BRITISH COLUMBIA.

CROWN LANDS SURVEYS

FOR THE

YEAR ENDING 31st DECEMBER,

1897.

THE GOVERNMENT OF
THE PROVINCE OF BRITISH COLUMBIA

VICTORIA, B. C.:
Printed by RICHARD WOLFENDEN, Printer to the Queen's Most Excellent Majesty.
1898.

CROWN LANDS SURVEYS,

1897.

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To His Honour THOS. R. MCINNES,

Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

Herewith I respectfully beg to submit the following Reports on the Surveys of Crown Lands during the year 1897.

G. B. MARTIN,

Chief Commissioner of Lands and Works.

Lands and Works Department,

Victoria, B. C., February 2nd, 1898.

SURVEYS.

SURVEYOR-GENERAL'S REPORT.

LANDS AND WORKS DEPARTMENT,
VICTORIA, B. C., February 2nd, 1898.

The Hon. G. B. Martin,
Chief Commissioner of Lands and Works,
Victoria, B. C.

SIR,—I have the honour to invite your attention to the individual reports of the different surveyors who have been engaged upon the various Crown land surveys throughout the Province, and in accordance with the custom which has been followed in the Department for several years, to add a short synopsis of the volume of business transacted by this branch of your office down to the close of the calendar year 1897.

NEW BUILDINGS.

During the first week of November last your Department moved into the commodious and comfortable quarters set aside for its use in the new Government Buildings, which are alike an ornament to the City of Victoria and a credit to the Province of British Columbia. The space devoted to each department is ample, and will meet the requirements of the business of the Province for many years to come. A detailed description of the building would probably be out of place in my report, but I wish to express satisfaction with the accommodation furnished the Lands and Works Department, the business of which is very rapidly increasing, as will be seen from the table below. The vaults, in which are stored all the original documents connected with land matters, are large, and are furnished with the latest time and labour-saving appliances, so that any record may be referred to with the least loss of time. The draughting rooms are commodious and well lighted, while the General Land Office is a model of beauty and convenience.

MAPS.

From the following list of maps printed during the past year, it will be noticed that they differ almost as much in character as in locality, and include districts extending from the southern boundary of the Province to Klondike, on which the eyes of the world are now centred.

On account of the unprecedented demand for information respecting the upper Yukon country in general, and the Klondike region in particular, it was deemed advisable to issue a small map showing all the main topographical features of that territory, and its relative position to the sea coast and to the Province of British Columbia which lies to the south.

The most expeditious method of attaining that end was to prepare the necessary information and have it printed upon a strip which could be attached to Mr. J. H. Brownlee's 1893 map of the Province, several hundred copies of which, out of an edition of 10,000 maps purchased from him, were still on file in your Department. This has been performed, and the

combined map has been found very useful and seems to have met the demand for information in a very satisfactory manner. To supplement the above, 2,000 copies of the Canadian Yukon map which accompanies Mr. Gosnell's Year Book were purchased from that gentleman, and are now rapidly being distributed.

The photo-topographic map of a portion of West Kootenay District, after a vexatious delay, has come to hand, and several hundred copies have been forwarded to the Agent-General in London. The character of the lithographic work is not first-class, and is certainly not equal to similar work performed by the same firm for the Dominion lands branch of the Department of the Interior. The map will, however, prove very useful, and, as the information thereon having been plotted from photographic views obtained from known points in a systematic triangulation, it must necessarily be reliable, besides furnishing a much more accurate idea of the character of the country than is shewn upon any maps heretofore issued by your Department.

The following maps, with two exceptions, were lithographed by the Colonist Printing and Publishing Company, of Victoria, in a very satisfactory manner:—

General map of Lower Osoyoos, to accompany Report of Minister of Mines	5,000,	2 colours.
Province of British Columbia (small), to accompany Report of Minister of Mines	5,000,	2 "
Photo-topographic map of part of Kootenay District	5,000,	4 "
West Kootenay, shewing mining divisions	5,000,	3 "
West Coast of Vancouver Island	3,000,	2 "
Province of British Columbia (small), Immigration Office	2,000,	3 "
South-West portion of the Province	5,000,	2 "
Small detail map, settlement at Cape Scott	2,000,	1 "
Yukon addition to Brownlee's map	1,000,	3 "
Map accompanying Year Book	2,000,	
Trail Creek mineral monument map	1,000,	2 "
Osoyoos—West part— "	200,	2 "
" East " "	200,	2 "
Slocan "	200,	2 "

Besides the above, a limited number of maps were purchased to fill requests for information concerning localities now coming rapidly forward on account of recent discoveries of valuable deposits of mineral. These were: A map of Frederick's Arm, published by E. A. Cleveland, P. L. S., of Vancouver; Fire Mountain, published by J. W. Vaughan, P. L. S., Vancouver; and a general mining map of a portion of the Osoyoos District, by Jno. A. Coryell, P. L. S., Midway.

WORK IN THE DRAUGHTING OFFICE.

As indicated in my last year's report, the expected increase in the volume of business passing through this branch of your Department exhibits very closely a similar advance over 1896 which that year shewed over 1895. In other words, the business since 1895, judging from the number of field-books received, as indicated by the schedule below, has increased in geometrical progression where the common ratio is two. This increase of business has taxed the small staff of draughtsman rather severely, and if it continues advancing in the future as in the past, a suitable addition to the permanent officials must be made.

Year.	No. of Field-Books.	No. of Purchase and Pre-emption Claims.	No. of Mineral Claims.	Total Surveys received.
1894	171	.....	.....	.....
1895	227	.....	.....	.....
1896	455	172	382	.....
1897	894	183	998	1181

SURVEYS.

The work performed during the past year upon the Crown land surveys has been somewhat varied in character, and, though fairly well scattered throughout the Province, has been carried out in localities where the demand for such work appeared to be necessary in order to meet the growing requirements of the districts. The triangulation surveys, commenced last year for the purpose of establishing mineral monuments, have been continued in Kootenay and New Westminster Districts, while small subdivisions have been made on Salt Spring Island and at the north end of Vancouver Island, where a colony of Danes have located upon a small reserve set aside for their use.

The reports of the different surveyors who have been engaged upon Government work during the past season are herewith appended, and furnish details of a much fuller character concerning the location and nature of the work than it is possible to place in a short synopsis. However, the following few explanatory remarks are submitted upon the service performed by each surveyor.

E. A. Cleveland.

In order to encourage settlement at the north end of Vancouver Island, two townships were set aside and inducements offered to a colony of Danes to locate in that district. It was understood that a large tract of tide-water meadow existed at this point, and it was agreed that eighty acres of bush land and a ten-acre block of meadow would be granted to each member of the colony who would work upon a dyke to its satisfactory completion for the reclamation of the meadow from tide water.

Mr. E. A. Cleveland, P.L.S., of Vancouver, was appointed Surveyor to the Colony on March 19th, and immediately proceeded to Cape Scott, where he performed such land surveys as were considered necessary, besides laying out a road to connect the colony with the sea coast. He concludes a rather interesting and exhaustive report in the following words:—"It may be said with certainty that if our northern coast can be successfully colonized, the Danish colony at Cape Scott will furnish the proof, as no better class of men for the undertaking could be found. They are, without exception, hardy, industrious, and intelligent, and well deserve success." On Mr. Cleveland's return to Victoria from this work, and after the completion of the necessary returns required by the Land Office, he was instructed to proceed to Fort Steele, East Kootenay District, and there commence a triangulation of the surrounding country, and at the same time establish mineral monuments at such points as he deemed advisable. He was also requested to make connections between certain lots in order that a continuous map might be plotted, showing in their proper relative positions all surveyed lands in that portion of the district covered by his instructions. Twenty-nine mineral monuments were established at suitable points in the three hundred and fifty square miles of country covered by his survey, which, considering the late date at which work was commenced, viz., the first of August, is a very satisfactory result, and a record indicative of faithful and economic service. His report speaks for itself, and will be found interesting and instructive reading.

E. S. Wilkinson.

Mr. E. S. Wilkinson made a careful examination of the head of Kitimat Arm of Douglas Channel, and carried his explorations up the Kitimat River over the divide into the valley of the Skeena River. Mr. A. L. Poudrier, in his attempt to discover a pass through the Cascade Range of Mountains in 1891, thus speaks of this particular section of the country: "The valley of the Kitimat is much larger than one would judge at first by the appearance of the stream, which is insignificant, but it is the beginning of one of the most curious structural valleys of the whole range; it opens from the sea with a width of about three miles, and keeps that width pretty regularly for the whole length of the Kitimat River. * * * Between the Skeena and the Naas rivers, the valley is watered by the Kit-sum-glum River falling into the Skeena, and the Tse-ax River and Lake falling into the Naas. At this point it has a width of 7 or 8 miles. From the Naas, the same valley keeps on much in the same direction, and I have reason to believe that it reaches the Stickine, or at least some of its branches." In view of the present vexatious Customs delays at Dyea and Wrangel, this may be considered a very favourable alternative all-Canadian route into the Klondike country.

The advantageous position of Alice Arm of Observatory Inlet having been brought to the notice of your department, it was considered advisable to verify the information received, and

to extend it somewhat by conducting an exploration from the head of the arm eastward to the Naas River, and thence by that river to where a line would branch off to reach Telegraph Creek, or to a point in the neighbourhood of Glenora, on the Stickine River. Mr. E. S. Wilkinson was entrusted with this work, but the late date on which work was commenced, and the dangerous character of country from accumulated snow, prevented him from being as successful as on his former exploratory work. His report is appended hereto, and doubtless will prove interesting to those who are seeking new and independent highways into the upper waters of the Yukon basin.

H. Fry.

The method of survey adopted in subdividing Salt Spring Island has been of an irregular character, and appears to have been performed from time to time as the demands of settlement required. The result was that the rougher portions of the island were never laid out into lots; but as applications for small parcels of this unsurveyed land were continually being made, it was decided to subdivide it into sections, and thus complete the survey of the whole island. Mr. H. Fry was entrusted with this work, which he carried to a satisfactory conclusion, and as several mineral claims have been located in the vicinity of his work, the posts established by him may be used as mineral monuments to which these mining locations may be connected when surveyed.

L. Thompson.

The country in the vicinity of Harrison Lake has been fairly well prospected, with more or less successful results; but the greatest activity appears to have been centered in the locality adjacent to the head of the lake, and extending along the Lillooet River up to the neighbourhood of Skookum Chuck. It was therefore considered advisable to cover this portion of the country with a net-work of triangles, establishing during the progress of the work mineral monuments where necessary, and at the same time gather sufficient data of a topographical character to materially increase the value of a map of that locality. Mr. Livingston Thompson was entrusted to perform this service, and although the work was not commenced until the season was well advanced, his progress appears from his report to have been satisfactory, considering the nature of the country covered. During a short visit to this section of the country I was much impressed with the necessity of a road connecting the new town of Tipella with the old Cariboo Road, which commences at the old Townsite of Douglas. If the mines now being exploited prove at all satisfactory, and in consequence the adjacent country becomes thoroughly prospected, and additional mines discovered, it will become absolutely necessary to construct the road. To any one who has passed over the old Cariboo Road from Douglas northward this must be apparent, as the labour involved in climbing an ascent of considerable height will be entirely avoided, besides doing away with the vexatious delays met with at the mouth of the Lillooet River.

J. H. McGregor.

That portion of Southern Kootenay District lying between the Town of Nelson and the International Boundary has recently been prospected, and numerous groups of claims have been staked on the hills adjacent to the many creeks scattered through that section of the country. In order to be in a position to determine the location of these groups of claims, Mr. J. H. McGregor was instructed to establish mineral monuments where he considered the demand for such existed, and to connect them together either by traverse or triangulation. His report speaks for itself, and, besides containing several interesting details, proves the value of an established line of railway as a base from which this particular kind of survey work may be economically and expeditiously carried on.

BOARD OF EXAMINERS.

The "Land Surveyors Act," at its best, was probably more liberal in its provisions regarding the qualifications necessary to become an authorised surveyor than those required by any of the other Provinces of the Dominion; but, during the last session of the Legislature, two amendments were passed which certainly open the door to men who otherwise would not dream of presenting themselves as candidates for a commission. British Columbia, owing to its mountainous character, is a difficult country to survey, and, therefore, none but the best men should receive commissions as Provincial Land Surveyors. The amendments referred to,

I regret to say, are not calculated to raise the standard of the profession, but, on the contrary, are drawn in such a vague manner as to render the duties of the Board of Examiners both difficult and unsatisfactory.

Section 2 of the "'Provincial Land Surveyors Act Amendment Act, 1897," is as follows:—

"2. Notwithstanding anything in the 'Provincial Land Surveyors Act, 1891,' any person who shall have passed the examination for and served two years in any of Her Majesty's surveys, or as an officer in Her Majesty's Royal Engineers, or who may have served regularly under articles for a term of two years with a surveyor in regular practice in any of Her Majesty's dominions, or who has been in the active employ of any chartered railway company in this Province as a surveyor and engineer for the space of five years, shall be admitted to serve as a Provincial Land Surveyor on his passing the examination provided in section 16 of the 'Provincial Land Surveyors Act, 1891,' and without his being obliged to serve any further apprenticeship."

It will be readily seen that this legislates against the native-born British Columbian and in favour of gentlemen from any other portion of Her Majesty's dominions. The knowledge gained by a student in England, for example, where the business of surveying is, as a rule, combined with that of an auctioneer and land agent, is useless in this country, where he is called upon to perform original surveys and furnish records which are placed on file in the Lands and Works Department, and become the original documents governing subsequent operations. His practice in surveying is almost wholly confined to traverse work for the purpose of ascertaining areas, and is performed generally with a chain and box sextant; he can make comparatively no blunders, as he can connect his work to the monuments established throughout the country by the excellent and precise Ordinance Survey.

The student in British Columbia, on the other hand, is compelled to serve three years with a surveyor who is daily performing the class of work required by the Land and Land Titles departments of the Government, besides adjusting disputed boundaries according to certain rules laid down in the Statutes for his guidance. He is thus much better fitted to perform the duties of an authorised surveyor than the man who serves two years in a country where the practice is totally different. Why, therefore, should the British Columbia pupil be called upon to serve three years, while the student from other portions of Her Majesty's dominions is asked to serve but two years, before being eligible for final examination?

The objections to the other clauses of this amendment are serious, but as I wish to refer briefly to the second amendment, I shall pass on to it, which is as follows:

"(*a.*) Provided, however, that nothing in this Act shall be construed to prevent any British subject who is a qualified Civil Engineer, and who holds undoubted credentials as such from any British or Canadian University or chartered Institute of Engineers, or from any British or Canadian Civil Engineer or firm of British or Canadian Engineers of repute, from making such surveys as may be incidental to works of construction upon which he may be employed; and plans of such surveys prepared and certified by him shall be authoritative and admissible, when necessary, to public record. And such Civil Engineer shall be entitled to practice as a Provincial Land Surveyor when he shall have presented such credentials to the Board of Examiners, or shall have otherwise satisfied the Board that he is qualified to practice as a Civil Engineer in some part of Her Majesty's dominions, and shall have furnished proof to them that he is possessed of a proper knowledge of the Provincial system of land surveys, and has resided in the Province for one year immediately preceding his application for admission."

It is under the provisions of this clause that the majority of candidates present themselves, and as the duties of the Board of Examiners are somewhat vaguely expressed respecting the character of the examination the candidates shall undergo, they have decided to give such an examination as will thoroughly prove to them that the candidate is quite familiar with such of the subjects as pertain to the system of survey in all its bearings upon the proper conduct of surveys in the field, and the correct preparation of returns for the General Land and Land Registry offices.

The regular meetings of the Board of Examiners commence according to Statute on the first Monday in each of the months of April and October. Two regular sessions were held at the Lands and Works Department, as provided by law, during the past year, and a special examination for the admission of pupils took place one month subsequent to the date of that held in October.

At the spring examination, ten gentlemen gave notice of their intention to present themselves for commissions as Provincial Land Surveyors. Of these, one did not put in an appearance, two failed to reach the necessary standard of requirements, and the remaining seven, having passed successfully, were granted commissions. Three of these were authorised surveyors from the Dominion and one from the Province of Ontario; they were, therefore, called upon to pass only the limited examination upon the system of survey adopted in this Province.

Two candidates gave notice for the October meeting, one of whom did not present himself; the other, upon undergoing a full examination, was granted a commission.

Two out of three candidates presented themselves in April for the preliminary examination, but having failed to reach the required standard were granted a special examination in November, owing to their having failed, by an oversight, to comply with the provisions of the law regarding due notice of their intention to be present at the fall meeting of the Board. These two candidates, on passing successfully, were granted certificates enabling them to enter into articles of indenture to an authorised surveyor.

The following are the names of the gentlemen added during the past year to the authorised list of surveyors for the Province:—

F. W. Groves	Kaslo.
Sidney Johnson, O.L.S	Trail.
S. L. Long	Rossland.
C. A. McGrath, D.T.S	Lethbridge.
John McLatchie, D.L.S	Nelson.
Wm. Pearce, D.L.S	Calgary.
F. A. Wilkin	Rossland.
O. B. N. Wilkie	New Westminster.

Certificates as students were granted in November to—

C. W. Gamble	Victoria.
J. D. Pemberton	"

For some unaccountable reason, the funds appropriated to defray the expenses of the Board of Examiners were reduced last year 50 %. In view of the fact that since the passing of the "Provincial Land Surveyors Act" and the organisation of the Board in 1891, the revenue derived from fees has been more than sufficient to defray all the expenses connected with the examinations. Since all fees are paid into Consolidated Revenue Fund, it seems hard that the Board should be hampered by the want of funds to properly carry on its work.

I have the honour to be,
Sir,
Your obedient servant,

TOM KAINS,
Surveyor-General.

DANISH COLONY SURVEYS, CAPE SCOTT, VANCOUVER ISLAND.

———o———

ERNEST A. CLEVELAND.

VICTORIA, B. C., July 23rd, 1897.

SIR,—I have the honour to submit the following report upon my work during the past four months in the Cape Scott colony.

Acting under your instructions of March 19th, I left Victoria the following day, accompanied by one assistant and a party of eight or ten colonists.

After a slow passage of five days we arrived at Fisherman's Bay—the landing place of the settlement—and proceeded at once to examine the country nearby, including the meadow and lagoon lying one and a half miles south-west of Fisherman's Bay, in order to determine the best method for the subdivision of the grass and timbered lands.

Under the agreement entered into with the Government eighty acres of bush land and a ten-acre block of meadow are to be granted to each member of the colony who works upon a dyke to its satisfactory completion for the reclamation of the meadow from tide water, and upon fulfilling the conditions set forth in the general regulations adopted by the Minister of Immigration for the settlement of the country by means of colonies. The colonists were to furnish as well all assistance on the survey of their lands, with the exception of one experienced assistant.

The area of meadow lands referred to above, was found upon completion of a traverse to be much less than was anticipated, consequently the number of ten-acre blocks into which it might be divided would not be sufficient to grant one to each member of the colony: that is to say, there were more eighty-acre blocks of upland than ten-acre blocks of meadow. The colonists were therefore given the option of a block of meadow and eighty acres nearby, or a quarter section just outside the section subdivided into eighties.

The area of grass land flooded only at extremely high tides was found to be one hundred and twenty-four acres; while the area of tidal lands, locally known as the lagoon, and which are flooded at every tide, is five hundred and ten acres.

The soil of the former area is a light loam and is covered with a fair growth of grass, while that of the larger area varies from silts and sedimentary deposit to sand and coarse gravel.

The lagoon is covered with water to a depth of from three to ten feet at ordinary tides, and from eight to fifteen feet at the January and June tides, at which times the meadow is also flooded.

A slough from thirty to fifty feet in width, having a good bottom of sand, intersects the meadow in an easterly and westerly direction; and about one mile from the head of the lagoon a small river, flowing westerly through the lands of the colony, spreads itself over the flats.

The lagoon was cross-sectioned at three different points to ascertain the quantities for a dyke of suitable dimensions at each place, and upon carefully estimating the cost of the work the conclusion was arrived at that the large volume of water flowing into the lagoon, which must be got rid of by means of sluice gates, thus adding considerably to the cost and maintenence of a dyke, together with the lack of suitable material, and the doubtful value of a great part of the flats to be reclaimed, makes the dyking of the whole lagoon an undertaking altogether too expensive for the colony—at least for some time to come. However a dyke about two thousand feet in length crossing the lagoon a short distance above the mouth of the main river—thus avoiding a considerable volume of fresh water—will serve to reclaim about one hundred and eighty acres now flooded at every tide, as well as to protect the grass land from the floods at spring tides. The colonists will probably turn their attention to this feature of their work during the coming winter.

Sections 19, 30 and 31, in Township 42, and sections 23, 24, 25, 26, 35 and 36, in Township 43, were wholly or partly subdivided into eighty-acre blocks; and section 18, Township 42, and section 13, Township 43, laid out and subdivided into quarter sections, thereby providing surveyed lots for settlers to the number of about fifty, while thirty more could locate on the sections outlined to the eastward of those mentioned, and also on the unsurveyed sections to the south and west.

This part of the country has been amply described in former reports but it may be said here that the greater part of the area included in the present settlement is timbered with a fairly heavy growth of pine, cedar, yellow cedar, and hemlock, with considerable areas of fairly open land covered with light scrubby timber.

Along the banks of the main river a limited quantity of very fine spruce is to be found, and no doubt will supply the colony with valuable lumber for building purposes as well as for fish boxes and other domestic uses. Some very fair yellow cedar, scattered over the whole area, may prove of considerable value to the colony, should they be able to find a market for that valuable wood, or find some way of manufacturing it into articles for which there is a local demand. The main river, as well as several smaller streams throughout the settlement, furnish abundance of water for domestic purposes, and one or two good water powers for small mills or other appurtenances of a successful colony.

The soil, generally, is wet, but will no doubt be brought into satisfactory condition by drainage of the open flats spoken of above.

The country has numerous small rounded hills, all of which are covered with timber.

Near the shore the sal-lal is almost impenetrable, but grows much lighter as one goes back from the sea coast.

As the past season has been exceptionally wet over a great part of the Province, and especially the coast, it is difficult to judge at all accurately as to the humidity of the climate. From the records of Mr. Nels. C. Nelson, the meteorological observer at this point, extending over the past three months—a copy of which are appended—and also from his observations during the past winter it is estimated that the average annual rainfall lies between sixty and eighty inches. Vegetables and small fruits were in a flourishing condition at Shushartie Bay when I passed there early in July, and as this point is only eighteen miles east of the colony it seems probable that the same conditions of humidity obtain at each place, and that the same products would grow equally well at Fisherman's Bay.

The colonists not arriving early enough in the spring to get any land under cultivation, and being since engaged on the survey and road work, will not be able to satisfy themselves on this point until another season.

It occurs just here that among the numerous matters upon which colonists in a new section must inform themselves are the quality and character of the products of the land and sea at their particular locality, the demand for those products, the permanency of the market, and the cost of placing such products in the market.

With regard to fish, the supply seems unlimited. The halibut banks just off Fisherman's Bay prove a veritable boon to the Indians who were camped on the shore during the latter part of May and early June for the purpose of catching and drying their winter's supply of Kâwash (halibut). Nearly every morning two canoes were out very early and returned before noon, bringing with them from ten to fifteen fine fish. During eight or ten weeks of the summer, the salmon canneries at River's Inlet furnish employment for a number of the settlers, while others catch and smoke the salmon running up the lagoon during July and August.

This section of Vancouver Island seems better adapted for dairy farming and stock raising, together with the development of the deep sea fisheries, than for any other purpose. Two or three experienced dairy and stock men, as well as a number of fishermen, among those now settled on the lands, will no doubt be able to test these branches of work in the near future. Many new settlers from various parts of the United States—principally California and Minnesota—are expected during the autumn, having already signified their intention of joining the colony. The coming winter will afford ample opportunity for the settlers to get in good working order.

It was expected, before an examination was made, that Sea Otter Cove—lying about nine miles to the south-west of Fishermen's Bay—would be the harbour for the colony, but upon looking into the matter, this cove proved an undesirable place for the headquarters of the settlement, not only because the harbour is inferior and difficult to enter—being quite impossible for steamers at low water—but because of the poor character of the land in the imme-

diate vicinity. It was consequently decided that Fishermen's Bay should be the point of call for the steamers. Shushartie Bay, about twenty miles to the eastward, is the nearest available first-class harbour, and during very heavy weather would be the only place at which the effects of the colonists might be landed in safety. Fisherman's Bay lies open to the northward, and though not greatly disturbed by a westerly wind, a northerly or north-westerly gale may produce such a surf as to make landing dangerous or even impossible. From observation during the spring and early summer it may be said that from March to November little, if any, difficulty will be encountered from this cause, and that during the whole year there may be but very few days when a boat could not land freight or passengers. Doubtless the colonists will shortly have communication with the coast cities by the inside or east coast route instead of by the somewhat uncertain and boisterous west coast—an uncertainty made painfully real during the past season by the failure of the transportation company to forward supplies at the time expected, thereby leaving us very short of provisions for about three weeks.

I respectfully beg to call your attention to a suggestion which has, I believe, been made before, with regard to a trail from Fishermen's Bay eastward to Shushartie, viz.: That a small sum, of say fifty dollars per mile be appropriated for this eighteen or twenty miles of trail, which could be located along the route most likely to be followed by a road in the future. Prospective settlers or colonists would then be able to get through the large section of country lying between these two points without the difficulty now experienced, and which effectually prevents this district from being carefully examined. The trail would be easily accessible from the coast, both by way of Cache Creek and Nahwitti River, and would give the colonists at Fishermen's Bay a way of getting over to the inside channel at any season or in any weather.

The road located during the past season through the lands of the colony runs southward from the landing at Fishermen's Bay about three miles, then turns slightly to the eastward, from which point the trail suggested above would be started.

A road one and a quarter miles long will connect the meadow with the main road along the township line, thus affording the settlers access to their hay lands.

Having got the colonists fairly started on the road work I left my assistant in charge and returned to Victoria.

It may be said with certainty that if our northern coast can be successfully colonized, the Danish colony at Cape Scott will furnish the proof as no better class of men for the undertaking could be found. They are without exception, hardy, industrious and intelligent, and well deserve success.

I have the honour to be,
Sir,
Your obedient servant,

ERNEST A. CLEVELAND.

Tom Kains, Esq.,
Surveyor-General, Victoria, B. C.

Register of Rain, Extremes of Temperature, and Direction of Wind, for the Month of April, 1897.

STATION, CAPE SCOTT, BRITISH COLUMBIA. OBSERVER, N. C. NELSON.

Day of Month.	Maximum Thermometer.		Minimum Thermometer.		Range.	Depth, Morning Observation.		Remarks.
	Observed.	Corrected.	Observed.	Corrected.		Rain.	Snow.	Direction of Wind, 7 a.m.
5	57.50	.....	34.50	.....	20.	.05	.....	S.E., light.
6	50.75	.....	37.75	.....	13.	.....	.....	" "
7	51.	.....	38.25	.....	12.75	.51	.....	" "
8	54.50	.....	40.60	.....	13.90	.26	.....	" fresh.
9	51.50	.....	41.30	.....	10.20	.43	.....	S.S.E., light.
10	53.80	.....	42.60	.....	11.20	.85	.....	N.W., fresh.
11	46.00	.....	32.75	.....	13.25	.02	.....	W., moderate.
12	52.75	.....	37.60	.....	15.15	.....	.....	" "
13	53.00	.....	33.20	.....	19.80	.....	.....	N.W., "
14	48.80	.....	42.00	.....	6.80	.....	.....	N.E., light.
15	46.50	.....	33.90	.....	12.60	.....	.....	" moderate.
16	53.80	.....	33.00	.....	20.80	.....	.....	S.E., light.
17	66.50	.....	44.10	.....	22.40	.....	.....	N.E., moderate.
18	48.00	.....	36.40	.....	11.60	.....	.....	S.E., light.
19	61.00	.....	41.10	.....	19.90	.24	.....	" "
20	49.50	.....	40.80	.....	8.70	.37	.....	S., moderate.
21	54.75	.....	41.30	.....	13.45	.35	.....	N.W., "
22	54.50	.....	35.00	.....	12.50	.....	.....	S., "
23	51.00	.....	42.00	.....	9.00	.15	.....	N. E., "
24	53.80	.....	42.90	.....	10.90	.01	.....	S.W., fresh.
25	60.00	.....	41.90	.....	18.10	.03	.....	S.E., "
26	61.00	.....	33.20	.....	27.80	.41	.....	N.W., strong.
27	46.20	.....	32.30	.....	13.90	.01	.....	" fresh.
28	46.70	.....	32.30	.....	14.40	.....	.....	S.E., "
29	47.00	.....	39.50	.....	7.50	1.19	.....	" moderate.
30	50.70	.....	44.50	.....	6.20	1.96	.....	S.W., light.
Sums...	1367.75	.....	994.75	.....	372.80	6.84		
Means..	52.59	.....	38.26	.....	14.33			

MAY, 1897.

1	51.00	.....	36	.....	15.00	.10	.....	S.E., light.
2	50.50	.....	42	.....	8.50	.90	.....	" fresh.
3	47.10	.....	39.5	.....	7.60	2.16	.....	" moderate.
4	55	.....	38	.....	17.00	.01	.....	S.S.W., light.
5	58.10	.....	37	.....	21.1	.....	.....	N.E., "
6	51.50	.....	43	.....	8.5	.12	.....	S.E., "
7	48	.....	43.6	.....	4.4	.66	.....	W., moderate.
8	52	.....	43	.....	9.0	.30	.....	S.S.W., fresh.
9	52.50	.....	36.3	.....	16.2	.32	.....	S.E., light.
10	56.90	.....	39.5	.....	17.4	.....	.....	S., moderate.
11	56.80	.....	39.2	.....	17.6	.01	.....	N.N.E., "
12	56.80	.....	39.5	.....	17.3	.....	.....	" "
13	52	.....	40.2	.....	11.8	.....	.....	N., "
14	59	.....	35.1	.....	23.9	.02	.....	N.N.W., "
15	50.50	.....	44.5	.....	6.00	.....	.....	S., light.
16	50.80	.....	37.5	.....	13.3	.....	.....	S.E., "
17	52	.....	41.5	.....	10.5	.09	.....	N., "
18	61.20	.....	41.6	.....	19.6	.11	.....	S.E., "
19	58	.....	45	.....	13.00	.16	.....	N., "
20	73	.....	45	.....	28.00	.45	.....	S.E., moderate.

MAY, 1897.—*Concluded.*

Day of Month.	Maximum Thermometer.		Minimum Thermometer.		Range.	Depth, Morning Observation.		Remarks.
	Observed.	Corrected.	Observed.	Corrected.		Rain.	Snow.	Directions of Wind, 7 a. m.
21	57	.....	44.6	.....	12.4	.05	.....	S.W., light.
22	57.50	.....	46	.....	11.5	.09	.....	N.N.W., "
23	51	.....	44	.....	7	.....	.....	N.W., "
24	50	.....	35.5	.....	14.5	.06	.....	S.E., "
25	54.20	.....	38	.....	16.2	.02	.....	" "
26	55	.....	44	.....	11.0	.....	.....	" "
27	61.50	.....	46	.....	15.5	.01	.....	" "
28	65.50	.....	45	.....	20.5	.....	.....	N.W., "
29	65.50	.....	.....	.....	.....	.....	.....	S.E., "
30	61.50	.....	.....	.....	.....	.14	.....	N.W., "
31	57.00	.....	39.50	.....	17.5	.....	.....	" "
Sums...	1728.7	.....	1187.60	.....	411.8	5.76		
Means..	57.05	.....	41.02	.....	14.20			

JUNE, 1897.

1	56.4	.....	36.0	.....	20.4	.....	.....	N.W., l.
2	56.	.....	39.7	.....	16.3	.....	.....	N.N.W., f.
3	54.	.....	38.0	.....	16.0	.....	.....	S.E., l.
4	55.8	.....	44.7	.....	11.1	.14	.....	"
5	59.	.....	51.1	.....	7.9	.44	.....	"
6	58.	.....	50.0	.....	8.0	.28	.....	S., l.
7	63.75	.....	51.0	.....	12.75	.59	.....	S.E., s.
8	52.	.....	39.50	.....	12.5	.28	.....	N.W., l.
9	52.4	.....	39.7	.....	12.7	.....	.....	"
10	54.	.....	37.0	.....	17.	.....	.....	S.E., l.
11	60.2	.....	48.5	.....	11.7	.90	.....	S.W., m.
12	60.1	.....	43.1	.....	17.	1.23	.....	S.E., l.
13	57.5	.....	43.7	.....	13.8	.03	.....	S.E., m.
14	55.6	.....	41.0	.....	14.6	.01	.....	N., l.
15	53.4	.....	47.0	.....	6.4	.....	.....	W., l.
16	51.9	.....	49.0	.....	2.9	.....	.....	N.W., f.
17	55.0	.....	42.0	.....	13.	.01	.....	S. W., l.
18	52.9	.....	46.9	.....	6.	.05	.....	W.W., s.
19	56.	.....	41.0	.....	15.0	.14	.....	N.E., l.
20	58.2	.....	50.5	.....	7.7	.....	.....	S.E., l.
21	65	.....	50.0	.....	15.	.....	.....	N.W., l.
22	60.5	.....	49.5	.....	11.	.....	.....	"
23	65.	.....	52.6	.....	12.4	.01	.....	S.E., l.
24	60.	.....	41.1	.....	18.9	.....	.....	N.W., l.
25	56.	.....	50.1	.....	6.	.....	.....	N., l.
26	56.8	.....	51.0	.....	5.8	.....	.....	"
27	54.6	.....	48.9	.....	5.7	.....	.....	S. W., l.
28	54.	.....	49.6	.....	4.4	.....	.....	N.W., l.
29	62.1	.....	49.6	.....	12.5	.01	.....	S. W., l.
30	62.8	.....	52.7	.....	10.1	.57	.....	S., l.
Sums...	.....	.....	.....	.....	.....	.....	.....	
Means..	57.09	.....	45.81	.....	11.48	4.69	.....	

JULY, 1897.

1	62.1	.....	54.30	.....	.....	.57	.....	N.W., m.
2	59.4	.....	48.8	.....	.....	.89	.....	Calm.
3	56.9	.....	49.5	.....	.....	.29	.....	N.W., l.
4	55.7	.....	51.	.....	.....	.07	.....	"
5	54.1	.....	50.8	.....	.....	.25	.....	N.W., m.
6	55.	.....	51.1	.....	.....	.04	.....	N. W., f.

EAST KOOTENAY TRIANGULATION SURVEY.

—o—

ERNEST A. CLEVELAND.

VICTORIA, B. C., January 13th, 1898.

SIR,—I have the honour to submit the following report upon my work during the past five months in establishing mineral monuments in East Kootenay District :—

SURVEY OPERATIONS.

Immediately upon receiving your instructions, dated July 24th, I left Victoria with two members of my party, and, after some delay, arrived on August 2nd in Fort Steele—which was to be my base of supplies and the centre of my season's operations. Here my party was increased by the addition of an axeman and a cook. The character of the country observed at once made it plain that horses could be used to very great advantage, and thereupon five were engaged for the season.

After two or three days had been spent in examining the topography of the country in the vicinity of Fort Steele, a base line was chosen across the townsite in a northerly and southerly direction, and extending the whole length of the bench upon which the town is situated. The first three weeks were occupied in making the base measurements and in setting expansion signals within a radius of seven miles of Fort Steele. At many of these stations considerable clearing had to be done, sometimes requiring two or three days to make the tops of the hills upon which the signals were located clear enough to observe the adjacent stations.

Upon completion of the base measurements and the occupation of the necessary stations, camp was moved some ten miles up Wild Horse Creek to Victoria Gulch, and from there "flying camps" were made over to the head of Tackle Creek and up Wild Horse to its forks. From these points the triangulation was carried on to the head of Six-Mile and Tracy Creeks and for three or four miles up each branch of the Wild Horse.

Twelve mineral monuments were set in this section—ten on the summits of the mountains and one in the valley of each branch of the Wild Horse. This work occupied nearly four weeks, and on September 29th we returned to the base of the mountains at Maus Creek, otherwise known as Sawmill or Shingle Creek. From this camp the mountain signals near by were occupied, and a monument set on a spur of the mountains on the east side of Maus Creek basin. Our next move was on October 5th to Dibble Basin, near the head of Lost Creek, and the work proceeded with in that section. At this time also M. M. No. 14 was set on a spur of the high range between Lost Creek and Bull River, locally known as the Steeples.

While in camp at the Dibble Basin the first considerable fall of snow came, and very reluctantly we again moved to Fort Steele, leaving two mountain signals yet to be occupied, both of which might have been done from the camp in the basin in one day. But a week of continuous bad weather, which seemed to be only very local, and which was therefore doubly disheartening, together with a depth of about fifteen inches of snow—which made it impossible for our horses to get any feed—very forcibly decided the question. Even at the best season of the year, there is very little feed for horses in the basin, and when the net-work of fallen dead timber, with which it is lined, is covered to a depth of a foot or more with snow, it precludes any possibility of subsistence. Unfortunately, through this bad state of affairs, one of our horses was so severely wounded on a snag in the snow as to be totally unfit for further work, and had to be abandoned.

From the camp at Fort Steele M. M. XIX., on the southerly slope of Mt. Baker, was set and occupied.

The weather having cleared again, a move was at once made for the unoccupied summits at Horseshoe and Lost Creeks, before mentioned ; but no sooner were these high peaks attempted than the snow again enshrouded them. Several attempts were made during the five days following, and on October 25th, after four hours spent on top in a fearful gale and snow

storm, the clouds cleared away, and a couple of hours of distressing cold that followed served to make the necessary readings. The remaining mountain station, which was the last to be occupied on the east side of the Kootenay River, was done on the following day. After setting two or three necessary stations west of Fort Steele, camp was moved on October 30th to Luke Creek, and four days later to a point on Mark Creek about three miles from its mouth. From these two camps and a flying camp at Kimberly—the point where the North Star road crosses Mark Creek—the monuments near the mouth of Perry Creek and on the North Star and Sullivan hills, with Nos. XXIV. and XXV., east and west of Mark Creek, respectively, were set and occupied. Here again bad weather prevailed for several days, and a daily increasing depth of snow made the work a little slower and very much more difficult than it otherwise would have been. It was, however, considered very desirable that the North Star Group and other surveyed claims surrounding it, as well as those on Sullivan Hill, should be connected with the triangulation, and their relative positions thus determined.

The fine weather continuing during the latter part of November and early December, camp was moved to Cranbrook, and the erection of monuments continued until December 6th. The townsite of Cranbrook, recently surveyed, was tied into the triangulation and camp finally moved to Fort Steele, where the readings were completed at those stations which yet remained unoccupied.

On December 10th my party was reduced to two, and the horses were disposed of. The camp equipage was stored with the Government Agent at Fort Steele, and the following day a start was made southwards to carry out the work in connecting the surveys along the Kootenay River, as set forth in your instructions, the performance of which will now enable your department to compile a continuous plan of the land claims in the Kootenay Valley, from the International Boundary northward.

The connection between Lots 127 and 490, near the mouth of Little Bull River, was made by a traverse on the ice, the Kootenay River being frozen over at that place. A part of the work at Elk River was done in the same way, but the river being quite free from ice for some distance, both above and below the Elk, we were compelled to keep on shore.

It may be well to mention here that the finding of old lines and posts in this part of the country proved very difficult. In a district where there is little underbrush except along the rivers and creeks, it would seem to be imperative that the trees along the lines should be well blazed and certain permanent reference objects, such as marked bearing trees, established at the corners. On the other hand, the practice in these old surveys appears to have been to blaze the least possible amount and not to mark, except perhaps with a lead pencil, either the posts, or what might be fancied, from the extraordinary cuts on them, to be bearing trees. The consequence is that it is now well nigh impossible for anybody, unless armed with plans and field-notes, to determine just where he is, even if he have found a survey post.

Having then finished the work in hand, we started for Victoria, arriving here on December 27th. The computations necessary to plotting the work are now being made, and when finished a map, showing the relative locations of the mineral monuments, the connections to surveyed claims, and the general topography of the country covered, will be placed in your hands.

GENERAL NOTES.

During the four and a half months spent in the district the weather was very favourable, that is to say, little time was lost through rain and snow, and but one or two days through smoke. All sorts of weather were encountered, from the hot days of 104° in the shade to the December mornings, when the mercury stood at 25° below zero. Taken altogether, a most delightful climate, with gentle winds and clear blue skies. The surveyor is forced to take into account all the vagaries of the weather, as his life in the field is a constant struggle against the elements. When perched high on top of a mountain, and most in need of clear and cloudless skies, the smoke may blow in or the clouds descend and hide from view his most cherished stations, utterly regardless of his toilsome climb, and disarranging completely his future plans. Nor must it be forgotten that in work of this character, where peaks of considerable altitude are occupied, the instrumental work often becomes very painful long before winter sets in, through cold winds from neighbouring snow-clad peaks, all of which adds some difficulty and considerable variety to the successful prosecution of the work.

Fortunately but little smoke and no forest fires prevailed in the district covered by the season's operations, and none near enough to cause any serious delay. The country, however,

has not escaped the arch-enemy of our forests, and its effects are plainly seen throughout the district, which owes much of its beauty to the clean-looking, thick red bark of its principal trees—the tamarac and western yellow pine. Scattered here and there over the hills and along the creek bottoms are to be found nearly all the varieties of woods observed elsewhere in the Province.

In those parts where growing timber is of the greatest value, as on the North Star and Sullivan hills and in the Dibble Basin, in close proximity to valuable mines and prospects, the area is almost destitute of living trees. Plenty of small standing timber yet remains for use in working the properties nearby, but its value as timber for use underground, buildings, and the many other requirements of working mines is steadily depreciating. The district does not offer as great inducements to forest fires as many other parts of the Province, from the fact that on the low-lying benches there is no underbrush and the trees are some little distance apart, affording a poor chance for fire to spread from tree to tree.

Among the many groups of mineral claims included within the limits of my season's work may be mentioned the Dardanelles, Golden Five, Coronado, and Spirit Creek groups, on Wild Horse Creek, upon all of which considerable work has been done, and some of which are very promising. This creek is famous for the production of its placers in the early sixties, when many thousand prospectors were scattered along the main stream and its branches. The banks along the main creek are still being profitably hydrauliced by the Nip and Tuck and Invicta Gold Mining Companies. It is estimated that the placers of this stream have produced not less than $18,000,000. The mountains on either side of the creek are heavily timbered along their lower slopes, and becoming as a rule quite precipitous near their summits.

Among the better known claims between the heads of Grundy and Six-Mile Creeks are those constituting the Lady Ann Group, and at the head of Tracy Creek the Cashier and Estella.

It is worthy of mention that more than 250 locations in the section of which we have just been speaking were recorded during the past year. Farther south, at the head of Lost Creek, is the well-known Dibble group of claims, on which work has been steadily pushed for some months past.

Leaving the Rockies and crossing the Kootenay Valley to the foothills of the Selkirks, the North Star Group stands foremost, not only as a shipping mine, but as an extremely valuable property. It is, however, at present under the disadvantage of a 23-mile haul for the ore before reaching the landing at the Kootenay River, where it is transhipped by steamer to Jennings, Montana, and thence by rail to the place of treatment.

On Sullivan Hill, two miles to the northward of the North Star, and forming the northerly slope of Mark Creek, are the Hope, Hamlet, and Shylock claims, while the intervening country is completely covered with locations, among them the recently surveyed claims Dean, All Over, Quantrell, Stonewall Jackson, Utopia, Stemwinder, Mavrick and others.

The early completion of the Crow's Nest Railway will give to the mining industry in this district a powerful impetus, as heretofore transportation has been most difficult and costly. The increased facilities for handling the products of the mines and the cheapening of the cost of living will certainly stimulate much-needed development.

It is believed that this network of triangles, covering about 350 square miles and forming a ground-work for a more detailed survey of the district, together with the considerable amount of general topography noted, will be of immediate practical value in the compilation of a correct map of the area embraced in the survey—a map which, from the absence of connecting surveys and sufficient data, it has been heretofore impossible to issue. While many of the twenty-nine mineral monuments will doubtless be used in connecting mineral surveys in the near future, there can be no question as to their ultimate value.

In concluding, it may be remarked that, should the Government desire to continue this work, the most needed extensions would seem to be from Cranbrook south, to include the Moyie Lake claims, and from Perry Creek, up the St. Mary's River, over the summit to Kootenay Lake, together with an extension of the system for six or eight miles up Perry Creek to embrace the surveyed claims in that locality.

I have the honour to be,
Sir,
Your obedient servant,
ERNEST A. CLEVELAND.

Tom Kains, Esq.,
Surveyor-General, Victoria, B. C.

REPORT OF KITIMAT AND LAKULSE VALLEYS AND PLATEAUS TO SKEENA RIVER.

—o—

EDWARD S. WILKINSON.

October 18th, 1897.

The Honourable the Chief Commissioner of Lands and Works :

SIR,—I have the honour to present the following report of the Kitimat and Lakulse valleys and adjoining plateaus to Skeena River.

KITIMAT VALLEY.

The tide flats at the head of the Kitimat Arm of Gardiner's Inlet were first examined and were found to extend across the end of the inlet. The average width was from a quarter to half a mile.

Tide Flats.

The Kitimat River runs through the centre of the flats spreading out into several shallow channels as it enters the sea. Some portions of the tide flats nearest the timber are covered with coarse grass and a few scattered spruce trees and bushes, and are only covered by the highest tides ; other parts by sedges, drift logs, etc.

Shoals.

The sea for some distance from the south edge of the flats is very shoal, especially at the mouth of Kitimat River and numbers of snags and trunks of trees are scattered over the shoal, leaving only a very narrow channel between the shoals at the mouth of the river and the east side of the inlet. Two other small streams cross the flats near the west side.

Area to Reclaim.

The higher portions of the flats with an area of two hundred acres could be easily reclaimed by small dykes and made productive, the soil consisting of from three to five feet of a rich silt with gravel sub-soil.

East Side of Inlet.

The east side of the inlet opposite the mouth of the river towards the Kitimat village is rocky and bluff to the water's edge. A large stream enters the inlet before the village is reached. This east side of the inlet is exposed to the winds from down the inlet and has no suitable locality for townsite or wharf.

Pile Wharf.

The west side of the inlet south of the flats is bordered by gradually rising foot-hills and a pile wharf could be made with sufficient depth of water for large steamers to approach without difficulty.

Rise of Ground.

The Kitimat Valley extends in a northerly direction for about eighteen miles, at which point it narrows to a width of one and a half miles. The ground rises gradually as you ascend the valley at the average rate of eighteen feet to the mile.

Timber.

It is covered with groves of spruce and cedar and hemlock, intermixed with clumps of alder and large cottonwoods with open areas covered with a light growth of small bushes making it a much easier task to clear the land than is usually the case on this coast.

Large Swamps.

On the west side of the valley and north of Kwa-kwa-kawa mountain extensive swamps occur for eight miles. These swamps are covered with scattered crabapples and small birches and low shrubs for some distance round the sides, and cranberries and mosses (Sphagnum) grow in the centre. The water level was up to within a few inches of the surface.

Drainage, &c.

These swamps can be easily drained, sufficient fall occurring and the ground being easy to ditch.

Soil, Crops, Potatoes.

The soil of this valley where the timber grows is composed of a fine mud silt, from three to six feet thick, with a sub-soil of eight feet of gravel and under that a hard and very tenacious blue clay (a true glacier clay), and is very rich and fertile and capable of growing very large crops, especially of potatoes. I inspected gardens on similar soil on the Skeena River benches which yielded splendid crops of potatoes of excellent quality, also rhubarb, turnips, carrots, green corn, etc.

Freedom from Frost.

I am informed that this valley and the Skeena benches are free from summer frosts.

Plateau of Gravel.

The greater portion of the valley is flat, with the exception of two isolated hills which occur. The smaller one reaches from the east bank of the river where a small cliff of trap rock is exposed, marked with glacial grooves, and is about 350 feet high with a long and gradual gravelly slope to the east. The second one (Mt. Kwa-kwa-kawa), an Indian name, meaning Round Mt., occupies a large area at a distance of about eight miles from the coast and attains an elevation of about sixteen hundred feet. At a distance of about eighteen miles we left the river and followed a small creek for a mile crossing a swamp, then ascending a slope of hill and of stope 45°, height 450 feet, and reached a level plateau, from the edge of which a fine view of the Kitimat valley was obtained, the two central hills and a gravel slide being plainly visible.

Area of Land for Settlement.

The valley up to this point contains an area of forty-five thousand acres suitable for settlement.

Forks of River.

At a distance of twenty-one miles from the inlet the valley is divided into two parts, following the course of the two branches of the river, which forks—one fork turning round the base of a mountain to the east, the other one running to the north-east for ten miles—both valleys get narrower towards the source of the rivers, and the timber improves in quality at the same time.

Area of Land for Settlement.

A further area of about twenty thousand acres of good land occurs, but not quite so suitable for settlement.

KITIMAT RIVER.

Indian Village.

We travelled up this river for twenty miles in a canoe, and I made a rough survey of it. Near the mouth the channel is from two hundred to four hundred feet wide with a rapid current, and depth of from two to four to six feet. At a distance of one mile from the inlet there is an old Indian village on the east bank; about twenty old houses remain, but the place looks deserted.

Gravel Slide.

One mile further the river strikes the foothills on the west side of valley. There there is a large gravel slide one hundred and twenty yards wide at base and four hundred feet high. This slide can be seen from the head of the inlet and from low hills eighteen miles up the valley.

Small Steamer.

A small light-draught steamer could run up the river for five miles. The course of the river now winds to the N.E. until the east side of the valley is reached at a distance of twenty miles.

Salmon, Trout, Char, Animals, Cranberries.

Some species of salmon run up the river, but not in sufficient numbers to justify the erection of a cannery. Trout and char also frequent the river, and a large run of oolichans occurs in the Kitimat Arm. Bear and cariboo frequent the valley in the winter, and large crops of cranberries grow in the swamps.

Freshets.

The river has only one large tributary joining it from the east foothills, and is subject to a freshet in October and November, which, however, does not last long. The highest freshet occurs in July and August, caused by melted snow from the mountains. The river then behaves in a very eratic manner. The channel runs on a bed of very tenacious blue clay, and when the water undermines the gravel and silt banks large trees are thrown bodily into the river and are washed down to the next gravel bar and form a jam.

Change of Channel.

The river to pass this rapidly cuts away from one hundred to two hundred feet of the bank for some distance and forms a new channel. This change of course occurs very often and can only be obviated by cutting the trees on the banks and burning some of the existing log jams in summer.

The principal insect pests are mosquitoes and small black flies.

LAKELSE LAKE AND 1ST PLATEAU NEAR KITIMAT VALLEY.

Dry Plateau.

After leaving the edge of the plateau previously described, we travelled on nearly level ground covered with a growth of small hemlocks and a few bushes for a distance of two miles and then went down to a small lake about 400 yards by 300 yards long. No streams or creeks are met with on this plateau, all rains being absorbed by gravel subsoil, which was only covered by a few inches of poor soil. We then went north for a mile and reached a small stream running into a swamp which proved to be part of Lakelse Valley.

Valley Open.

After following the edge of the swamp and mountain side for two miles we reached the large open valley at the south end of Lakelse Lake. A further journey of one mile and a half through the valley brought us to the end of the lake. This part of the valley is covered round the sides with a growth of crabapples, birch, cedars and spruce, and areas of small bushes four feet high are found also. The central portions are covered with moss (Sphagnum) and cranberries and are dotted with birch trees. The east side of the lake for five miles was covered with cedar and spruce trees and was very swampy. The west side of the lake is fringed by a series of low hills reaching to the water's edge, with an elevation of from three hundred to four hundred feet. At the north and upper end of the lake a small valley about one mile wide extends for over a mile, with a stream running through it and into the lake. The valley further north narrows rapidly. The same low range of hills on the west side of the lake extends along the side of the valley.

Area of Land.

The valley at the north and south and east of Lakelse Lake contains an area of from five to six thousand acres, a large portion of which is good soil. But I do not consider this valley to be of the same importance as the Kitimat Valley, owing to the greater difficulty of draining it.

Outlet of Lake.

This can only be accomplished by lowering the outlet of Lakelse Lake.

SECOND PLATEAU.

Height of Land. Dry Plateau.

On leaving the valley at the north of Lakelse Lake we ascended the slope of hill on the west and after an ascent of five hundred and fifty feet above the lake level at an angle of 45° up a gravel slope, we reached a second gravel plateau very similar to the first one described between Kitimat Valley and Lakelse Valley. We travelled along this flat for five miles through groves of hemlock and bull pines, with a thick carpet of grey moss underfoot. Again no water was met with, all rain being absorbed by gravel. The direction of our trail was from 60° to 70° N.W. Mag. We reached the spurs of the plateau on the west and descended down a steep slope into the valley of the Skeena River, which was six hundred and forty feet below the summit of the plateau.

Crossing the River.

Travelling up the banks of the Skeena River for about a mile brought us to the little cañon opposite the edge of the Kitsumgalum Valley. Here a very favourable crossing of the river occurs for a bridge. A long spur of hard grey granite runs more than half way across the river, and about sixty feet from the end of the spur a small island of granite is situated; from the far side of the island to the west bank of the river is about one hundred and sixty feet. This affords an easy means of throwing a bridge across the river and giving direct communication with the Kitsumgalum Valley, which could be seen extending to the north for a long distance towards the Naas River.

THE SKEENA RIVER.

This river was examined for a distance of ten miles to the north.

Area of Land.

Several long benches of land occur above high water mark on the east side of the river, containing an area of about three thousand acres of rich land, suitable for settlers, south of the Kitsilas Cañon.

Kitsumgalum Valley.

There is also a large area of about fifteen hundred acres at the mouth of the Kitsumgalum Valley of similar land.

Benches of Land.

In fact there are other benches of land further down the river also available in case of better means of access from the coast.

RAILWAY OR WAGGON ROAD.

In the event of a railway or waggon road being built I would suggest the following route: To commence at the N.W. corner of the inlet at Kitimat and follow the lower edge of the foothills on the west side of the valley—thereby avoiding the bridging of the Kitimat River—and gradually rising until the edge of the first plateau was reached, and then running in a practically straight line to Lakelse Lake; then along either the east or west sides of the lake, gradually rising up the foothills on the side of the second plateau, and keeping to the east of our trail, where the ridge can be crossed at a somewhat lower elevation, and the benches of the Skeena reached. The river could then be crossed by a bridge at the little cañon, and the Kitsumgalum Valley entered; or the line could be carried up the benches on the east side of the Skeena and no serious obstacles encountered between there and Hazelton.

A railway through the country described in this report would meet with no great engineering difficulties either in grades or bridges. A plentiful supply of gravel occurs over a great part of the distance, and all the necessary timber lies close at hand. There are no rocks to blast and the hills are low and free from snow slides. In fact it would be difficult to conceive a more favourable route through the coast range to the interior of British Columbia than this one, and capable of being constructed so rapidly, and at so low a cost, and so easy to keep open through the winter.

GEOLOGICAL NOTES.

The Kitimat Valley has evidently been the bed of a glacier. The blue clay under the subsoil and the glacial grooves on the rocks at the base of the mountains are sure evidences. The two gravel plateaus are glacial moraines. The mountains at the head of the Kitimat Arm are composed of granite, which weathers very rapidly in some places. Three exposures of trap are met with on the east bank of the Kitimat River, and the small hills marked on the plan at the head of the lower part of the valley are also trap. The mountains on the east side of the Lakelse Valley are of granite, and a small exposure of granite occurs half a mile north of the little lake.

Snowfall.

The snowfall in the Kitimat Valley is from three to six feet deep and hardens on the surface sufficiently to admit of snowshoeing.

Climate.

The climate partakes in some respects of the characteristics of the interior, in others of the coast. I have not described the flora in this report, as that has been done previously by other surveyors.

I have the honour to be,
Sir,
Your obedient servant,

EDWARD S. WILKINSON, P. L. S.

EXPLORATION FROM ALICE ARM.

—o—

To the Chief Commissioner of Lands and Works:

SIR,—I have the honour to present the following report of the exploration from Alice Arm—a branch of Observatory Inlet north of Naas Straits :—

DESCRIPTION OF ALICE ARM.

The north-eastern extremity of Alice Arm, which has an average width of from one mile to one mile and a quarter, forms a nearly perfectly land-locked harbour, with ample facilities for wharves, etc., and good anchorage in all parts, excepting on the N.E. end where extensive tide flats occur, and there the water is shoal for a distance of from one-quarter to half-a-mile from the edge of the tide flats. This arm occupies a rather peculiar depression in the mountains, the hills in the immediate vicinity only reaching an elevation of from 300 feet to 1,500 feet. Up to November 25th only a few inches of snow lay on these hills.

It is difficult to obtain any reliable information as to the extent of ice that forms in this harbour in the winter, the Indian guide, Paul, who has used this place for a hunting ground, not being able to give any definite information on this point. It is safe to say that some ice does form, but to what extent can only be proved by personal inspection at the end of February or the middle of March. During our stay, when a fall of three feet of snow occurred, the snow falling in the salt water formed a thick slush, through which it was very difficult to force a boat by rowing. This slush, which remained for thirty-six hours and covered a large area of the harbour, in case of a night's frost would have been sufficient to detain the steamer Chieftain. The weather remaining mild, however, it drifted out with the tide. During our stay very strong gales from the north prevailed in the Naas Straits, but were not felt in this harbour at all.

At the junction of Alice Arm and Hastings Arm and Brooke Island, the Indian Paul reports having seen rocks, below low water mark, which might be dangerous to navigation unless located and shown on a chart.

At the head of the Inlet an area of tide-flats stretches across the Inlet, of 600 to 800 acres, and is covered with coarse grass and only flooded by the highest tides. The soil is from three to six feet deep, and under this a bed of coarse gravel which is impregnated with iron in some places. The more southern portion of the flats are of mud and gravel and extend to the south to some distance below low tide mark, when they abruptly terminate, and the water deepens very rapidly. One or two small streams intersect the flats besides the river that we explored, draining narrow valleys to the east.

The valley at the head of the flats, through which the river flows, has a width on the arm of two miles and, rapidly narrowing, extends to the north for $3\frac{1}{2}$ miles, where it ends at the foot of a mountain range on the east of the river.

This valley is intersected with a few dry channels of the river, and is flat, with a poor sandy soil of from one to four feet deep with gravel subsoil. A portion of the upper part of the valley is overflowed by the river to a depth of one foot during freshets.

The valley is covered with a good growth of hemlock and spruce, from two to four feet in diameter, and the underbrush is very light, the usual shrubs and plants peculiar to the Coast Range occurring.

A trail was followed in exploring this valley, commencing at the centre of the flats and leading up the valley until it strikes a point where the valley terminates, about $3\frac{3}{4}$ miles from the coast. We then walked up the river on the ice, the mountains now coming sheer down to the river on both sides. At a point $1\frac{1}{2}$ miles further up a narrow cañon, from 100 to 60 feet, occurs, and we then skirted along benches, from 100 to 200 feet high, for a quarter of a mile until the cañon was passed. We now follow the bed of the river for 2 miles, low benches occurring on the west bank. At a distance of $7\frac{3}{4}$ miles from the coast a narrow cañon, of from 10 to 20 feet wide, occurs for a quarter of a mile. To avoid this we ascend a bench

on the west bank of river, 300 feet high, and then descend and follow the river bed again, which is now from 200 to 250 yards wide with gravel bars. A high water mark is very distinct here, showing a rise during freshets of 6 feet. Low benches of gravel, from 10 to 20 feet high, occur, first on one side of the river then on the other, and the river contracts at intervals, presenting good opportunities for bridges. When we reach a point nearly 17 miles from the coast the river again contracts into a cañon of 60 feet wide for a quarter of a mile, and then narrows to a defile of 10 to 20 feet wide.

At this point a mountain on the east side of the river was ascended to a height of 1,200 feet, the climbing being so rough and dangerous that only one mile was traversed in half-a-day. From a projection on the mountain side a good birds-eye view of the river valley was obtained for 6 miles, running in a direction N.W. 35° magnetic, and Paul, the Indian guide, pointed out the place where we should leave the river and turn to the east to reach a large lake that drained into the Naas River. The height of this divide was obtained approximately, and a photograph taken of the pass and divide. The dangerous condition of the mountain side and signs of a heavy fall of snow and the reluctance of the Indian guide to proceed further, rendered it advisable to return to the head of Alice Arm, which was reached during a heavy snow storm, three feet of snow falling on the day of our return.

A few photographs were taken of different views of the river valley. I was unable to take any views of the harbour on account of heavy mist and snow.

Timber.

Spruce and hemlock, from two to five feet in diameter, occur through the whole of the valley and up the sides of the mountains to a height of 2,000 feet.

Snow Slides.

No signs of any snow slides were observed on any part of the mountain sides until a distance from Alice Arm of 22 miles, where two small slides could be seen on the east side of the river of from 100 to 250 feet high. A few fragments of rock occasionally fall from the cliffs, but no recent signs could be observed.

Geological Notes.

The prevailing formation on each side the river is blue slate veined with quartz. In the narrow defile, 17 miles from the Arm, the slate cleaves freely, the line of cleavage being N.W. 45° magnetic, nearly vertical. The beds of slate are very much contorted and disturbed in a short distance. A few pieces of float granite found in the river bed indicate the presence of granitic rocks further up the pass.

Railway.

The valley, as far as explored, presents no great engineering difficulties towards the construction of a railway. In the first 18 miles there would be from 6 to 7 miles in which the road-bed would be cut out of hard blue slate. For the rest of the distance low benches of gravel, and the lower valley would be available. The most northern six miles, shown in photograph, would probably be the most expensive portion of the line, the river running in a narrow defile with no benches, and the grade being heavier.

The fact that no snow slides of any importance are seen, and that no large tributary streams run into the main river to necessitate numerous bridges is encouraging. The plentiful supply of good timber occurring all along the route would also be a welcome factor in railway construction.

Waggon Road or Trail.

This valley is not suited for either a waggon road or trail. The expense of construction would be so great in proportion to that of a railway, that for the extra cost a railway might just as well be constructed at once.

Paul Klatah's, Indian Guide, Statement.

This Indian, who is a man of more intelligence than usual, gave a very clear and correct description of the river valley that was explored. In fact, the actual facts tallied so correctly with his description of them that I am inclined to place confidence in his account of the rest

of the route to the Naas River. From a point shown on the plan annexed, he states that the way lies to the east over a low hill, and then a large lake is reached which drains into a branch of the Naas River. He further states that from the top of a mountain close to the lake a fine view can be obtained, to the north and east, for a long distance over a flat country, and that frequent journeys to Telegraph Creek are made by Indians living on the Naas River without any great difficulty.

I remain,

Your obedient servant,

EDWARD S. WILKINSON.

Table of Recorded Temperatures and Barometric Readings.

1897.	Therm'r. 6.0 a.m. Fahr.	Bar'r. 6.0 a.m.	Therm'r. 12 noon. Fahr.	Bar'r. 12 noon.	Therm'r. 6.0 p.m. Fahr.	Bar'r. 6.0 p.m.	Remarks.
November 25th....	19° +	30.55	32° +	30 63	25° +	30.70	N. wind ; clear.
" 26th....	12° +	30.80	26° +	30.80	8° +	30.70	" "
" 27th....	5° +	30.70	7° +	30.50	0° zero	30.40	" "
" 28th....	½° −	30.30	7° +	30.10	2° +	29.85	" light clouds.
" 29th....	5° +	29.57	14° +	29.40	12° +	29.26	" fine snow in air.
" 30th....	10° +	29.50	34° +	29.68	10° +	29.75	N.W. wind ; cloudy.
December 1st	10° +	29.75	10° +	29.98	8° +	29.98	" light snow.
" 2nd....	12° +	30.00	28° +	30.00	15° +	29.70	" snowing all day, three feet of snow.
" 3rd....	30° +	29.65	34° +	29.60	32° +	29.50	" heavy mists.
" 4th....	32° +	29.80	36° +	.....	.....	.....	" " and fine rain.

Temperature of sea water in Alice Arm at high tide on November 25th = 25° +.
Average fall of snow reported to be six feet.

SALT SPRING ISLAND SURVEY.

———o———

HENRY FRY, P. L. S.

SIR,—I have the honour to submit the following report on the survey made by me during the past season:—

Acting under your instructions of June 24th, regarding the completion of the survey of the unsubdivided portions of Salt Spring Island, I obtained from the Lands and Works Office the information and notes required to connect the work with the former surveys, and went into camp on Lot 12, Central District, July 19th.

The unsurveyed land was divided into 17 lots, numbered from 23 to 40. The land is only fit for grazing purpores, rocky and precipitous in places, while the ravines are thickly covered with underbrush; the timber is fir, cedar and hemlock, stunted and difficult to get to the coast. The whole of the part surveyed may be described as 3rd class.

Near the coast we came upon several location lines of mineral claims, the formation showing schist, with numerous small veins of white quartz.

From the north-west corner of Lot 30 to the District line, the distance is 1½ miles; the mountains rise precipitously from the water, and are solid rock, in places covered with oak scrub and scattered fir.

Running east from the coast, and following the District line, we came upon several clumps of good fir timber that may be utilised for lumber or piling.

Having completed the survey of the central portion, we moved camp to Burgoyne Bay on August 7th, and started work from Lot 45; on the 16th moved to Musgrave's Landing and completed the work on September 11th, when I paid off the party and returned to Victoria.

The southern part of the Island is very mountainous and broken into steep ridges and ravines; for the most part the land is rock, or very poor gravelly soil.

In Lots 43, 44 & 50, there are a few small swamps which if drained would make hay land; they lay about 1,200 feet above sea level.

The timber is of little value, although good fir and cedar may be found in small quantities, but on account of the distance from the coast and rough broken character of the country, difficult to get out.

Near the coast the land is everywhere steep and rocky, covered with small fir and scrub oak; the formation a slatey sandstone, with many narrow veins of red and white quartz; several mineral claims have been located on this portion of the Island.

In conclusion I may report the land subdivided to be only 3rd class, and useful only for grazing or mining; as to the latter, although a number of claims have been located, no developement work has been done to test their value.

I have, etc.,

HENRY FRY, P. L. S.

Tom Kains, Esq.,
Surveyor-General, Victoria, B. C.

MINERAL MONUMENT SURVEY, FIRE MOUNTAIN AND HARRISON LAKE COUNTRY.

LIVINGSTON THOMPSON, P. L. S.

VICTORIA, January, 1898.

Tom Kains, Esq., Surveyor-General,
Victoria, B. C.

DEAR SIR,—I have the honour to state that in accordance with instructions received from you I commenced to get a party together, and left Harrison Hot Springs on the 1st August, 1897, for Douglas, where we arrived late on the evening of the 3rd.

The work of selecting a good position for a base was no easy task. I tried to get one in the Lillooet Valley, east of the Ten-Mile House, on the old Cariboo Road from Douglas to Tenasse Lake. I had great difficulty in getting any position which would afford any means of accurate measurement, and at the same time give means of obtaining sights to prominent points.

I ran out a line of over a mile in length on the eastern side of the valley, and about four miles south of the point I had hoped to be able to utilise, as I found from that point I could not get sights to any number of prominent points.

Leaving part of my party at work clearing out the base, I proceeded to the top of Tipella Mountain to arrange the signals thereon to enable me to commence the triangulation, intending to move the camp up on to the mountain by way of the Townsite of Tipella, on the upper end of the lake. Whilst on Tipella or Fire Mountain I saw a very good place for a base, and I determined to adopt it at once should I find on my return the first one was unsatisfactory, which I feared.

I returned to the valley and found it would be impossible to depend upon the measurement of the base being accurate, so I determined to get my base on Fire Mountain, but whilst I was on my way down from the mountain I found that I could not move camp by Tipella, as the Fire Mountain Gold Mining Company's pack train was completely busy, and I had then to decide to go up by Skookum Chuck, where I could get Indians to pack in.

As there were several locations made at Skookum Chuck and John Gowen Creek, I determined to put in the necessary monuments there and connect them with a traverse to enable me to get some of the points along the road to tie the traverse to the triangulation. I therefore chose the first point at 20-mile house and commenced to traverse from there and place in the monuments where necessary.

It is very difficult to get prominent places for such monuments in a steep mountainous country when it is also heavily wooded, and I trust that I have chosen satisfactory sites. I had to be greatly guided by the localities in which mineral claims were taken up, and endeavour to in all things carry out my instructions. After completing the line of traverse I moved the camp by the Glacier Lake trail from Skookum Chuck to Fire Mountain. This trail is very fair for about six miles but from that on it is straight up the mountain, and is a tedious and hard climb. We reached Captain Moore's camp and decided to make that place my headquarters for completing the work on the mountain, as it is one of the few places where water is to be found. This camp is 5,000 feet above Harrison Lake.

Leaving the standing camp I moved up with two men to the top of the mountain to lay out the base and commence the triangulation.

I located the base on an open piece of ground which allowed of its being accurately measured, and the measurements being checked by triangulation, the bases for carrying out this check being taken across the slope so that they could be accurately measured. This system will be shown in my notes which I am now preparing, and which I think you will find will give a satisfactory result.

During the time I was laying off the base I had two men out putting up signals to sight to and from, and these now being in some degree complete, I commenced the triangulation.

I carried out this with parties out putting up signals in advance so as to enable the work to be carried on continuously.

I found great difficulty in drawing the triangulation down through the narrow valley at the head of Harrison Lake as the triangles were not as well conditioned as I could have wished for, but I completed the triangles and closed on to a check base on the beach at the top of Harrison Lake, as by this time the water had fallen and allowed me to find a line of nearly a mile in length to check my work by. This also enabled me to continue the triangulation down the shores of the lake.

I withdrew the party on 23rd November, owing to heavy snow and storms on the lake, which prevented the party from economic work. During the last week I had to leave the work in the hands of Mr. Laffere, P. L. S.

Speaking in a general way, as to the country covered by your instructions, I would say that I endeavoured to carry the survey down from Skookum Chuck to Harrison Lake and along the shores of the same to connect with the Dominion Survey, made by Mr. J. A. Kirk, D. L. S.

Harrison Lake, as you know, is about 43 miles long, with a width varying from one to three miles across. The southern part of the lake lies a little west of north and east of south, but from the twenty-mile point up the direction changes much more to the west.

The lake is fed from the top by the Lillooet River, which empties by several channels.

At the head of the lake, at the north corner, there is a channel coming out of Douglas Lake, at the upper end of which is the old townsite of Douglas, from which starts the old Cariboo Road. This road has been greatly improved this year, and is now available for waggon traffic to Skookum Chuck, and the trail has been opened up as far as the old town of Pemberton, arcund Tenasse and Lillooet Lakes, by this means giving an outlet from the Blackwater District.

At the top of Harrison Lake, at the western corner, is the townsite of Tipella, owned by the Fire Mountain Gold Mining & Milling Company, and from this place the company have built a pack trail to their mines on Fire Mountain. This trail, if it had been properly located, might have been made into a waggon road and rendered useful as a means of communication. Should it be decided to put in a waggon road, an entirely new location will have to be taken.

The hills are precipitous, and up to a height of about 5,000 feet are covered with timber. The timber is in places very good and I find that a good deal of it has been taken up as timber claims. On the higher ground a great deal of cypress is found.

As to the amount of arable land, there is none outside the valley of the Lillooet, and most of that is occupied by Indians.

The rock of the mountains around Douglas and Tipella townsites is all granite, but about three miles north you come into phonolite, serpentine, diorite, etc., and in these the quartz is found.

The entire of Fire Mountain is covered with claims, and there is a very great deal of overstaking, and a great number of claims held by the same person.

The principal claim upon which any development has been done is the "Money Spinner," staked by Mr. Brown, and owned now by the Fire Mountain G. M. & M. Co. On it the company have a tunnel in about 90 feet, and a shaft, I understood, about 60 feet from a point about 40 feet from the mouth of the adit.

The Skookum Chuck Company have also done considerable work on the "Monterey" claim, and the Fire Lake Company, The Telluride of Gold Company, and the Broken Three Company have done considerable work on their claims. To the south end of the mountain there are several claims running to free gold.

On Harrison Lake the most development done is on the "Providence" and "Silver Bell" claims, and there is every indication of these claims improving. Mr. Fader has done considerable work on the "Deep Cave" claims at Silver Creek.

The Fire Mountain Company have put up a Huntingdon Mill and it will soon be running, and naturally there is a great deal of waiting for the result of the first clean-up.

I consider that with careful prospecting work that this district will at no distant date turn out some quantity of gold and copper.

I have the honour to be

Sir,

Your obedient servent,

LIVINGSTON THOMPSON, P. L. S.

MINERAL MONUMENT SURVEY, WEST KOOTENAY.

J. HERRICK McGREGOR.

To the Hon. Chief Commissioner of Lands and Works:

SIR,—I have the honour to submit to you the following report of my proceedings in making a Mineral Monument Survey of a part of the Nelson Mining Division of West Kootenay District.

On receipt of your instructions, delivered to me at Nelson, on the twenty-eighth of August, 1897, I proceeded immediately to gather information concerning mineral and other surveys lying within the district which I proposed to cover, and after obtaining the necessary outfit and supplies, I left Nelson on the sixth of September with a party of four men, and pitched camp at Hall's Siding on the Nelson and Fort Sheppard Railway.

From my knowledge of the topographical features of the country tributary to the Salmon River, I had decided to make a careful traverse along the line of the railway as a base from which I could throw out triangulation and traverse surveys as occasion required.

A survey carried on entirely by triangulation would have necessitated a great deal of extra work owing to the thickly timbered valleys and lower hillsides, and would also have made it very difficult for me to make connections with former surveys, and to place mineral monuments where they would be of easy access in future.

After traversing several miles northward from Hall's, and placing a monument near the railway where the Clearwater enters the Salmon from the east, at which point I took an observation for azimuth, I made a careful traverse along the waggon road from Hall's Siding to the Fern Stamp Mill on Hall Creek, connecting with the surveys of the Fern Millsite and Fern group of claims, and placing a monument on the waggon road, about two miles from the railway.

At the Fern Mine much work was in progress both below and above ground. The heavy machinery of the stamp mill was being placed in position, and a surface tramway was nearing completion from the mine to the mill, a distance of about feet with a four hundred-foot fall.

Since the completion of the mill a trial crushing of about a thousand tons of the Fern ore (a free gold bearing quartz) has taken place with excellent results, about fifteen thousand dollars being saved.

The bed of Hall Creek has for several years been worked by placer miners with fair results; the only operators that I witnessed, however, were a half dozen Chinamen, who were presumably, making wages.

Continuing my railway traverse southward, I moved camp to the waggon road then in course of construction up Barrett Creek to the Portorico Mines. I made a traverse of this road as far as completed and by triangulation connected with the Portorico survey.

A large number of men were engaged in the development of this property, which carries high values in gold ore, both free and refractory. Having placed a monument on the waggon road, and one on the railway, about two thousand feet north from the crossing of the road, I continued southward, camping near the town of Ymir on Quartz Creek.

From this camp I made connections with the Tamarack, Tennessee and Parker group of claims, the last two of which were being steadily developed. I also placed one mineral monument near the railway, a short distance below Ymir, and one on a bare, and well exposed hilltop, about one and a half miles from the town, all of which work was done by triangulation from carefully measured bases on the railway track.

I then proceeded to traverse the waggon road from Ymir up Wild Horse Creek, to the Ymir Mine, now being extensively developed by the London and British Columbia Goldfields Company.

The waggon road, which was built by the same Company, with assistance from your Department, is an excellent piece of work, well graded and constructed, and will prove of immense benefit to many promising properties on this creek.

I connected with the Ymir group and the Elise, which is reached by a trail from the Ymir and is about one and a half miles farther up Huckleberry Creek (a branch of Wild Horse). At a point on the waggon road, commanding a good view east and west along Wild Horse, and north along Huckleberry Creek, I placed a monument checking the azimuth of my traverse by readings on and from the mineral monument above the town of Ymir.

Owing to the lateness of the season I did not consider that I had time enough at my disposal to continue my survey up Wild Horse Creek to connect with the Wilcox and other surveyed claims. I therefore continued my work southward, and moved camp to the town of Erie on the North Fork of the Salmon.

I placed a mineral monument near Salmo, and by a series of triangles from the railway, I placed another one on a bare hilltop two miles north-east from Erie, and a third one three miles up the North Fork trail.

Making a traverse of this trail for some distance beyond Craigtown, I checked on my triangulation points and connected with the Young America and Titanic groups of claims.

By this time snow was falling heavily in the hills and after checking my azimuth by observations I pushed on west and south, camping at Champion Station and at Sayward, and placing one monument two and a half miles west of Erie, and one near Buck Creek entrance to Beaver Creek.

At Sayward I again took observations, connected with the Juliet claims, and continuing south along the Columbia River, connected with the Pug claim, and on the 27th of October I crossed the Pend d'Oreille River at Wanita, and connected my survey with the International Boundary Line, which is marked by two large stone cairns on the west side of Columbia River.

From here, I returned to my point of commencement, on the railroad, and worked northward until the continued snowfall interfered with my work to such an extent that I broke up my camp and returned to Nelson on the tenth of November.

After getting traverse sheets and observation calculations in shape I returned to Victoria where I completed a map of my work, which I have delivered to the Surveyor-General, together with a fair copy for lithographic purposes, field-notes of survey and other papers.

In all, I planted twelve mineral monuments at suitable points, and located twelve groups of surveyed mineral claims, besides various land surveys.

The total cost of the survey from August 29th to January 12th, including preparation of Plan, amounting to eighteen hundred and twenty dollars.

I have the honour to be,
Sir,
Your obedient servant,
J. HERRICK MCGREGOR, P.L.S.

VICTORIA, B. C.:
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1898.