot water, and to heat the water whole forests are cut down and used as firewood. It often happens that fine flakes of gold in the washer become studded with needles of ice and are carried off in the stream. It is evident that with such a process nothing but coarse gold can be saved.

The most sensational feature of the South African gold craze was and is the delirious stock jobbing which it gave rise to. This has been dubbed the "Kaffer Circus," and if circus it was, Barney Barnato, the suicide, was head ringmaster. African gold is no novelty, for the Portuguese brought back gold dust and negro slaves from Cape Bojador 450 years ago. But in 1867, when a band of Australian gold diggers went out and set up a small battery for crushing quartz on the Zambezi, the first serious attempt at gold mining was made since the days of the lost races, the ruins of whose great cities were discovered by Karl Mauch.

The "craze," however, did not set in until 1883, when

a Natal trader had picked up pieces of quartz along the Kaap River. The news spread, and the famous pioneer reef was discovered on the farm of Moodie, who sold out for a million dollars. Then the rush set in from other gold fields which had not panned out well, and the De Kaap "boom" set in. Some fifteen Natalians formed a syndicate to exploit this country on their own account, but after four months of fruitless toil the money was all gone. They were down on their luck, when, as they returned to camp on what was intended to be their last evening there, one, Edwin Bray, savagely dug his pick into the rock as they walked gloomily along. But with one swing there came a turn in the fortunes of the band, for he knocked off a bit of quartz so richly veined with gold as to betoken the existence of a wonderful "reef."

From this start arose the Sheba Mine, which was capitalized within a year for a million and a half sterling and all the stock sold. This wonderful success led to the floating of a vast number of hopeless or bogus enterprises, and the British public bit eagerly at fabulous prices. Yet, surrounded as it was, by a host of fraudulent imitators, the great Sheba Mine has continued as one of the most wonderfully productive mines in the world. Millions have been lost in swindling and impossible undertakings in the De Kaap fields, but the Sheba Mountain, or "Bray's Golden Hole," has proved a mountain of gold.

It was one Sunday night in 1886 that the great "find" was made which laid the base of the prosperity of the Johannesburg-to-be. A farm servant went over to visit

a friend at a neighboring farm, and as he walked homeward in the evening knocked off a bit of rock, the appearance of which led him to take it home to his employer. It corresponded with what the "boss" had found in another part, and on following up both leads revealed what became famous as the Main Reef.

A lot of the "conglomerate" was sent to Kimberly to be analyzed, and a thoughtful observer of the analysis came to the conclusion that there must be good stuff where that came from, so he dropped quietly into the Rand, as it is now called. Then he quietly acquired the Langlaate farm for a few thousands, which the people on the spot thought was sheer madness. But his name was J. B. Robinson, and he was soon known in the Kaffir circus and elsewhere as one of the gold kings of Africa. In a year or two he floated a company with a capital of 450,000 pounds to acquire what had cost him about 20,000 pounds. In five years this company turned out gold to the value of a million pounds, and paid dividends of 330,000 pounds. The Robinson Company, another formed a little later, in five years produced gold to the value of one and a half million pounds and paid 570,000 pounds in dividends. With these discoveries and successful enterprises the name and fame of the "Rand" were established, and for years the district became the happy hunting ground of financiers and company promoters.

The Rand, or Witwatersrand, is the topmost plateau of the High Veldt of the Transvaal, on whose summit is the gold city of Johannesburg.

From Discovery Claim to El Dorado Creek.

BONANZA CREEK VALLEY,
From Discovery Claim to El Dorado Creek.

In the later eighties and early nineties the principal feature of South African mining was in the madness of the stock exchange; in fact, all Europe became inoculated with the disease, which at one time made Johannesburg a marvel and a reproach. That disease was a craving for speculation in the shares of gold mining companies, whose markets were called the "Kaffir Circus." The fact that in 1895 South Africa was producing two and a half million ounces of gold per annum, at a gross profit of about three millions sterling, fired the imagination and stirred the cupidity of hundreds of thousands of people who had not taken the trouble to ask what it all meant. When the British public did go in for African ventures it went with a rush.

The climax of madness was reached two years ago. A small handful of men, a few years ago, dropped into the Rand and acquired properties for, in the aggregate, less than a couple of million pounds, which in the space of eight years reached a realizable value of two hundred million pounds, or a billion dollars at the market quotations for shares. Some of these men became worth a hundred millions of dollars apiece, of whom Barnato was the king of speculators. It is a very curious history, quite without parallel in the records of human endeavor, this concentration of the whole gold-mining industry of South Africa, in companies of half a dozen cliques, each of which has its "King."

It is a contrast to the experience of Australia and California, where combined effor in the way of company working only came into operation when individual diggers

had creamed all the nuggets and surface gold and fallen upon evil times. In 1895, the top wave of the craze, the inflation was so great that the capitalized value of all the South African companies, was 300,000,000 pounds.

There was a great set-back shortly after, but the inflation is still enormous, for most of the companies have not yet paid any dividends at all, and it is doubtful if the legitimate profits of all of them together this year exceed two and a half millions sterling. The latest estimate of the gold resources of the Witwatersrand is that if mining can be carried on to a depth of 5000 feet something like 700,000,000 pounds of gold should be obtained within the next fifty years at a cost of 500,000,000 pounds. This would leave a clear profit of 200,000,000 pounds in fifty years, on a capital of 150,000,000 pounds. This is little more than 2½ per cent., even supposing all the expectations of deep-level mining are realized, although there is no experience to guide. The South African game does not look to be worth the candle unless you are snugly tucked away on the inside.

All the gold mined in the world from the date of the discovery of America to the close of the fiscal year of 1895 is placed by the statisticians of the various governments at $8,781,858,700.

It is interesting to know that nearly half of this total for over four hundred years has been taken out of three countries in less than fifty years. Since the days of '49 California and the contiguous gold fields have given up $2,035,416,000. Gold was discovered in Australia in 1851, in New South Wales, New Zealand, Queensland,

Tasmania, Victoria, and Western Australia, and the total output to date is $1,655,713,000.

Gold in the South African Republic has only been of importance since 1890, and the total at the end of the first six months of 1896 was a little less than $212,000,000.

The precious metal is to-day being yielded at an annual rate of $36,000,000 in the United States, $35,500,000 in Australia, and $30,000,000 in South Africa. But little is ever heard of the enormous fortunes that must have been made in Australia. This is due to the fact that the principal mines are operated by syndicates of English capitalists.

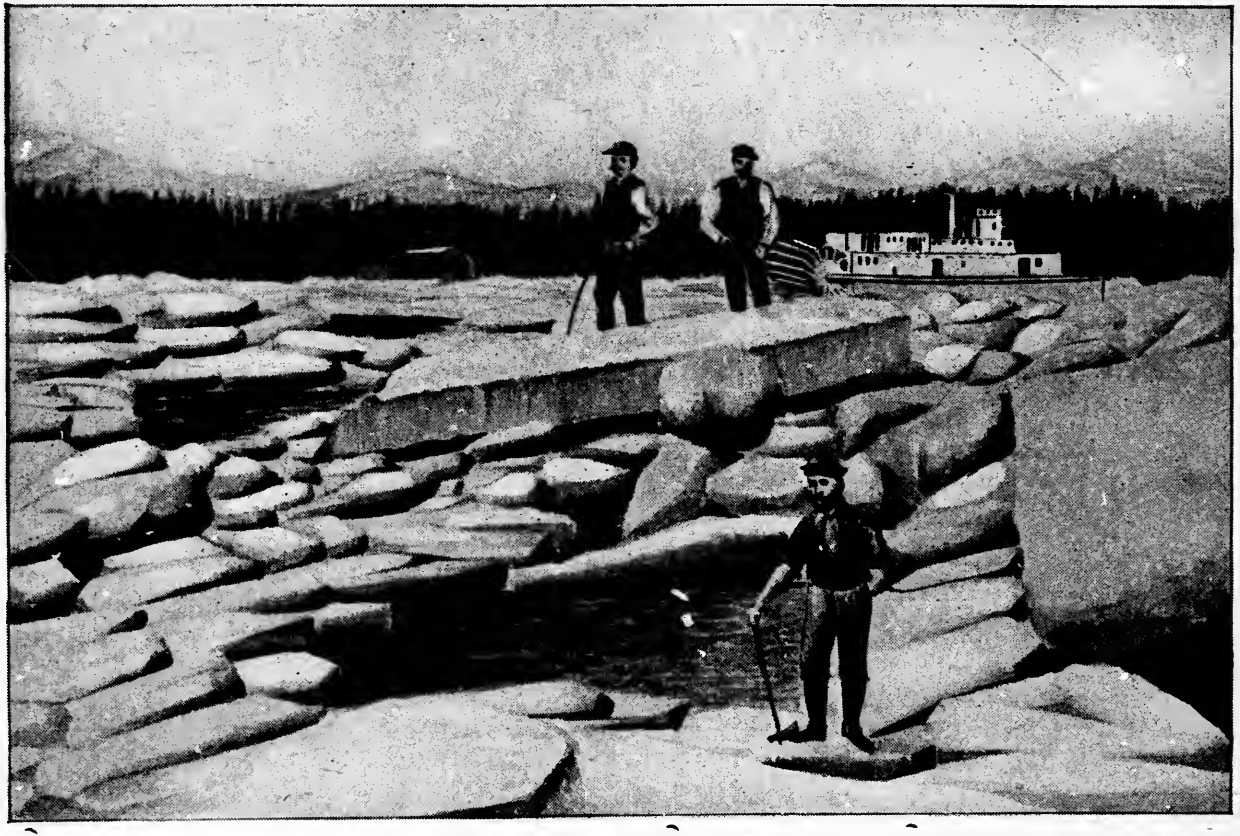
The name that is pre-eminent in the history of Australian gold fields is that of "Money" Miller, who is said to have retired with a fortune of $25,000,000, not large enough to make him conspicuous should he live in California.

The wealth of the South African Republic has been divided among fewer men. Barney Barnato is said to have been worth $200,000,000. Alfred Beit is the reputed owner of $100,000,000; Cecil Rhodes of $50,000,000; and the greatest of all is S. B. Robinson, who is supposed to command $250,000,000.

The list of Americans who have become many times millionaires through gold mines is a long one. Fully one-half of the millions taken out of the mountains of the Pacific is divided among less than twenty men. The names of the more famous are part of the financial history of the world, and include:

Leland Stanford..... .....$25,000,000

James G. Fair	25,000,000
Charles Crocker Estate	22,000,000
Peter Donahue	20,000,000
J. B. Haggin	20,000,000
Claus Spreckles	30,000,000
John W. Mackay	10,000,000
James G. Flood	10,000,000
William S. O'Brien	10,000,000
Sharon Estate	20,000,000
Mark Hopkins	21,000,000
Lick Estate	10,000,000
C. P. Huntington	35,000,000
Charles McLaughlin	5,000,000
Alex. Montgomery	5,000,000
Dave T. Murphy	5,000,000
Adolphus C. Whitcomb	5,000,000
Thomas Blythe	5,000,000
J. C. Wilmerding	5,000,000
Walter S. Hobart	5,000,000
Robert C. Johnston	5,000,000



STEAMER "PORTUS B. WARE," ICE-BOUND AT CIRCLE CITY.

STEAMER "PORTUS B. WARE," ICE-BOUND AT CIRCLE CITY.

CHAPTER XIX.

BONANZA KINGS.

Some of the famous princes of the gold-mining world—From poverty to sudden riches—The miners' cabins changed for great palaces and luxurious living—Great fortunes easily acquired and rapidly thrown away—Nuggets of pure gold picked up by chance—The best-known cases of finding lumps of the pure yellow treasure.

THE gold fields of Alaska are still too young in the knowledge of man to have produced many of those interesting types of humanity which we call "bonanza kings," but to the name of Treadwell, the owner of the famous mine, and some others who have passed from poverty to riches in a brief space of time, will probably be added a long list of equally fortunate men. Some of those who came down from the Klondike country on the "Portland" and other vessels during the past summer, bringing with them bags of yellow dust, have already taken long strides toward the enviable position of mining princes, and when they return again will probably be able to spread before the world still further evidences of their claim to the title.

One of the pioneers of the Alaska country who is likely to be heard of before long as the possessor of a great fortune which came to him suddenly after years of wandering and search is Captain John Healy, known to northern territory as "King of the Klondike."

The title is given by those who have lately been in Alaska grubbing for gold to a genial, jovial old hunter and prospector who went into that frozen country before many of those who have since grown rich there had ever more than heard of it. Had it not been for John Healy, indeed, it is doubtful if the world would yet know of the riches of the Klondike. Because, after he had wandered over the Alaskan hills and learned what the country contained, he came back to civilization in the interest of opening up the region to prospectors and hunters, while others who were there were doing their best to keep it closed.

But aside from being the so-called King of the Klondike, John Healy has an interesting history. At the start he was a boy in New York. Then he ran away from home to join the Walker filibusters on the Pacific Coast. Later he became a hunter, trapper, prospector, guide, and scout on the Western plains, and a Montana sheriff. Twelve years ago he went to Alaska, and has been the means of organizing the largest transportation company that now operates in the country. Dyea, which is now one of the principal points on the mountain route to the Klondike diggings, was once Healy's Store. The so-called king of to-day established his trading post there years and years ago. He is a pioneer of the pioneers.

Incidentally, while a scout on the Western plains, Healy did a little work for the government, and at one time offered to bring in the ferocious old Indian warrior,

"Sitting Bull," either dead or alive, for the sum of $50,000. All his life Healy has been a rover, an active, ardent, and courageous explorer of new countries. Civilization has no charms for him. He is a lover of the wildest nature, of the camp-fire, the mountain pass, and the trials and joys of the hunter. For forty-five years he has lived in the mountains and on the plains digging for gold or trading in furs. To his love of adventure and to his genius for exploration the men who are now growing rich in the Alaskan gold fields may be largely thankful, and his reward will no doubt come to him in other practical ways, even if his mines do not show the riches they promise.

Since the Klondike excitement began a great deal of mention has been made in the papers of Captain Healy —he has the title captain as well as that of king.

Healy's life has been an adventure from the start. He has always had a liking for the plains and he had a taste of frontier life and war early in his existence. The first was when he ran away from his home to join the filibustering forces of the venturesome and daring Walker. Walker, as those who are acquainted with the history of the middle of this century will remember, had in hand a project for the conquest of northern Mexico, with the idea of making himself its ruler. He was born in Nashville, Tenn., had studied medicine in Europe and law in this country, and practiced both. In 1850 he went to California as a lawyer and an editor, and three years later organized his expedition to take northern Mexico,

where it was announced he intended to establish the Pacific republic.

This daring enterprise appealed at once to young Healy, and he cut away from home to join the expedition. The party eluded the vigilance of the United States authorities, and sailed from San Francisco, landing soon after in Lower California with one hundred and seventy men. Walker at once proclaimed himself President of the new republic, but the party was soon assailed by a large force of Mexicans, and driven across the border to surrender to the United States troops. If he had been successful Healy would probably have been one of his chief lieutenants in the government.

Healy did not join Walker in his expeditions after the failure of the Pacific republic. He was in that enterprise only for the daring and excitement of the thing, and after it was over he went to the plains. It was there that he found the surroundings that best suited him, and the life he preferred above all others. For years he inhabited the camps of the Indians, followed the trail of the buffalo, and traded in skins and furs. Other years he spent in prospecting in the rich hills of the Rockies, making a good strike once in a while, cleaning up a good bit of money, but always pushing on to something new.

At the time of the Mormon war, of course, he made for Salt Lake City, and was happy in the activity and dangers of the times. Later he became sheriff of one of the counties of Montana, which speaks well for his cour-

MINERS' CABINS ON THE KLONDIKE.

MINERS' CABINS ON THE KLONDIKE.

age. No tenderfoot could hold his job as sheriff in Montana in these bad times. The cowboys were full of bad medicine.

It was during his days as a scout and a guide on the plains that he fell in with old Sitting Bull. There was a warm liking between Healy and the Indian chief, if that ferocious old red man can be said to have had any liking for anybody.

It cannot be said that Captain Healy went to Alaska with any idea that there would ever be any such gold excitement there as has recently developed. Twelve years ago no one suspected that the river beds up there were shining with the yellow metal. Healy went there to engage in the fur trade. That and salmon fishing made up the list of everything Alaska was supposed then to be good for. Being a prospector and a miner of experience, though, it did not take him long to learn that there was gold in Alaska, and he located and mined a good bit of it. In 1892 he went to Chicago to meet Portus B. Weare, with whom he had been engaged in the fur trade in the early days of the Northwest. He influenced Mr. Weare to start the North American Trading Company, now one of the largest of the companies doing business in the new country. Of this company Healy is now vice-president and general manager.

Soon after going to Alaska Captain Healy built his fort at Dyea, near the Chilkoot Pass. He learned from the Indians that there was gold along the Yukon, and

went there, prospecting along Forty-Mile, Sixty-Mile, Stewart, and other rivers. His wanderings there gave him information that resulted in his returning to the States and subsequently to the organization of the gigantic company.

Personally Captain Healy, the "King of the Klondike," is a genial, whole-souled sort of a man, companionable and agreeable in all ways. His manners are quiet and gentle, and, though he likes to talk of his doings on the plains, he never does so in a boasting way. In stature he is a little above the average. He is about five feet nine inches tall, weighs about one hundred and eighty pounds, and has a pair of broad shoulders and a deep, sound chest. His face is expressive of courage, and that and his love of adventure are his chief characteristics.

The history of the "bonanza kings" who have become famous in all lands furnishes one of the most romantic and fascinating chapters in the history of the world. The rise and fall of Barney Barnato and the final tragedy of his life are still too fresh in the minds of the reader to need recounting here, though he was probably the greatest of all the money princes of his class. His sudden acquisition of great wealth and the way he threw it to the winds in luxurious living and lavish hospitality and pomp has probably never been equalled. Some other instances of great luck in the gold fields are worth recounting.

The most famous case of prodigal waste of a large

fortune in the Western mining region is that of Lemuel Bowers, better known as Sandy Bowers, of Gold Hill, near Carson City, Nevada. Probably there never was a more extravagant use of wealth than that of Sandy Bowers—"Coal Oil Johnny" not excepted. The late Senator James G. Fair said that he had never known of a great fortune so easily acquired and thrown away as that of Sandy Bowers. Bowers was a raw-boned, red-headed, ignorant Irish lad. He could read and write a little, and was the personification of good nature. When the bonanza ledge of the Comstock lode was found by Mackay, Fair, Flood, and O'Brien, in 1869, Bowers was a day laborer in Carson City. It was found that ten feet of Bowers's place, out on the hills, covered the silver lode, and that the little farm of a poor widow, Mrs. Bridget McCowan, covered hundreds of square feet of the silver bed beneath. Sandy and the widow had known each other in poverty for years, and when the dawn of prosperity came into their lives, they pooled their issues by marriage. The mines located on their combined farms were the famous Crown Point Ravine and the Bowers. In the summer of 1871 the Bowers couple had an income of $2,300 a day. For a year and a half they got checks semi-monthly for about $18,000, often $21,000. They received offers several times of about $1,000,000 for the Crown Point Ravine and the Bowers.

It is not to be wondered at that Sandy and his bride were about wild with joy over the flood of money that came in

upon them. Some people say they believed they had a veritable Aladdin's lamp, but others say they never heard of any such lamp, and were simply crazy from their extraordinary income. The Central and Union Pacific Railroads had been opened two years at that time. Railroad fares in the West were high, and special cars cost small fortunes. Nevertheless, Sandy and Mrs. Bowers chartered a special train to take them and a score of friends to Chicago and New York. The Bowerses stocked the cars with all manner of fancy provisions. In Chicago, and later in New York, they took their guests to the best hotels and treated them lavishly. Then, in two weeks, the party returned to Carson City and Virginia City.

Sandy Bowers and his wife had seen the mansions of Chicago and New York, and they determined that, to occupy the places of millionaires, they must have a royal home instead of the red-wood, three-roomed house they had delighted in. An architect was summoned from San Francisco and set to work.

"What we want is a bang-up mansion like what them other rich 'uns have, and we want it quick, too." This was Sandy's order.

There was no talk about the cost of the house. A man who, two years before, occasionally earned $1.50 a day, and was then getting over $2,000 every day in the week from an apparently inexhaustible supply of rock under his farm, could not bother about a few extra thousand dollars in his home. The site chosen for the man-

sion was in Washoe Valley, six miles from Gold Hill, in a desolate region, which Sandy thought looked like valleys he had seen on the Hudson River. In speaking of the howling wilderness where the Bowers's mansion was erected, Mark Twain once wrote that "the first landscape gardener sent there by Sandy Bowers was slain by the Indians."

The Crown Point Mine continued to pour out its riches, and in 1873 the Bowers's granite mansion was finished. The army of builders, decorators, landscape gardeners, and furnishers, all brought from San Francisco, Chicago, and New York by Sandy's young business manager, had full swing, and had followed the miner's orders to "do the job in grand style." The house would be stately even now on Fifth Avenue or on Nob Hill. It was built of granite, and up to the day it was turned over to its owners it had cost upward of $460,000. Several men and women had traveled in Europe purposely for decorations for the mansion in the sage-brush, desolate valley of Washoe. There were twenty-four rooms in the house. A cologne fountain spouted in the marble front hall; an immense buffet of teak-wood, carved in India expressly for the mansion, stood in the big dining-room; several thousand books, bound in the costliest covers, and chosen by a man in Chicago, stood on the mahogany shelves in the library, and a marble bath-tub was one of the luxuries of the upper rooms. Sandy's friends said he paid bills to the amount of $25,000 for oil paintings alone that were sent

him from New York and abroad. An idea of the extravagance of the mansion may be had from the fact that the door-knobs were molded in solid silver from unique designs, while the stair-rods were of solid silver, tipped with solid gold. Such table vessels as soup-tureens and potato-dishes were of solid gold, and there were dinner and tea sets in solid silver throughout.

Sandy and his wife moved from their $1,000 house into this mansion. Meanwhile the curse of a great many suddenly made millionaires in the West—a taste for intoxicants—had its hold on Sandy. He entertained lavishly. A Fourth of July celebration and banquet to the bonanza mining millionaires, in 1873, was the most elaborate affair known even in those days of prodigality. It is said to have cost $11,000 for the day's hospitality to forty gentlemen. Sandy became more reckless as his taste for liquor grew. When his silver ledges began to "pinch out," disasters came upon him thick and fast. In 1875 his income had decreased to a few hundred dollars a month. He was living at the rate of a thousand or two a week. He mortgaged his property, sold his library and art treasures piece by piece. Then he parted with his costly furniture for a song. The Crown Point Ravine petered out entirely in 1876, and Bowers and his wife lived in a single room of their big house. Everything that could be converted into ready cash was sold at any price. Sandy died in 1877. He was buried by contributions from people who had enjoyed his bounty when he was rich. Mrs. Bowers is still alive. She goes about

California and Nevada telling fortunes from cards, at twenty-five and fifty cents a head. She is very poor and feeble. She recently told a reporter in Los Angeles that her only hope is to get enough money together to be buried at the side of her husband in Carson City.

The Bowers mansion is in ruins now. It was proposed that James J. Corbett might use it as a home and training place in his preparations for the recent fight with Fitzsimmons at Carson City, but the building was found too dilapidated even for temporary occupancy.

Accident pure and simple led to the discovery of Montana Bar, the richest half-acre of gold ground in the world. In the spring of 1864 four prospectors—McGregor, Fredericks, Sullivan, and Wright—were straggling through a gulch on the east side of the Missouri River, a few miles from the site of the present city of Helena. Pausing for rest, one of the parties scooped up and began to wash a panful of dirt. Their pickings up to that time had been very dry, and the miner's surprise may be imagined when, from a single shovelful of dirt he washed about forty dollars in coarse dust. Excitedly announcing his discovery to his companions, they set to work with a will, and by nightfall had a pile of dust and nuggets worth $21,000. Early in the morning of the second day they located all the ground the law allowed by driving stakes, with the usual posted notices, and then resumed digging and washing. The locality was an isolated one, and they guarded their find with such care that no hint of it reached the outside world.

When the coming on of winter made further operations impossible, they had taken from half an acre of ground three and a half tons of coarse gold, worth not less than a million dollars. The gold had been hidden as rapidly as taken out under the log cabin they had thrown up as a habitation. How to get safely away with their treasure was the problem which now confronted them. A covered freight wagon, a four-horse team, and a number of empty nail kegs were bought at the nearest settlement and taken to the claim, where, at the end of a week, the dust was packed in the kegs and the latter securely bound with thongs of rawhide. Then the kegs were loaded into the wagon, and by easy stages conveyed a distance of 120 miles to Fort Benton, the head of navigation on the Missouri. Then, after much deliberation, it was decided to build a flat-boat that would go over the shallow places, and with it float down the river to St. Joseph, which plan, after several startling experiences, was successfully carried out. Following the departure of McGregor and his comrades a stampede to the gulch set in, and many good finds were made. In one instance a miner who had staked off a claim and found good prospects was bantered by a bystander who owned a couple of pack horses for a trade. This was quickly agreed to, and in a few weeks the new owner took out dust to the value of $56,000. Another valuable claim was bought with a Colt's revolver. The total yield of the gulch exceeded three million dollars.

Chance also led to the discovery of the famous Com-

KLONDIKE GOLD MINING, SHOWING SLUICE,

stock lode in Nevada. The site of the lode, so the story runs, was prospected by a miner named Comstock, who thought so little of the claim which he had located that he soon abandoned it. Then an eccentric character, Finney by name, while hunting in the neighborhood, shot a deer, which struggled off as fast as it could, with Finney in hot pursuit. The hunter, in scrambling up the side of a hill, dislodged some loose stones, and, as he passed, thought he perceived signs of "color." At the moment, however, the wounded deer claimed his attention, and, though upon his return to camp he related the incident, he does not seem to have attached much importance to it, for he made no effort to return and locate a claim. But Peter O'Reilly and Patrick McLaughlin, overhearing his story, resolved to examine the locality, and a few days later began operations on the site of the present Comstock mines. At first their search seemed a futile one, but they persevered, and being finally attracted by some curious-looking black earth, they washed a little of it in a pan. To their surprise, from the small quantity of earth tested came ten or fifteen dollars' worth of gold. This served to raise their drooping hopes and they were making splendid progress when Comstock appeared and demanded to know what they were doing on his claim. Compelled either to kill the claimant or to take him into partnership, O'Reilly and McLaughlin chose the lesser of the two evils. But no sooner was Comstock pacified than along came Finney, or Old Virginny, as he was called, and demanded a share

also for having furnished the information that led to the discovery. He was more easily placated than Comstock, for after some negotiation and no end of swearing, he was bought off with $25, an Indian pony, and a jug of whisky, the additional compliment being paid him of naming the new-found mine after the State from which he came and which furnished him with a nickname. Finney was killed not long afterward by a bucking mule, and two of his associates met with an equally luckless fate. O'Reilly died insane, and Comstock, after permitting incalculable wealth to slip through his hands, became almost a pauper and shot himself while searching for the famous Lost Cabin mine in the Big Horn range.

The Comstock mine has made more money for the owners in the years which have followed than any other enterprise of its kind in the world. Some of the best known of the mining kings have lived for years in luxurious palaces as the result of the ore taken from this famous lode.

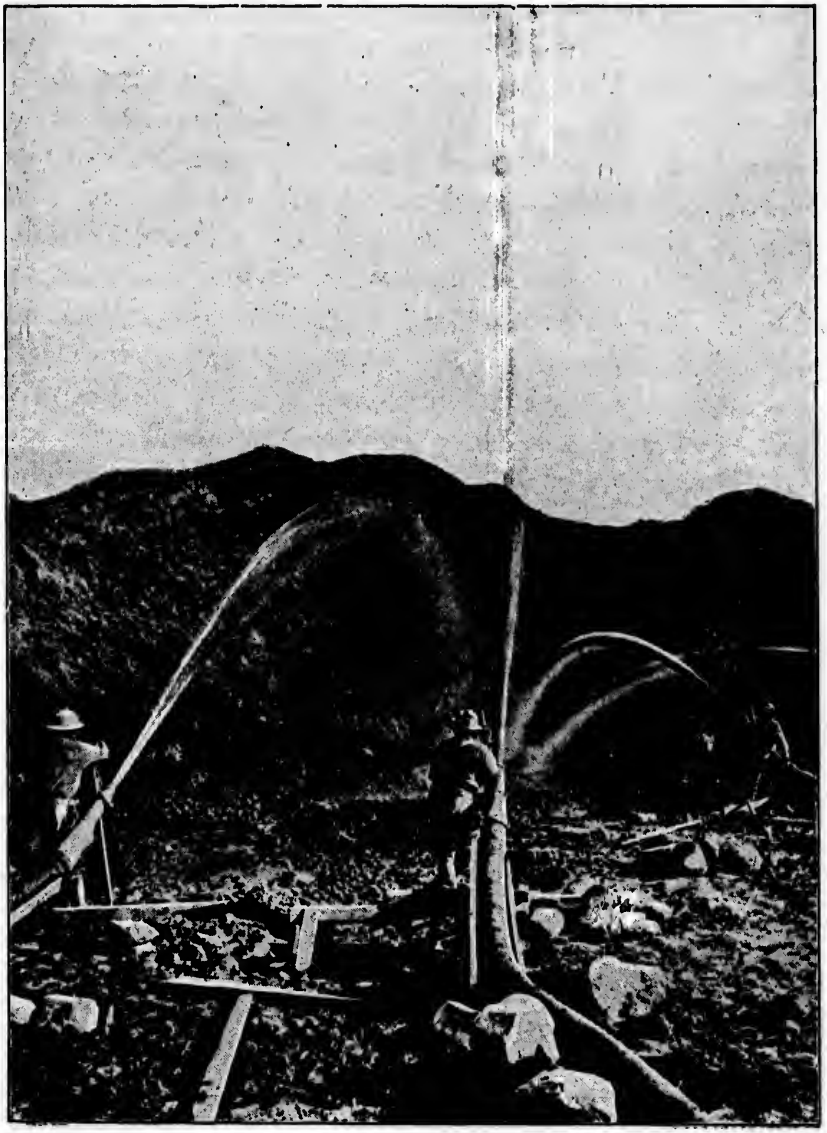
The name of the Nick o' Time mine in Arizona recalls a singular story of its discovery. A miner, named John Quincy Adams, who was prospecting in the mountains of that territory, while wearily trudging along one hot day through a gulch where the sun beat fiercely upon his back, suddenly smelled smoke. He glanced quickly about him to ascertain its origin, but, seeing nothing, resumed his journey. An instant later the smell returned, stronger than before, and a tiny wreath of smoke curling about his ears gave him warning that

his haversack was on fire. Following the usual practice of miners, his kit included a large lens for examining the specimens and the sand in his pan. This, for want of room, he had hung on the outside of his haversack, where, concentrating the rays of the sun, it had set the pack on fire. Stowed up in the haversack were twelve or fifteen pounds of powder, and Adams, as soon as he realized his peril, lost no time in dropping his burden between two huge stones and getting as far away as possible before it exploded. Then, from a safe distance, he watched the faint puffs of smoke and waited until the expected explosion was over, so that he could return and gather up the remnants of his scanty belongings. Suddenly there was a deafening report, and the ground trembled beneath the feet of the miner, who dodged behind a friendly rock to escape the fragments of flying wreck. The danger past, he hurried to the spot to gather up what he could find, when, to his surprise and joy, he discovered that the quartz that had been blown up fairly glittered with gold. His powder had done better on its own account than it had ever done on his, and had literally blown open a gold mine for his benefit. For that reason Adams named his mine the Nick o' Time. Many thousands of dollars soon passed into Adams's pocket, and he became immensely rich.

The Christmas Gift mine in California got its name in not less curious fashion. Its discoverer was one of a hunting party that had gone out from San Francisco during the Christmas holidays. While following a nar-

row trail that skirted the side of a steep hill, his horse suddenly stumbled and, with its rider, slid into the gulch below. Chancing to be the last in the line and some distance behind his companions, the huntsman was not missed for some moments. When his absence was finally noticed the party turned back to look for him, fearing some untoward accident. At first no trace of him could be found, but the place where the horse had slipped and fallen over the bank, together with the traces of the fall, being plainly visible, the men slowly picked their way down the slope and, when near the bottom, came upon an interesting spectacle. Just behind a clump of bushes, which rider and horse had crashed through on their way down, stood the animal, apparently uninjured, while on a slab of rock nearby the man was capering like an Indian at a ghost dance. Fear seized the members of the rescuing party that their friend had lost his senses, but catching sight of them he ceased his dancing and beckoned them to come to him. When they joined him he showed them several lumps of almost pure gold, hastily knocked from the ledge with a stone for a hammer, and announced his discovery of a gold mine. The sliding horse had brought up against the ledge and the restive animal in trying to rise had kicked the moss from the stone and thus disclosed a gold-bearing vein of exceptional richness, which its lucky finder appropriately named the Christmas Gift.

Still, pluck is often more potent than luck, and Jim Whitlach, of Nevada, a famous miner, lately dead, was



PLACER MINING, HYDRAULIC SYSTEM.

wont to say that the man who followed prospecting for a dozen years or more was sure in the course of time to strike it rich. The history of David Swickhimer and his wife gives striking confirmation to Whitlach's dictum. It was in 1884 that Swickhimer appeared in Rico, Col., and opened a small saloon, which soon numbered among its patrons a prospector named George Barlow. The latter was half owner of several mines near Rico, and when, in 1885, he asked Swickhimer, who by this time had found liquor-selling a long road to wealth, to buy out his partner, the saloon-keeper accepted the proposition. The prospect looked good, but the mineral was slow in coming in, and when the shaft was 250 feet deep Barlow gave up in disgust and presented his half of the claim to his now penniless partner, whose money had all been swept into the hole on the side of Dolores Mountain. Swickhimer's spirits had also sunk to a low ebb, and when a miner with some money and more faith offered him $500 for the claim he was inclined to accept the proposition, and would have done so had not his plucky wife entered an emphatic protest against it. Instead, she found a place as a servant, and in due course of time work, single-handed, was begun in the shaft by the husband.

Then came an unlooked-for turn in the road. Unknown to her husband, Mrs. Swickhimer had invested in a lottery, and one day word came to her that her ticket had drawn a prize of $5,000. This money was promptly put into the shaft, and while it lasted everything went swimmingly, but with old debts to be paid

and new machinery to be bought, in a short space of time he again found himself penniless, with nothing to show for his time, labor, and money but a hole a little less than than 300 feet deep and—no ore. Once more the Swickhimers proved the sturdy stuff of which they were made. They went to work for wages, and as soon as they had saved a few hundred dollars operations were resumed in their mine. Their labor and weary waiting now had their reward, for when 300 feet of depth had been gained the long-sought-for vein was struck, and it ran 500 ounces of silver and five ounces of gold to the ton. That was eight years ago, and to-day Swickhimer is President of the Rico National Bank and the owner of a great many houses in Denver and several business blocks in Pueblo. In two years and a half he took out of his mine $1,000,000 worth of gold and silver, and then sold it to an English syndicate for $1,500,000 cash. His wife, the star that led him on to success, is also rich in her own right, for his first act after selling the mine was to make over to her two-thirds of the purchase-money. Their days of scrimping economy, thanks to a woman's pluck, are ended for good and all. But with the money happiness did not come to the couple, for they have since been divorced.

Pluck also made a many-times millionaire of Thomas Cruse, discoverer of the famous Drum Lunnon mine in Montana. A dozen years ago Cruse, who had been a miner from his teens, could be found at the bottom of the claim he had located in the rough mountain country,

a few miles from Helena, working with pick and shovel for the treasure he never lost hope of finding. His neighbors, who called him Old Tommy, looked upon him as a harmless crank, and when, after years of patient delving and digging, he struck into a vein of rich ore, few placed the value of the mine, where he lived and worked alone, so high as did the owner. When he refused $500,000 for it the people of Helena said he was foolish, and when he turned away from an offer of $1,000,000 they set him down as a fool. But the miner was wiser than those who had nothing save advice to give him, and eventually received his price, $3,000,000 and a goodly number of shares in the new company. Then, as so often is the case, the old familiarity was dropped and the Tommy of other days became Mr. Thomas Cruse, capitalist. A kindly-hearted, thoroughly honest man, of whom all who knew him are ready to say a good word, he is in these days a familiar figure on the streets of Helena, and the president of a savings bank in the city where, when a struggling prospector, he often found it difficult to get trusted for enough to keep himself alive—a notable example of the ups and downs of a miner's life.

Pluck also made a millionaire of N. C. Creede, from whom the town of Creede, Col., takes it name. A native of Indiana, reared in Iowa, he entered the regular army when he was nineteen, and for seven years served as a scout against the Indians. In 1869 he took up the life of a prospector, and for upwards of two decades roamed

the mountains of the West in search of silver-bearing quartz. Usually a partner kept him company in his wanderings, but now and then he could get no one, either for love or money, to share them. Each year he stayed in the mountains until the snow came, and many months went by without his seeing the face or hearing the voice of a fellow-being. Twice he was stricken with pneumonia in the mountains. Luckily he had a companion each time, or death would have ended his prospecting for good and all. However, his labor and hardships counted for naught, and the spring of 1890 found him as poor as he had been twenty years before.

Still hopeful and stout of heart, Creede resumed his wanderings, and in May of the year just named struck some float on the side of Mammoth Mountain, near the site of the present town of Creede. Float is the name given to stray pieces of rock broken from a mineral-bearing ore and washed down a mountain by water and frost. He tied his burros and began to follow it, climbing the mountain in the trail of the float all day. The sun was beating down on him; the glint of the float under his feet was blinding; but still he pushed forward, and just as a gorgeous sunset reddened the western sky the tired man lifted his head, and there, projecting out in front of him, was a bowlder of silicate as big as a house! He had found the source of the float which he had followed all day. "I almost screamed with delight," said he afterward. "I knew it would come some day, but the idea of finding it in such shape

was appalling to me. I staked off a claim, which I named the Mammoth, and then went back to camp and slept as I hadn't slept for years before."

Fortune, after eluding Creede for half a lifetime, now showered her favors upon him. The sale of the Mammoth and of three other claims, including the Holy Moses, brought him $25,000, and the confidence and financial backing of David H. Moffat, a wealthy banker of Denver. Two Germans, named Reininger and Haas, were prospecting a claim on Bachelor Mountain when in August, 1891, along came Creede, with his eyes open as of old. What he saw about the Reininger-Haas diggings made him laugh. There was a hole in the ground where there was small prospect of striking anything short of China, and a stake with a notice on it, which no man could interpret. But the scene round about was cheering to a wonderful degree. The translucent rocks that could be found there by the ton were of amethyst quartz. A mine worth millions was just under the roots of the grass and the flowers, while no end of wealth protruded into the sunshine. It would have been easy for the experienced Creede to have deprived Reininger and Haas of all right in the vein, but he was not that kind of a man. Instead, he helped to set their stakes properly, and then located a claim on the vein at the end of theirs, which he named the Amethyst. With Moffat's money behind him he at once began digging and shipping ore from what has proved to be one of the richest silver mines in Colorado, and six months later he had realized

the hope that for so many years spurred him on. He had attained the income of a millionaire.

The plucky and long-continued battle against ill fortune waged by Winfield S. Stratton, now the wealthiest resident of Cripple Creek, has had as happy an ending as the story of which Creede is the hero. Prior to 1891 Stratton was a carpenter. That was his trade, but he felt a call to prospect. He would push the jackplane long enough to get a grub stake, and then hasten to the newest mining camp. Almost every camp in Colorado claimed him as a resident at one time or another. He prospected every gulch and hillside in the gold camps, and made futile search for carbonates in Leadville. For many years Stratton wandered over the face of nature looking for float. When Cripple Creek came into notice he was working at his trade in Pueblo. Too poor to travel by rail, he walked into the new country and located a claim on the slope of Battle Mountain. He entered his claim desperately, more to have one than because he had any faith in its future. His becoming a millionaire was but the result of his customary hard luck. He had located two claims, and set up his stakes on July 4th, 1891. Being nothing if not patriotic, he named one claim Washington and the other Independence. The latter showed the best prospects, and Stratton bent his energies to its development. One day he struck a good ore body and gladly accepted an offer of $10,000 for the claim. The would-be purchaser gave him $1,000 to bind the bargain, but was never able to make good the

balance. Suing the person who had contracted for the mine proved a losing venture, and Stratton dejectedly resumed work. The failure to make a sale, however, was the luckiest thing that ever happened to him, for in the five years that have since elapsed he has taken out $5,000,000 worth of ore, and has $3,000,000 worth of ore exposed. He has declined a cash offer of $10,000,000 for his property, and has to wage a hand-to-hand fight with fate to keep his income from the Independence below $150,000 per month. He owns other properties also, and his present fortune is estimated at not less than $20,000,000.

While Australia probably leads the gold world in the size of nuggets, or pieces of almost pure gold, picked up by chance or by the miner in search of ore, many more have been found in America than in any other land.

The first big lumps of gold found in California created a great excitement among the miners. They at once began picturing in imagination masses of gold larger than could be lifted by a dozen men. It was a common camp-fire amusement. There were afloat stories of men sitting down to starve by huge golden bowlders rather than risk leaving their finds to go in search of transportation facilities. The first nugget of sufficient size to create more than a mere local sensation was found by a young man named Henrickson. It is related that he found it in the Mokelumne River while in the act of taking a drink from that stream. The nugget weighed nearly twenty-five pounds. The finder at once hastened

to San Francisco with his prize, where he at once placed it in the hands of Colonel Mason for safe-keeping. The big lump was sent to New York and placed on exhibition. It produced great excitement, and was probably the cause of many a man striking out for California. The largest mass of gold ever found in California was that dug out at Carson Hill, Calaveras County, in 1854. It weighed 195 pounds. Other lumps weighing several pounds were found at the same place.

August 18th, 1860, W. A. Farish and Harry Warner took from the Monumental quartz mine, Sierra County, a mass of gold and quartz weighing 133 pounds. It was sold to R. B. Woodward, of San Francisco, for $21,636.52. It was exhibited at Woodward's Gardens for some time, then was melted down. It yielded gold to the value of $17,654.94. August 4th, 1858, Ira A. Willard found on the west branch of Feather River a nugget which weighed 54 pounds avoirdupois before, and 49½ pounds after melting. A nugget dug at Kelsey, El Dorado County, was sold for $4,700. In 1864 a nugget was found in the Middle Fork of the American River, two miles from Michigan Bluff, that weighed eighteen pounds ten ounces, and was sold for $4,204 by the finder.

In 1850, at Corona, Tuolumne County, was found a gold quartz nugget which weighed 151 pounds 6 ounces. Half a mile east of Columbia, Tuolumne County, near the Knapp ranch, a Mr. Strain found a nugget which weighed fifty pounds avoirdupois. It yielded $8,500 when melted. In 1849 was found in Sullivan's Creek,

Tuolumne County, a nugget that weighed twenty-eight pounds avoirdupois. In 1871 a nugget was found in Kanaka Creek, Sierra County, that weighed ninety-six pounds. At Rattlesnake Creek, the same year, a nugget weighing 106 pounds 2 ounces was found. A quartz bowlder found in French Gulch, Sierra County, in 1851, yielded $8,000 in gold.

In 1867 a bowlder of gold quartz was found at Pilot Hill, El Dorado County, that yielded $8,000 when worked up. It was found in what is known as the "Bowlder Gravel" claim, from which many smaller gold quartz nuggets have been taken at various times. Some years ago a Frenchman found a nugget of almost pure gold, worth over $5,000, in Spring Gulch, Tuolumne County. The next day the man became insane. He was sent to the Stockton Asylum, and the nugget was forwarded to the French Consul at San Francisco, who sent its value to the family of the finder in France. In 1854 a mass of gold was found at Columbia, Tuolumne, weighing thirty pounds, and yielded $6,625. A Mr. Virgin found at Gold Hill, in the same county, a bowlder that weighed thirty-one pounds eight ounces, and when melted yielded $6,500.

A gold quartz bowlder found at Minnesota, Sierra County, weighed twenty-two pounds and two ounces, and yielded $5,000. In 1850 a nugget was found at French Gulch, in the same county, that weighed twenty-one pounds and eleven ounces, and contained gold to the value of $4,893. In 1876 J. D. Colgrove, of Dutch

Flat, Placer County, found a white quartz bowlder in the Polar Star hydraulic claim from which he obtained gold to the value of $5,760.

At the Monumental quartz mine, Sierra County, in 1869, was found a mass of gold that weighed ninety-five pounds six ounces. It was found in decomposed quartz at a depth of twenty-five feet below the surface. This was the only "pay" found in that particular part of the mine. All the auriferous energy of the vein at that point seemed to have been concentrated in the one nugget. In 1855 a nugget weighing sixty pounds was found at Alleghanytown, Sierra County. It was a mass of gold taken from a quartz vein. Several other large "chunks" were taken from the same mine—lumps of nearly pure gold weighing from one pound to ten or twelve pounds. These masses of gold were dug by Frank Cook (afterward City Marshal of Marysville) and others, his partners.

In 1851 a Mr. Chapman and others flumed a set of claims on the middle Yuba. When the water was turned from the river into the flume, about the first thing seen in the exposed bed of the channel was a horseshoe-shaped mass of pure gold, which weighed twenty-eight pounds. This was a very handsome and "showy" nugget. It was sold to Major Jack Stratman of San Francisco.

The Sailor Diggings, on the north fork of the Yuba, just below the mouth of Sailor Ravine, about three miles above Downieville, were wonderfully rich in nuggets.

The diggings were owned and worked by a party of English sailors in 1851. In their claim the sailors found a nugget of pure gold that weighed thirty-one pounds. They also found a great number of nuggets weighing from five to fifteen pounds. The party all left together for England. They took with them all the nuggets they found—both great and small. They were carried in two canvas sacks, the weight being too great to be conveniently handled in a single sack. When the party reached England, they for a considerable time made a business of exhibiting their collection of nuggets and various fancy specimens in all the large towns and cities, thus infecting great numbers of people with the gold-digging fever, for just at that time came the world-startling news of the great gold discoveries made in April of that year in Australia.

In French Ravine, Sierra County, in 1855, there was found in the claim of a Missourian named Smith a double nugget of almost pure gold. The larger of the two nuggets weighed fifty pounds, and connected with it by a sort of neck was a lump of gold that weighed fifteen pounds. In taking out the large nugget the two were broken apart. The large nugget yielded $10,000 and the small one $3,000.

In September, 1850, L. P. Wardell, now in Virginia City, found in Mad Cañon, on the middle fork of the American River, a nugget of solid gold weighing six pounds. The nugget had in it a round hole, and the finder made use of it in his cabin as a candlestick. It

was doubtless the most valuable candlestick on the Pacific Coast. After the nugget had been thus used so long that it was covered with candle grease, the owner sold it, grease and all.

In the early days of placer mining in California colored miners were proverbially lucky. Companies of white men were always ready to take in a colored man as a partner, believing he would bring them good luck. Steve Gillis, of Virginia, Nev., a veteran printer and pioneer miner of the Pacific Coast, tells of the following sample of "nigger luck:" In 1868 a colored miner who was out on a prospecting trip found on the slope of Table Mountain, Tuolumne County, a nugget that weighed thirty-five pounds avoirdupois and yielded over $7,000. The nugget was found on the slope where Table Mountain drifts down toward Shaw's Flat. The man saw a corner of it sticking out of the ground, and, digging it up, he planted it in a new place near by, marking the spot, and continued on his way to his intended prospecting ground.

He did not take up a claim where he found the nugget, as he believed it to have rolled down from some point high up on Table Mountain. He found such good pay in the place he went to prospect that he remained there at work for several weeks, feeling quite at ease in regard to the big nugget he had cached.

Finally he quit work in his new diggings and set out to look for his big nugget. On coming in sight of the spot where he had buried it he almost dropped in his

tracks, for he saw a big company of men at work just where he had made his "plant." The men proved to be a lot of Italians and they had worked up to within about ten feet of the spot where lay buried the big nugget. The colored miner explained the situation to the Italians and they permitted him to dig up and carry away his nugget.

Near Sonora, Tuolumne County, in 1852, a nugget weighing forty-five pounds and containing gold to the value of about $8,000 was found. The finder had a friend who was far gone with consumption, yet was trying to work in the mine. The owner of the nugget saw that by working in the water and lifting heavy bowlders this man was fast killing himself. He told his friend to take the big nugget and go back to the States and exhibit it, as at that time such a mass of native gold was a curiosity to see which many would willingly pay a reasonable sum.

As the ailing man was well educated it was arranged that besides the nugget he should take some fine dust, "chispas," gold-bearing quartz, black sand, gravel, and dirt from a placer, and the like, and with all was to fix up a lecture on life in the mines, mining operations, and California in general. When the owner of the nugget wanted it or its value he was to let the other know of his need.

The sick man took the nugget to the States, got up his lecture, and did well wherever he went. For a time the miner heard from his friend pretty regularly, then

for months lost track of him. He began to think his nugget lost; that perhaps his friend had been murdered and robbed in some out-of-the-way place.

One day, however, a letter reached the miner from a banker in New Orleans, telling him that his friend had died in that city, but had left the big nugget at the bank subject to his order. The miner wrote to have the nugget melted down, and in due time he received a check for a little over $8,000.

Pocket mining as practiced by the experts of California is a branch of gold-hunting that may be said to stand by itself as an "art." The pocket miner follows up the trail of gold thrown off from a quartz vein and strewn down a mountain slope until he at last reaches the mother deposit whence the gold scattered below proceeded. This is an operation which sometimes requires many days to be devoted to the careful washing of samples of dirt taken from the slope of a mountain. Many rich pockets have, however, been found by accident. One of the richest of the pocket mines in California was that in the Morgan mine on Carson Hill, Calaveras County, from which $110,000 was thrown out at one blast. The gold so held the quartz together that it had to be cut apart with cold chisels. It is estimated that this mine yielded $2,800,000 in the years 1850 and 1851, and new pockets have since been discovered almost yearly somewhere in the peculiar formation at and about Carson Hill.

The telluride veins of Sierra County, extending from

Minnesota to the South Yuba, have been prolific of pockets. A big pocket found in the Fellows' mine on this belt yielded $250,000. Many other pockets yielding from $5,000 to $50,000 have been found in this region.

Many rich pockets have been found about Grass Valley, Nevada County; Auburn, Placer County, and Sonora, Tuolumne County. The "Reece Pocket," Grass Valley, contained $40,000. This sum was pounded out in a hand-mortar in less than a month. Near Grass Valley a pocket that yielded $60,000 was found by a sick "pilgrim," who was in search of health, and knew nothing about mining.

The "Green Emigrant" pocket vein, near Auburn, was found by an emigrant who had never seen a mine. It yielded $160,000. This find was made within thirty yards of a road that had been traveled daily for twenty years. No more "pay" was found after the first pocket was worked. The "Devol" pocket, in Sonora, alongside the main street of the town, owned by three men, yielded $200,000 in 1879. It was nearly all taken out in three weeks. The "grit specimen," showing arburescent crystallization, sent to the Paris Exposition, was found in Spanish Dry Diggings, El Dorado County, weighed over twenty pounds and contained over $4,000 in gold. About $8,000 additional of the same kind of gold crystals was taken from the same pocket. The formation at this place is slate and a fine-grained sandstone filled with crystals of iron pyrites in cubes. At American Camp, between the forks of the Stanislaus, in

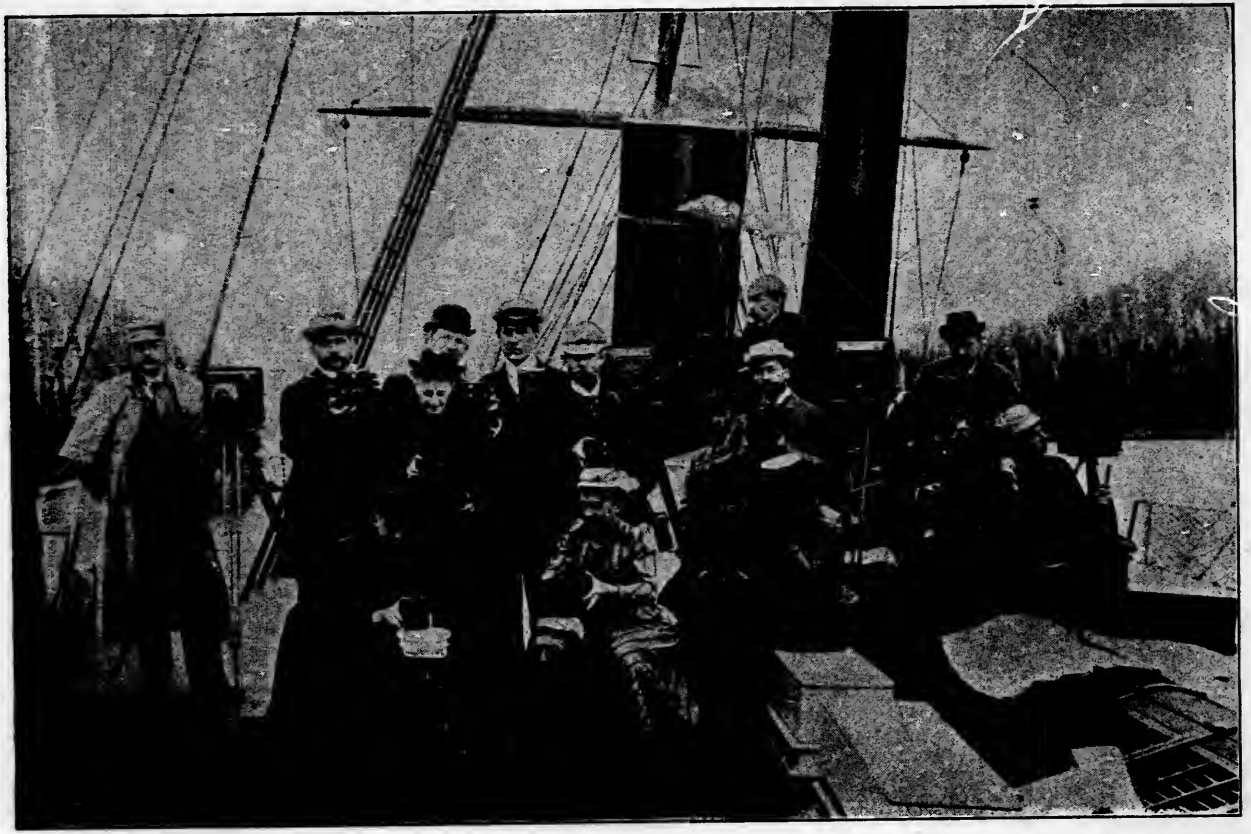
1880, Le Roy Reid found a pocket in the "grass roots," from which he took out $8,200. Near Magalia, Butte County, in 1879, a pocket paid its finder $400 per two hours' work.

The largest nugget ever found in Nevada was one taken out of the Osceola placer mine about twenty years ago. It weighed twenty-four pounds, and is supposed to have contained nearly $4,000 in gold. A hired man found and stole it, but repenting, gave up to the owners in a month or two over $2,000 in small bars—all he had left of the big chunk. In the same mine, about a year ago, a nugget worth $2,190 was found.

Montana's largest nugget was one found by Ed Rising at Snow Shoe Gulch, on the Little Blackfoot River. It was worth $3,356. It lay twelve feet below the surface and about a foot above the bed-rock.

Colorado's biggest nugget was found at Breckenridge. It weighed thirteen pounds, but was mixed with lead carbonate and quartz.

The pioneer nuggets in the United States were found in the placers of the Appalachian range of mountains, where gold was discovered as early as 1828. In October, 1828, a negro found grains of fine gold in Bear Creek, Georgia, but the discovery did not attract much attention. Presently the same negro found a nugget in the Nacoochee River worth several thousand dollars. This "find" started a gold-hunting furor. Several other nuggets of considerable size have been found in Georgia at various times.



KODAKERS ON THE YUKON.

The largest nugget ever found in the Appalachian mining region was that dug at the Reed mine in North Carolina. It weighed eighty pounds.

In the same State some children playing along a creek found a nugget that weighed twelve pounds. The quartz veins of this region generally show a good deal of coarse gold, good-sized lumps, but seldom weighing as much as a pound.

CHAPTER XX.

ALASKA'S SILENT CITY.

Auroral Display During August—Awe-Inspiring Mirages—"Dick" Willoughby's Negative—A Splendid Business Venture—Prince Luigi's Vision.—The Most Famous Mirage Anywhere to be Found—L. B. French's Story of The Silent City—How Willoughby Made His Find—A Stone Pile for a Record Vault—President Jordan Investigates—The Scientific Explanation of Mirages—When and Where They Occur.

BRILLIANT auroral displays and mirages often appear in the glacier country of southeastern Alaska during the month of August. By refraction the ice-floes are frequently magnified into ice cliffs 1000 feet high, apparently barring a ship's retreat to the southward. Richard C. Willoughby, familiarly known to all Alaskans as "Dick" Willoughby, in 1889 claimed to have taken a photograph of a mirage which represented a birds-eye-view of an old English city. Since then nine out of ten tourists in the course of their travels through Alaska have spent more or less time in trying to get a glimpse of what is called in the guide books the "Silent City." The discoverer has in the meantime made several thousand dollars through the sale of photographs printed from what he claims to be the original negative.

However far the "Silent City" fails in having a scien-

tific reason for its existence the fact remains that it has excited and still excites as much interest as any one feature of scenic Alaska. Only quite recently additional import has been added to its phantom history by the return of Prince Luigi of Italy, who, besides having made the ascent of Mt. St. Elias to its very summit, claims also to have had vouchsafed him a grand view of the spectral city, a most exquisite yet awe-inspiring picture impanelled on the sky far above the fleeting clouds. As the story runs the image is so perfect and so clear that the astonished beholder can scarcely realize that it is not indeed a real city that lies outstretched before him. He sees well-defined houses and great public buildings and the lofty spires of churches, even people moving about, and trees and well-arranged parks. But within a brief half-hour this city grows dim and vanishes, and no wonder that the beholder rubs his eyes, and can scarce believe his senses.

But not often does nature record this wonderful vision. It has flitted before the eyes of but few men. In many years it has been seen but by a handful of travelers and explorers.

The vision rarely lasts more than half an hour, when it suddenly vanishes into the mists that begot it, leaving the astonished observer in a state of wonder and awe, feeling that he must have been in a dream or have been fooled by some trick of the imagination or of the optic nerve.

Prince Luigi's party consisted of a number of scientific men, including Lieutenant Umberto Cagni of the Italian

Army, who made all the meteorological observations; Mr. Vittario Sella, a famous amatuer photographer; Dr. Filippo de Fillippi, surgeon of the party; and Cavalieri Francesco Gonella, president of the Alpine Club of Truin.

It was in the early morning of July 7th last. The Prince and his party were returning from the ocean with supplies, when suddenly a city appeared before their astonished eyes. They had not noted it before; they knew that no city existed at this spot, and yet so perfect was the image that it was hard to disbelieve in its reality.

"It required no effort of imagination," said one of the Prince's party, "to liken the vision to a city. It was so distinct that it required instead strong faith to believe that it was not what it appeared to be. It remained a perfect image for thirty minutes and then faded away, while in its place appeared a rocky ridge." The Prince and his party were singularly fortunate in having this vision vouchsafed to them, for its appearance is like angel's visits, few and far between. No mirage that appears anywhere on the face of the globe is so distinct in its outlines, and it is perhaps well that the image did not last long; otherwise the weary traveler and explorer might follow in the direction of this will-o'-the-wisp-like city for days, in the hope of securing comfortable accommodations within its walls.

The Prince and his party were so overcome by surprise that unfortunately they did not secure a photograph of the "Silent City."

Mr. L. B. French, who thinks he saw the city outlined in the Willoughby picture, tells of his experience in the following words:

"About five o'clock in the afternoon of an early July day we suddenly perceived, rising above the glacier, over in the direction of Mount Fairweather, what at first appeared to be a thin, misty cloud. It soon became clearer, and we distinctly saw a spectre city moving toward us. We could plainly see houses, well-defined streets and trees. Here and there rose tall spires over huge buildings, which appeared to be ancient mosques or cathedrals.

"It was a large city, one which would contain at least one hundred thousand inhabitants. I have seen Milwaukee miraged over Lake Michigan, and this city appeared considerably larger than that. It did not look like a modern city—more like an ancient European city. I noticed particularly the immense height of the spires. Of course we were much excited. The Indians who were with us were overcome with superstitious fear and ran away. We had cameras, and separated in order to take it from different points of view. By the time we reached points of vantage it had grown fainter and soon disappeared. I should say the spectacle lasted about twenty-five minutes."

Minor W. Bruce, in his narrative of his trip up the Alaskan coast, says in this connection:

"Two years previous to my arrival at Juneau, Professor Willoughby had been exhibiting a negative of a

picture which he said he had succeeded in taking of a city which appeared above the face of the glacier in the longest days of each year, and which was brought to his attention by the natives, who called it the 'Silent City.' He procured a camera, and in three successive years made the journey in a canoe with natives, and each time was able to make an exposure, but the plate that had been exposed the third year proved, upon development, to be the only one that contained a picture of the city. It was a weird-looking negative and, contemplating it while the professor told the story with the utmost earnestness and sincerity, one could not but be interested and inclined to believe it to be true. He said that the city always appeared as if suspended in the air, just in front of the Fairweather range of mountains. The atmosphere was so clear that the peaks many miles to the north were distinctly seen, and every ridge and wallow and curve of the icy crust that enveloped them could not have been more clearly defined had they been but a stone's throw away. While asleep in his tent one morning, a native called to him excitedly to get up; and upon looking to the north he saw a strange-looking object hanging over the sides of the mountain, and following the direction of a stream or glow of light which seemed to radiate from the range squarely down upon the glaciers at the head of the bay. Gradually it became more distinct, and soon assumed the appearance of a city of immense proportions, stretching out into the distance until its furthermost limits were lost to view.

The style of architecture was new to him. Buildings of massive dimensions extended in solid and unbroken blocks as far as the eye could reach. The solemn walls of cathedrals arose almost to the skies, and his imagination reveled in silvery music, chanted to a chorus of tinkling bells, that was wafted out from the frescoed aisles through the openings of gorgeously painted windows. The entire limits of the city were confined within a halo of light, dense, yet transparent, pouring its soft glow upon roof and wall and window in glorious transformation. To the right and left ranges of mountains, covered with the garb of winter, formed the background. The tops of buildings, and the spires of churches, appeared to pierce its ghostly robes, yet not one breath of their chilled presence extended within the portals of the city. Again, he seemed to hear the bells from the steeples of a hundred churches mingling sweet and happy melody, yet, within the whole length and breadth of this boundless city, not one soul could be seen. Not even a shadow darkened the light for an instant. All was silent as the grave when suddenly the vision began to move away. Its glories and grandeur lured him with a fascination which he could not resist. But as he walked forward, it seemed to recede with even pace. Gradually, though he quickened his step to get within the silent portals before it was too late, it was wafted into space and finally lost to view.

"In the summer of 1889 I accompanied Professor Willoughby to Glacier Bay and spent six weeks in exploring

the glaciers and surrounding country. Anxious to see the spot where he claimed to have witnessed this wonderful sight, although, I feel free to say, I did not live in very high expectations of gazing upon the silent city. One day we ascended the side of a mountain to a level space affording a glorious view of the whole bay. He took me to a pile of rocks, laid carefully one upon the other, to a height of perhaps five feet. Slowly he commenced to throw off the rocks until an opening was made in the center, and inserting his arm, he drew out what appeared to be a scroll or book made from several leaves of birch bark. It was badly mildewed and upon unrolling it a pencil fell to the ground. The half-dozen pages looked bright, and contained a record, stating that the object of three trips made to this locality, in as many different years, was to secure a photograph of the city.

"During the six weeks I spent with Professor Willoughby, the relations between us, in camp and in our travels, were such as to encourage an exchange of confidences on many subjects, and although the subject of the silent city and mirages was often referred to, he never by word or implication gave me any reason to think that his story was other than a true one."

Some months ago President Jordan began an investigation into the merits of the "Silent City" and after going over the ground wrote a paper for one of the scientific monthlies in which he gave it as his opinion that the Willoughby negative was a poor impression of Bristol, England.

Mirages are caused in this way:—The density of the air generally diminishes with the height; rays of light that proceed obliquely from an object then become more and more horizontal, but generally pass away into space. When the density of the air diminishes with the height with unusual rapidity, as when the air is cooler, the nearer it is to the earth, then the ascending rays may become quite horizontal, and then bend downward toward the earth, reaching the earth at a far distant point from the object reflected.

The observer at that point sees distant objects at an unusual elevation, or sees above the true horizon erect images of objects which may or may not be beyond the horizon. If the layer of air near the earth be uniformly dense, as in the cold air over a frozen sea, and a warmer stratum lie above it in which the density rapidly diminishes, so that the rays are brought back to the earth, the rays cross one another in the hot stratum, and the observer sees objects upside down.

In the desert of Sahara and other arid deserts the conditions are reversed, for the air is hottest near the hot sand. Skylight rays descending become bent upward. The mirage is not inverted and the illusion is often perfect.

CHAPTER XXI.

THE GLACIERS.

Wonders of the northern territory—The great ice fields—The formation and action of glaciers—What is known of the remarkable Malaspina glacier—Some freaks of nature which man studies with intense interest—Some mysteries in the frozen land which he cannot solve—The Muir, Guyot, Seward and other glaciers.

PERHAPS no single feature in Alaska, aside from its gold treasure, has excited so much human interest and investigation as its glaciers. The Malaspina, Muir, and other less well-known Alaskan glaciers are regarded in the scientific world as among the most remarkable works of nature of this class on earth.

The name glacier is one given to a mass of ice, having its origin in the hollows of great mountains where perpetual snow accumulates but which makes its way down toward the lower valleys, where it gradually melts, until it terminates exactly where the melting, due to the contact with the warm air, earth, and rain of the valley compensates for the bodily descent of the ice from the snow reservoirs of the higher mountains. Of the manner in which glaciers are formed and moved and disappear much has been learned by the scientist in a general way, but much of the story of their work in the ages which are gone, of the stupendous force which they exert on the earth's surface, is yet to be learned.

A recent report to the government on the Mt. St.

Elias district gives some interesting statistics of the great Malaspina glacier which may be regarded as the type of these ice bodies called Piedmont glaciers. They are so called because formed at the foot of mountains by the union and expansion of ice streams from the valleys of adjacent highlands. The glaciers flowing south from the great neve fields on the mountains of the St. Elias system, for full one hundred miles west of Yakutat Bay, expand on reaching the flat lands between the base of the mountains and the sea, and unite to form a vast lake of ice, which has been named in honor of Malaspina.

The glacier extends with unbroken continuity from Yakutat Bay, seventy miles westward, and has an average breadth of from twenty to twenty-five miles. Many of the glaciers are vastly greater in dimensions, but the formation and movements of this one, as known to man, will serve to show the general laws. The area is about that of the State of Delaware, or a little larger. It is a vast, nearly horizontal plateau of ice. The general elevation of its surface, at some distance from its outer border, is fifteen hundred feet. The central portion is free from moraines, or dirt of any kind, but it is rough and broken by thousands of crevasses. Its surface is a broad, desolate prairie, not unlike the rolling lands of the Western plains.

The Malaspina consists of three principal lobes, each one formed by the expansion of a large tributary ice stream. The largest has an eastward flow toward Yakutat Bay, and is supplied mainly by another smaller

glacier, known as the Seward. The next lobe to the west is the result of the Agassiz glacier. Its current is toward the southwest. Still a third lobe lies between the Chaix and Robinson hills, and is supplied by the Tyndall and Guyot glaciers. Its central current is southward.

The Seward lobe melts away before reaching Yakutat Bay, but its southern margin has been eaten into by the ocean, forming the Sitkagi bluffs. The Agassiz lobe is complete, and is fringed in all its extremity by wood moraines. The other lobe pushes boldly out into the ocean, where it breaks suddenly, forming the well-known Icy Cape. The waves undermine these great ice cliffs and piece after piece is deposited in the ocean to sail away in the form of bergs. This is the only instance known in Alaska where a glacier advances into the open ocean. The ice cliff at its extremity is one of the finest specimens of its kind to be seen in the world, and furnishes to the tourist one of the most beautiful sights on the Pacific coast.

On the northern border of the Malaspina glacier, but below the line of perpetual snow, where the great plateau has a gentle slope, the melting surface gives the origin to hundreds of rivulets, which course along in channels of clear ice, until they reach a crevasse, where they plunge down to the drainage beneath. On a summer day, when the sun is well above the horizon, and where the surface of the glacier is inclined, the rush of the water may be heard constantly, but as soon as the shadows of evening fall the flow ceases. These streams

are always of clear, sparkling water, and it is seldom their channels contain *débris.* Where the surface is level and broken frequently by crevasses, these streams are absent though pools of water are often found.

The moulins in which the streams disappear are well-like holes of great depth. They are seldom straight, as the water plunging into them from one side washes away the other. In descending the water is washed from side to side, increasing the irregularity of the wells. A deep roar coming from the hidden chambers to which the moulins lead frequently tells that large bodies of water are rushing along in ice caves underneath. The Stikines, hearing the mysterious roars and crashes from within at Le Conte Bay, believed it to be the home of the Thunder Bird, or Hutli, as the native tongue has it. They thought the noises were caused by the flapping of his wings. All Thlingits believe that in the beginning the mountains were living creatures, grandly embodied spirits whom they all worshiped. The glaciers are the children of the mountains, and the parents hold them in their arms, dip their feet in the sea, cover them with a warm snow blanket in the winter and scatter rocks and earth over them in summer to protect them from the hot sun. Sitkh is the general name for ice, and its whispered sibilants suggest the Indian horror of cold. They have an idea of a hell of ice instead of fire, a place of everlasting and intense cold, where those go who fail to do right in life.

Sitkh too Yehk is their ice spirit, an invisible evil

power, whose icy breath is death and who manifests himself in the Arctic winds which sweep over the glaciers. His voice is heard in the crash of falling bergs and the crunching of the ice floes. When the ice winds are still and the glacier is quiet the evil spirit is believed to be sleeping or wandering in search of mischief in the labyrinths of ice in the interior. The natives are careful to be quiet, fearful of waking the disagreeable one and refrain even from striking the icebergs with their canoe paddles for fear trouble may result. When they have to journey across the glaciers they pray for mercy of the ice spirit with great ceremony and many chants. The seals are regarded as children of the glacier and proof against all the evils arising therefrom. Under the glacier it is believed that man-faced seals dwell, and much care is taken to propitiate these.

In the lower portion of the glacier, where the ice has been deeply melted, and especially where large crevasses occur, the abandoned tunnels made by englacial streams are sometimes revealed. These tunnels are frequently ten or fifteen feet high, and occasionally one may pass through them, from one depression in the glacier to another. In some instances they are floored with rounded stone and other *débris*. As the melting progresses this material is concentrated at the surface as a moraine.

The ice in various portions of the glacier is formed of alternating blue and white bands, which is the rule in glacial ice generally. The blue bands are of compact

ice, while the white ones are filled with air cavities. This banded structure has been the subject of much study, and, as shown by Professor Tyndall, is of the nature of the slatey cleavage in rocks, and results from the pressure to which the ice has been subjected in flowing through narrow channels. The presence of this structure in a vast ice body, like the Malaspina glacier, which is not confined in narrow valleys, but has room to spread in all directions, raises the question whether the cause may not be looked for in other directions. Nearly parallel with the blue and white layers, but crossing them at low angles, there are frequently bands of hard blue ice, two or three inches thick, and several hundred feet long, which have a secondary origin, and are the result of ice freezing in fissures. A medial line may sometimes be traced in these veins, as in certain banded ore veins, suggesting that the fissures have been filled by water freezing to their sides. There are also dirt bands on the glaciers, especially along the borders adjacent to the marginal moraines, which are probably the outcropping edges of the old dust-covered surfaces. The rapid melting of the surface produces many curious phenomena, which are by no means peculiar to the Malaspina, but common to ice bodies, especially those beneath the perpetual snow line. The long belts of stone and dirt forming the moraines protect the ice beneath from the action of the sun and air, while adjacent surfaces waste away. The result of this different melting is that the moraines become elevated ridges

of ice. The forms of these ridges vary according to the amount and character of the *débris* resting upon them. In places they are steep and narrow, reaching a height of two hundred feet. From a distance they look like solid masses of *débris* and remind one of railroad embankments. The sides are extremely difficult to climb, owing to the coating of loose stone, which rolls and crumbles away beneath the feet.

The largest bowlders are the first to be dislodged by the melting ice, and they roll to the foot and form a coarse belt along the bottom. In this way a curious assortment of *débris*, according to size, is distributed along the sides of the ridges. In time the narrow belts of large bowlders at the foot become elevated, and again roll down to take their natural place. Rocks rolling down the steep banks are reduced constantly in size, and finally the fragments are reduced to sand and clay. When the *débris* is reduced to this condition it is washed away by the surface streams, and so the work goes on through the ages. Not all the turbidity of the sub-glacial stream can be charged to the grinding of the glacier on the rocks on which it rests, as some of it certainly comes from the crushing of the surface moraines, on the outer border of the glacier, during their frequent changes of position, but the amount of glacial silt originating in this way must be small.

Isolated blocks of stone lying on the glacier, when of sufficient size not to be warmed through by the sun's heat in a single day, also protect the ice beneath, and retain

this position as the adjacent surface melts, so as to rest on pedestals frequently several feet high. These elevated blocks are usually flat, angular masses, sometimes twenty feet in diameter, and have received the name of glacial tables. Owing to the greater effect of the sun on the southern side of the columns, they usually lean in that direction, and eventually the bowlder slides off in that way. No sooner has the block been deposited than the old process begins again; it is elevated and once more dropped to the south. In the course of time the bowlders are reduced to fragments.

While large objects lying on the surface of the glacier are elevated on pedestals in this manner, small ones, and especially those of a dark color, becoming heated by the sun melt the ice beneath and sink. Over large portions of the Malaspina glacier there are little wells, filled with water and with objects at the bottom. It is curious to note the character of some of the objects found at the bottom of these wells. A leaf is often found there as well as insects and fish.

Above the perpetual snow line dark objects become heated and melt the snow about them, but do not form wells. The water thus formed is immediately absorbed in the surrounding porous matter. As the melting progresses, a conical depression is formed which has a striking resemblance to the pit holes made by sand-dragons in loose sand, but are often several feet deep. When small stones and dirt are gathered on the surface of a glacier, or on a larger scale when moulins become

filled with fine *débris* and the adjacent surface is depressed by melting, the material thus acts as do concentrated large bowlders, protecting the underlying ice. But as the gravel rises in reference to the adjacent surface the outer portion rolls down from the pedestal on all sides, and the result is that a sharp cone of ice is formed, having a sheet of gravel and dirt over its surface. These sand cones sometimes reach to a height of twelve feet, and form, over large areas, a conspicuous and characteristic feature of the glacier. They are of the same character as the *débris* pyramids, so common on the stagnant borders of many glaciers of Alaska, except that they are composed of finer materials, and, like the glacial tables, are short lived. The melting of the ice about them causes the *débris* on the surface to slide farther and farther away, so that finally it is unable to shelter the ice beneath. The fragments then act independently, and either protect the ice or, becoming warm, sink into it, according to size and color. In this way the sand cones disappear, only to form again when the *débris* gathers in other depressions.

The surface of the Malaspina glacier, over a large area, is covered with a coral-like crust formed by the alternate melting and freezing of the surface. The crevasses in this portion of the great plateau are seldom of large size, and owing to the melting of their margins are broad at the surface and contract rapidly downward. They are in fact mere gashes ten or twelve feet deep, and are apparently only remnants of large crevasses

formed in the mountains. Deeper crevasses appear at certain localities about the border of the glacier, where the ice at the margin falls away from the main mass, but these are seldom conspicuous, as the ice is heavily covered with *débris* and the openings fill rapidly with material therefrom. The surface of the glacier, level or otherwise, is generally a fair indication of the condition of the ground on which it rests. Where the larger tributaries of the Malaspina flow in there are great ice falls, caused by steep descents of the earth beneath. These falls are at the lower limit of perpetual snow, and are only fully revealed when the melting has reached its maximum and the winter snows have not begun to accumulate.

From a commanding point overlooking the glacier one sees that the central expanse of clear white ice is bordered on the south by a broad, dark band, formed by bowlders and stones. Outside this, and forming a belt concentric with it, is a forest-covered area, in many places several miles wide. This forest grows on the moraine resting on the ice of the glacier. In surveying the glacier, by far the greatest portion is clear white ice, but in crossing it on foot, the difficulties encountered in the forest make one think that its area is greater than it actually is. The moraines not only cover all the outer portion of the glacier, but stream off from the mountain spurs that project into it from the north. One of these spurs starts from the Samovar hills, crosses the entire breadth of the glacier, and joins the marginal moraine on its southern border. This long train of stones and

bowlders is really a highly compound medial moraine, formed at the junction of the expanded extremities of the Seward and Agassiz glaciers.

All of the glaciers which feed the great ice sheet below are above the snow line, and the *débris* they carry only appears on the surface after the ice descends to the region where the annual waste exceeds the supply. The stones and dirt are then concentrated at the surface, owing to the melting of the ice that contains them. This is the history of nearly all moraines. The Malaspina glacier in retreating has left irregular hillocks of coarse *débris*, which are now forest-covered, but these deposits have not the character of marginal moraines. They indicate a general retreat without prolonged halts. The heaps of *debris* left as the ice front retreats have a general parallelism with the margin of the glacier, and are pitted with lake basins, but only their higher portions are exposed above the general sheet of assorted *debris* spread out of the streams draining the glacier.

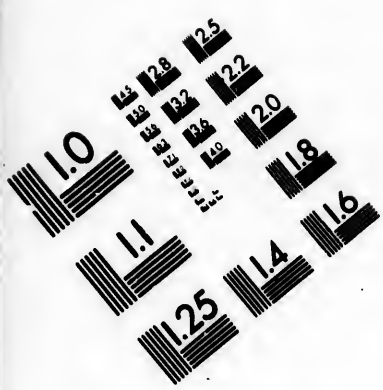
A peculiar and interesting feature of the moraine on the stagnant border of the Malaspina glacier is furnished by the lakelets that appear everywhere upon it. These are found in great numbers both in the forest-covered portion and in the outer border of the barren moraine. They are usually rudely circular, and have steep walls of dirty ice which slope toward the water at high angles, but are undercut at the bottom, so that the basins in vertical cross section have an hour-glass form. The walls are frequently from fifty to one hundred

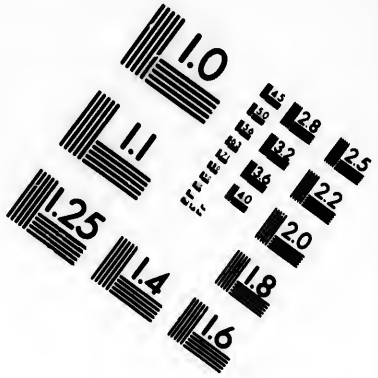
feet high, and not seldom are nearly perpendicular. The lakes are usually one hundred feet in diameter, but larger ones appear. Their waters are always turbid, owing to the mud which is carried into them by avalanches and streams of water that trickle from their sides. The rattle of the stones falling into them is a common sound when the air is warm or when it is raining. The crater-like walls inclosing the lakes are seldom of uniform height, but frequently rise into pinnacles. Between the pinnacles there are occasionally low saddles, through which the lake overflows. The stones and dirt which fall into them in the end fill up the space and force the water out. As the general surface of the glacier is lowered by melting, the partially filled lakes gradually disappear, and their floors, owing to the accumulations of *débris* on them, protecting as it does the ice beneath, become elevated above the surrounding surface in the same manner that glacial tables are formed. The *débris* covering these elevations slides down the sides, as the melting progresses, and finally a rugged pyramid of ice, covered by a thin coating of *débris*, occupies the place of the former lake. These pyramids sometimes are sixty or seventy feet high, and usually are conical in shape. They resemble sand cones, but are much greater in size and covered with coarser *débris*.

Like the lakes, to which they owe their origin, these pyramids are confined to the stagnant portions of the glacier and play an important part in the breaking up

of marginal moraines. Owing to the sliding of the bowlders and stones into the lakelets and their subsequent fall from the sides of the pyramids, they are broken and crushed so that the outer portion of the glacier, where the process has been going on longest, is covered with finer *débris* and contains more clay and sand than the inner portions.

Just how the holes containing glacial lakelets originate it is difficult to say, but their formation seems to be initiated by the melting back of the sides of crevasses. Breaks, in the general sheet of *débris* covering the glacier, expose the ice beneath to the action of the sun and rain which causes it to melt and the crevasses to broaden. The openings become partially filled with water and the lakelets are formed. The waves wash the *débris* from the ice about the margin of the lakelets, thus exposing it to the direct attack of the water, which melts it more rapidly than the upper portions of the slopes are melted by the sun and rain. It is in this manner that the characteristic hour-glass shape originates. The lakelets are confined to the outer, or stagnant portion of the glacier, for the reason that the motion in the ice, where the pressure from the highlands is greatest, would produce crevasses through which the water would escape. Where the lakelets occur in great numbers, it is evident that the ice must be nearly or quite stationary, otherwise the basins would not exist for years as they do. The lakelets and the resulting pyramids are the most characteristic feature of the outer border of the glacier.





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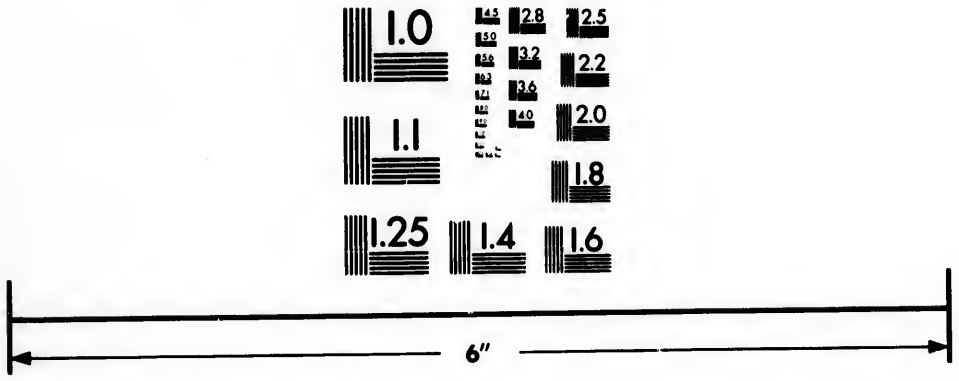

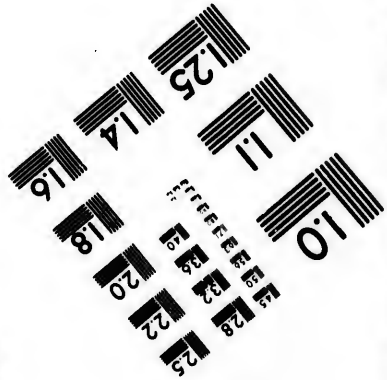

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The outer, and consequently the older portions, of the moraines are covered with vegetation which in places has all the characteristics of old forests. It consists principally of spruce, cottonwood, alder, a great variety of small shrubs, and some rank ferns. This vegetation grows from the accumulation of dirt on the top of the ice. The ice layer beneath this surface covering is not infrequently one thousand feet thick. The forest-covered portion of the Malaspina is estimated to be from twenty to twenty-five square miles in area.

There are lakes at the extremity of the mountain spurs extending into the glacier that furnish another interesting subject for investigation. Where the rocks of the spurs touch the ice they become heated, causing the frozen mass to melt, and thus depressions are formed, which are enlarged by a flow of water through them, until a heavy covering of *débris* protects the ice from further encroachments. The lines of drainage on each side of the spur converge and form a lake at the extremity, from which the water usually escapes through a tunnel. Typical lakes of this character are the ones at Terrace Point and on the south side of the Chaix Hills.

A glacier, in flowing past the base of a mountain, frequently obstructs the drainage of lateral valleys, and causes lakes to form. These usually find outlets, as in case of the marginal lakes, through subterranean passages, and are filled or emptied according to the condition of the latter, obstructed or open. The conditions

which lead to the formation of these lakes are unstable, and the records which they leave in the form of terraces, deltas, and so on, are very irregular. When streams empty into one of these lakes, deltas and horizontally stratified lake beds are formed, as in ordinary water bodies, but as the lakes are subject to many fluctuations, the elevations at which the records are made are continually changing, and in instances where the retaining ice body is constantly diminishing may occupy a wide vertical interval.

The terraces left by streams flowing between moraine-covered glaciers and precipitous mountain slopes are peculiar. The channels become filled with *débris* that slides down the mountain slopes. This material is at first angular in form, but when brought within reach of the stream becomes rounded. On the margin of the channel adjacent to the glacier there is usually a heavy deposit of unassorted *débris*, which rests partly upon the ice and forms the actual border of the stream. When the glacier is lowered by melting the stream abandons its former channel, and repeats the process of terrace building at a lower level.

The material in the Malaspina forming the terraces is largely a blue clay, filled with both angular and rounded stones and bowlders, but its elevated border is almost entirely of angular *débris*. The drainage from the mountain slope above the terrace is obstructed by the elevated border, and swamps and lagoons are formed back of it. In the material forming the terraces tree

trunks occur frequently, and growing upon its surface there is a forest of large spruce trees.

The drainage of the Malaspina glacier is subglacial. There is no surface drainage except in a few localities, chiefly on its northern border, where there is a slight surface slope, but even in such places the streams are short, and soon plunge into a crevasse and join the drainage beneath. On the lower portions of the Alpine glaciers, tributary to the Malaspina, there are sometimes small streams coursing along in ice channels, but these are short lived. On the borders of the tributary glaciers there are frequently important streams flowing between the ice and the adjacent mountain slope, but where these come down to the Malaspina they disappear in tunnels.

Along the southern margin of the glacier there are hundreds of streams pouring out of the escarpment formed by the border of the glacier, or rising like great fountains from the gravel and bowlders at the base. All of these streams are brown and heavy with sediment. One of the largest streams draining the glacier is the Yahste. This river rises in two principal branches at the base of the Chaix Hills, and flows through a tunnel eight miles long, emerging at the border of the glacier a swift brown flood, one hundred feet wide and fifteen or twenty feet deep. The stream, after its subglacial course, spreads out into many branches, and is building up an alluvial fan, which has invaded and buried several acres of forests. On the border of the glacier facing Yakutat Bay, the flow of the ice is eastward, but its margin is

stagnant, and instead of forming a bold, continuous escarpment, it ends irregularly and with a frontal slope.

When the streams from the north reach the glacier they invariably flow into tunnels and disappear from view. The entrances to the tunnels are frequently high arches, and the streams flowing into them carry great quantities of sand and gravel. About the southern and eastern border, where the streams emerge, the arches of the tunnels are low, owing to the accumulation of *débris* which obstructs their discharge. In some instances the obstruction is so great that the water rises in a vertical shaft, in order to reach the surface, and rushes up under heavy pressure. The sand and gravel brought out is well-rounded and is deposited in alluvial cones. Beside being overloaded when they emerge, the streams receive large amounts of *débris* from the moraine-covered ice cliffs adjacent. The deposit of the *débris* through the tunnels brings about an obstruction which causes the water to run in higher levels, and finally it comes in contact with the roof, slowly enlarging it upwards.

Other glaciers of Alaska do not differ materially from the Malaspina, though each has received much investigation and thought in the scientific world, and there is an extensive literature on the subject.

The movement of glaciers is, as subject for study, one of great interest. The most remarkable feature is the motion downwards from the neve to the lower valleys. The explanation of it is by far the most important application of mechanical physics connected with the subject.

The glacier is formed in the mountains of a mass of snow and ice, which is constantly being added to and which makes its way down to the lower valleys, where it gradually melts, until it terminates exactly where the melting, due to contact with warmer air, earth, and rain compensates for the bodily descent of the ice sheet from reservoirs in the highlands within the line of perpetual snow. It usually protrudes into valleys far below the latter limit, and terminates amidst a wilderness of bowlders borne down upon its surface and deposited as the ice melts. These are the moraines spoken of in connection with the Malaspina glacier heretofore.

Prior to 1842 two theories of glacier movement had been maintained. One of these is known as the gravitation theory and the other the dilatation. Both suppose that the motion of the ice takes place by its sliding bodily over its rocky bed, but they differ as to the force which urges it over obstacles opposed by friction and the irregularities of the surface over which it moves. Under the gravitation theory it is claimed that the frozen masses, carried along by the slope of the bed on which they rest, disengaged by water from the adhesion, which they might otherwise contract, to the bottom, must gradually slide and descend along the declivities of the valleys or mountain slopes which they cover. It is this slow but continual sliding of the icy masses on their inclined bases which carries them down into the lower valleys, and which replenishes continually the stock of ice in valleys, some of which are warm enough to produce

luxuriant vegetation. Very many objections have been urged to this theory. It is evident that those who believe in it regard the glacier as composed of an accumulation of fragments instead of a great mass, throughout which the fissures and crevasses are in slight proportion to the whole; also, that they attribute to the subglacial waters a kind and amount of action in removing the friction that they do not possess. The main objection, however, to the gravitation theory is that a sliding motion, of the kind supposed, when once commenced, would be constantly accelerated by gravity and an avalanche would result. The small slope of most glacier valleys and the irregularity of the bounding wall are also objections.

The dilatation theory disposes of the want of sufficient moving power to drag along the mass by calling in the well-known force with which water expands on its conversion into ice. The glacier being traversed by innumerable capillary fissures, and being in summer saturated with water in all its parts, it was natural to invoke the freezing action of the night to convert this water into ice, and by the amount of its expansion to urge the glacier onward in the direction of its greatest slope. In answer to this argument it has been claimed that, even in the height of summer, those parts of the glacier that move the fastest are never reduced below the freezing point, and that even in the most favorable cases of nocturnal radiation, producing congelation at the surface, it cannot penetrate above a few inches into the interior.

It was some time before observers took up the problem

of discovering just how fast and in what manner glaciers moved, but in 1842 Forbes did this. His observations were carried on with the aid of all the scientific apparatus at hand at that day, and he thoroughly satisfied himself that the motion was continuous and tolerably uniform—that it was not by jerks. He also ascertained that the motion was greatest toward the centre of the glacier and slowest at the sides. It was also found that the rate of motion varied at different points of the length of the same glacier, being greatest, on the whole, where the inclination was most marked. As the seasons advanced he noted changes in the rate of motion of the same part of the ice and connected it by a direct relation with the temperature of the air. Last of all, it was discovered that the surface moved faster than the ice nearer the bottom of the bed. The observations resulted in the theory that "a glacier is an imperfect fluid or viscous body, which is urged down slopes of certain inclination by the mutual pressure of its parts."

The glacier problem cannot, even to-day, be considered solved entirely, but enough is known now to make the further investigation promising.

CHAPTER XXII.

HUNTING AND FISHING.

Wild Country for the Huntsman—Big Game in the Chasms and on the Mountains—Opportunities of the Fishermen—Mallards and Canvas-back Duck—Price of Game in the Sitka Market—Native Alaskans not Sportsmen—Mosquitoes and the Bruins—Suicide Rather than Die by the Attacks of Insects—Nicholas Huley the Hero of a Fine Bear Story—Native Huntsmen.

FOR all those who hunt and fish for pleasure, not for pelf, for those who love nature in its grandest moods, there is not a land anywhere under heaven like unto Alaska. There are countless waterways, lined with towering mountains, upon whose summits the snow rests eternally, like a mantle woven from threads of silver. Gracefully it is draped over their giant shoulders, as if they were attired in bridal garments for a marriage above the clouds. Sharp and distinct, and cut as straight and clearly as a furrow in a wheat field, the dark green of the forests meets the snowy border, marking the line where vegetation ceases. Thence downward to the very verge of the sea, great spruce trees and hemlocks and cedars and hanging mosses, a jungle of small growths, with the rank luxuriance of a tropic clime. Then these mountains of stone and snow and verdure are rent from

base to sky-line in great canons and valleys, where the shadows linger eternally, and out of them come tumbling in mad haste the green waters of the melting glaciers.

Populate these shadowy densities with bear and deer and wolf and lynx and mountain sheep. Follow a trail from the sea margin to some inland lakes, or toward some mountain top—the path will be as smoothly worn by the feet of wild beasts, as a cowpath through a meadow, and if you have a spark of the sportsman's instinct alive within your breast it will burn into a flame.

The streams which reach the sea are alive with salmon trout—big, gamey fish, who strike voraciously at any bait, and fight for freedom with a vim and dash and strength that test the skill and tire the stout arms of the most expert and stalwart fishermen.

There are many narrow defiles, precipitous on either side, which run landward from the ocean, broadening out into great bays, shut in by mountains so tall that their tops are lost in cloudland. In season these are the abiding place of mallards and canvasbacks and blue-winged teal and thousands of strange aquatic birds.

The Sitka market is always overstocked with game. Venison sells usually there at four cents per pound. The deer are not large, but their flesh is of delicious flavor. The duck are not so good because of their fish-like taste. The fish are always fresh, of infinite variety, and, if properly cooked and served, are fine eating. If one is too lazy or too busy to catch them, they may be had at the wharf for the asking. These are oc-

casionally varied by bear meat, which many do not like.

The native hunters are improvident. They persist in killing deer in and out of season, solely for their skins, which they dispose of at the trading stores. A great number are slaughtered annually in the vicinity of Sitka, whose carcasses are left where they fall—feasts for the eagles and ravens. This is true of other parts of the territory.

An official utterance on this wanton destruction of the game of the country is found in William Ogelvie's report to the Canadian Government in regard to the animal and fish found in the Yukon District:—

"Game is not now so abundant as before mining began, and it is difficult, in fact impossible, to get any close to the river. The Indians have to ascend the tributary streams ten to twenty miles to get anything worth going after. Here on the uplands vast herds of caribou still wander, and when the Indians encounter a herd they allow very few to escape, even though they do not require the meat. When they have plenty they are not at all provident, and consequently are often in want when game is scarce. They often kill animals, which they know are so poor as to be useless for food, just for the love of slaughter.

"An Indian who was with me one day saw two caribou passing and wanted me to shoot them. I explained to him that we had plenty, and that I would not destroy them uselessly, but this did not accord with his ideas. He felt

displeased because I did not kill them myself or lend him my rifle for the purpose, and remarked in as good English as he could command: 'I like to kill whenever I see it.'"

Baranof Island is noted for its enormous black bears. "For a long time after my arrival in the country" says one who hunted in these parts "there was rarely a week passed that one or more natives were not brought in frightfully mangled from fighting these monsters. Many of them died, and others were slain outright. They are lordly, rollicking rascals, these colossals of the coast islands; counterparts of their Polar brothers, except in color, the one a moving midnight, the other an animated snowdrift. The sale of breech-loading firearms to the natives is prohibited by law.

"An ancient muzzle-loader and a knife are inefficient weapons for attack or defense against these ferocious brutes, yet I know several native hunters who have survived such contests. They are disfigured of course, rarely coming out of the fight scathless, but they carry their scars with pride, for in Alaskan heraldry a bear token is an honorable distinction."

In their sequestered haunts the bear roams unmolested except by mosquitoes and gnats, those diminutive scourges of the highlands and of the lowlands. These settle in swamps upon their eyelids, and sting them until they are blind and helpless. Then the bear gropes about for food and water, and getting mired in some swampy place, dies there, while its diminutive and fiend-like enemies sing jubilation songs and are happy.

Anyone going to the Klondike must protect themselves against the tortures inflicted by a number of pests. The louse, known by the name of "greyback," thrives there, as it does in all mining camps in fact. Lice last the year round. But the most dangerous pest in summer is the enormous mosquito. The Alaskan mosquitoes come by the millions, and they are larger in size than any known to exist in any other spot on the globe. Hundreds upon hundreds of these big mosquitoes will light on a man on a summer day when the mercury is 100 in the shade, and if his face and hands are not protected his life is really in danger. The usual protection is a wire frame, hood-shaped, and covered with mosquito netting, that is placed over the head and strapped to the shoulders. The hands are protected with cotton gloves. When this mosquito story was told in Denver, an old Irishman, standing by, with a querulous look in his eye, remarked: "Begob! if the dom m'skeeters a-are ez thick ez that, w'y don't they ate the m'skeeter nittin?" After this humorous turn, an old prospector, who had been in Alaska, pulled a cob pipe from his mouth, and solemnly said: "Well, as sure as I'm sitting here I've seen polar bears commit suicide to escape the mosquitoes. They simply used their forepaws in see-saw fashion and cut their throats."

John Cudahy's gold mine near Sitka is connected with a bear story which is worth telling. It is a true story, and does not need embellishment.

Nicholas Huley, from whom Mr. Cudahy purchased

the claim, was a private in the regular army, and came to Sitka with the detachment sent up there to take possession at the time of the transfer of the territory from Russia. With him came his wife and two sons. His term of enlistment terminated while in Alaska, and being satisfied with his surroundings he decided to remain. He was a fine-looking, stalwart Irishman, standing six feet two inches in his stockings. His sons grew to be as stalwart as himself. Nicholas had prospected in many places, and among other locations had made one at the head of Silver Bay, about fourteen miles from Sitka.

This location was always a prime favorite with him, and he and the boys had done a good deal of work there. The property is situated about two miles from the bay shore, at an altitude of about 3,000 feet. From the beach to the ledge they had constructed a fine trail, and the many excursions thither had made of it an easy way. Not long before the Cudahy purchase, Nicholas and the boys pulled away from the Sitka wharf on one of their periodical excursions to the ledge. Besides the ordinary camp supplies they carried an old army rifle, a relic of Huley's soldiering. In due time they reached the landing place where the trail began. Here it was discovered that they had left their axe behind, and Mr. Huley told the boys to pull over to Salmon Creek, two miles away, and borrow one of Steve Gee, who was cutting wood there.

"I'll go up the trail. Don't be long, for I'm hungry as a bear," said he.

Then he shouldered the old rifle and disappeared. The path wound in and out, a sinuous way, over declivities, across rocky shoulders, through heavy timber and dense thickets, which were like tunnels of verdure, following as near as possible an easy grade, but trending skyward ultimately. He had no thought of danger, carrying the firearm merely from force of habit, and because, on several occasions, he had shot deer by the way.

In one of the densest thickets, close set with underbrush and small young trees, a bear suddenly charged on him like a black thunderbolt.

He had no time to shoot. The beast had closed upon him suddenly. It wrenched the gun away, and seized him with its great paws, flung him to the ground so violently that for a little time he was dazed and unconscious. When he rallied the huge animal had straddled him lengthwise, and was poking his cheeks with its nose, as a pig roots in the soil.

Huley had been told by native hunters that if one could be perfectly still and counterfeit death a bear would go away. His nerve did not desert him in this awful emergency. He lay still while the animal continued its investigations. Finally the hot, fetid breath exhaled from the cruel mouth so close to his became unbearable. He kicked him with one foot, being careful to keep the other portions of his body immovable. The bear jumped away, and looked and listened intently for a time; then it returned, and began the same rooting process about Huley's jowls with its nose.

Again Huley kicked him. This time the bear snuffed suspiciously, then went a little distance up and down the trail, and finally disappeared. Huley lay motionless for what to him seemed an eternity, then he arose to his feet thankful for the wonderful deliverance, when instantly the copse near him was swept asunder, and the ebony demon seized him again. Only for an instant was he conscious, and during that interval he says that he experienced a sensation of being twirled round and round. The boys came up the path, and almost stumbled over the battered and bloody body of their father. The bear had torn and mangled him fearfully, stripped him of every rag of clothing and fled. They carried the inanimate form to the boat, and as speedily as possible reached the revenue cutter Adams, then moored in the bay. The ship's surgeon found that besides numerous flesh wounds Huley's skull was fractured, and one leg was broken. With competent treatment and careful nursing he eventually recovered.

When you go to Sitka you will doubtless see a stalwart man, with a decided limp, a badly scarred head and face, and an impediment in his speech. You may know that is Nicholas Huley, a pioneer, a capitalist, a good fellow—and over and above all, a bear-hater.

The native men of Southeastern Alaska, are of a taciturn disposition, but they are indefatigable hunters, making long journeys into the interior on foot, through the mountain defiles and over passes, using their light canoes chiefly for crossing rivers and lakes. They build

along their routes of travel, here and there, temporary shelters or sheds, open in front, with sloping roof thatched with grass. Each traveling individual or party, on leaving such a place, deposits in a certain nook a small bundle of dry moss, birch bark, resin or twigs, to enable the next comer to kindle his fire without difficulty. This hospitable and thoughtful custom is never omitted. This is one of the many pleasant ways which the weird Alaskan savages have that their white civilized brothers would do well to imitate.

These wild nimrods of the North have had their day. Already the axe strokes of the pioneers are ringing in their forests, and camp fires blaze along the mountain trails; steam whistles wake the echoes far up their mighty streams, and the smoke from many a white man's habitat rises and vanishes in the mists, as they, too, will vanish in that future time, when the Argonauts of 1897 live in history as the creators of an empire by the Northern Sea.