RECONNAISSANCE

NASS RIVER WATERSHED & HEADWATERS OF SKEENA

P. S. BONNEY, 1913

IV
Report on Exploratory Reconnaissance
of a Portion of the Nass River Watershed, and Headwaters of Skeena River.

May to November - 1913.

P. S. Bonney,
Forest Assistant.
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of the Skeena River.

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Resume of Season's Work.

In accordance with instructions, I left Victoria on
May 10, and proceeded to Vancouver where I joined the survey
party of Mr. K. C. C. Taylor, B.C.L.S., who had been assigned
by the Surveyor-General to the survey of the Naas River Pre-
emption Reserve. I travelled with the party to Port Nelson, a
cannery calling point on Observatory Inlet, near the mouth of
the Naas River, where the supplies and party were transferred
to light draught gasoline launches and taken some seventy miles
up stream to the Southern boundary of the Pre-emption Reserve.
Two days are required to make the trip upstream against the
strong current, while the return trip can be done in from
six to eight hours, depending upon the tide at the mouth of
the river.

At Aiyansh, an Indian Village and post office on the
Naas, Joseph Davies, a recent pre-emptor in the valley was secured
as general assistant and work began. Mr. Davies' services termin-
ated July 1, on account of sickness and Mr. S. R. Brown, an able
and enthusiastic woodsman, was secured for the remainder of the
season. Supplies were drawn from Mr. Taylor's commissary, except
in cases where it was impracticable to return to his camp. It was impossible to secure certain necessary supplies for back-packing such as evaporated food stuffs from the survey outfit and these were purchased locally.

Exploratory trips of from one to three weeks were made into the various parts of the valley, using Mr. Taylor's camp as a base. The only means of transportation available was back-packing and by this means the Naas Valley, from the Tseaxe River up to the Cranberry Basin was covered by early August.

Last winter's exceptionally heavy fall of snow lay on the ground unusually late this spring and proved a great hindrance until late in June, at which time the bulk of it had melted, making work in the higher elevations possible.

On account of the fact that Mr. Taylor's survey covered such a comparatively small part of the watershed, which necessitated long return trips for supplies, it was deemed advisable to have a sizeable quantity of grub packed up river some eighty miles to Meziadin Lake, from which point the White River, Meziadin Lake Country, and Upper Naas Country were covered by the middle of September.

A trip of twenty-three days was next made from the mouth of Meziadin River to Cabin No. 6 on the Yukon Telegraph Line, a distance of some ninety miles, through trailless country. The rugged nature of the country, heavy brush and wind-falls, and the severity of the weather, together with the weight of our packs
made this trip one of some little hardship. It might be mentioned here that four separate outfits consisting of two survey crews, a party of prospectors and a road supervisor’s gang have during the last two years experienced great hardship in making this same trip. Cabin 6 was reached on Oct. 5, where we rested and fed up for a day and a half.

From Cabin 6 a trip of eight days was made through the Ground Hog Country, going in over the Ground Hog Trail, which branches from the Yukon Telegraph Trail eight miles below Cabin 6, and returning to Cabin 7 via the Biernes-Anthony Creek Route.

It had been planned to continue on up the Telegraph Trail to Cabin 9, but in view of the fact that twelve inches of snow fell on the night of our arrival, it was deemed advisable to follow the advice of the old timers and get to the "outside" before the heavy snows set in, there being no snow-shoes obtainable. Hazelton, lying one hundred and fifty miles distant, was reached on October 30, and from here travel by the usual route was made to Victoria, where I arrived on Nov. 9.

Method Employed.

The method employed in this work was of necessity rough and inaccurate in detail. It is obviously impossible to make a survey of this magnitude in the time allotted, which will be complete enough to obviate the necessity of revision. The work done this season is essentially an extensive exploration of forest and agricultural resources.
My instructions were to cover as much country as possible this year and since Mr. Taylor's survey was confined entirely to the Naas River Pre-emption Reserve, which consists of a strip 2 miles wide on either side of the river and 25 miles long (100 sq. miles); it was deemed best to sacrifice accuracy in local detail and make a cursory investigation of a large area. Accordingly, a series of trips up the main streams and onto the most advantageously located peaks and high hills were made, and conditions mapped and investigated in an extensive way.

A large portion of land immediately along the main streams from Meziadin Lake south has been surveyed by Government and private parties for pre-emption, purchase and timber license. A number of coal leases and a system of base lines have been surveyed in the Ground Hog Country. These existing accurate surveys afforded a system of primary control from which rough "hiking" traverses were run. These traverses are designated "hiking" for lack of a better descriptive term. They consist of lines run from known initial starting points, such as a lot corner, plotted river forks, lake shore, or other similar location, out into unexplored country. Usually the line of easiest travelling compatible with the objects of the trip is followed; the bearing and distance of each different direction of travel is plotted on a field sketch map; and "shots" are taken on peaks whose elevation and location thus determined. The method, while inaccurate in detail, does afford a rapid means of roughly mapping the country explored.
The Ground Hog base lines were tied to Meziadin Lake by this method.

During the summer a considerable number of strategically located peaks and high ridges were climbed and forest types, stand conditions, burned areas, possible agricultural areas, topography etc were studied and sketched in field books under loose sheets and later transferred to a small scale index map, which afforded a means of continually correcting and checking the work. Prominent peaks, hills, certain landmarks, lakes, glaciers, burns, muskeg, etc. were roughly located by a system of triangles which was extended up the main valleys. Observations of slope and elevation were made with clinometer and aneroid barometer.

Some two hundred photographs were taken during the season showing general conditions over the area explored. This group of pictures shows conditions in a manner which is not possible by either map or report and they should form a valuable adjunct to this report.

Approximately one thousand miles travel, exclusive of railroad and steamship journeys, was done during the season and with the exception of about 100 miles on which pack animals were used, the distance was done by back-packing.

Data on conditions in general was collected both by observations and interviews with surveyors, trappers, settlers, prospectors, and in fact every manner of man whose statements appeared reliable.

Area Covered.
The area covered this season is estimated at 2,812,610 acres (4395 Sq. miles) in the form of an irregular strip laying in a general north and south direction along the Naas River and extending into the headwaters of the Skeena, between Latitudes 55° North and 128° and 130° East Longitude. Described locally, the district covered by this summer's operations consists of the entire Naas Watershed from the mouth to Meziadin Lake; a strip averaging ten miles in width extending from Meziadin Lake up the main Naas to the Blackwater River, and that portion of the Ground Hog Coal Fields roughly bounded by lines drawn from Cabin 7 on the Yukon Telegraph Line to Blackwater Lake, thence to the mouth of Courrier Creek, thence northwesterly along the divide between the main Skeens and the Kiu-tan-tan or Moss River Fork, to about six miles above the mouth of Biernes Creek, thence southerly to the mouth of Anthony Creek and thence to Cabin 7.

Of the 2,812,610 acres reported upon, 1,792,000 acres may be classed as forest land of which 324,700 acres is statutory timberland. It is roughly estimated that there are 199,000 acres of land in the area on which some form of agriculture is possible. The percentage of barren lands was high, there being in all 759,300 acres. The burned areas total 261,700 acres.

The country has been sectionized and conditions obtaining on each section described more in detail.

Cost of Work

The expense of conducting this work is comparatively very low.
The character of the country with its lack of means of transportation forced us to cut down our back-packing out-fit to absolute necessities and as a result we lived very poorly, but decidedly cheaply. It is safe to state that the Forest Branch Reconnaissance crew this year lived poorer, had fewer bodily comforts, and were housed poorer than any of the half-starved Naas Indians, who roam in the upper country. A list of expenses is as follows:

Supplies .......................................................... 409.45
Freighting, packing and transportation ........... 213.75
Equipment ......................................................... 26.47
Salary of Forest Assistant ............................. 771.00
Salary of Field Assistant ......................... 487.94
Miscellaneous ................................................... 6.95
Total ................................................................. 1915.56

Cost per sq. mile .............................................. .4358
Cost per acre ..................................................... .0006

Topographical Description.

The area explored presents a multitude of topographical conditions, varying from the extensive comparatively level valley plain of the middle Naas country, to the rugged irregular mass of mountains at the northern extremity.

The Naas River, which drains nearly all of the country under consideration, rises in a rugged range of mountains; an off-shoot of the Cassiar Range with a general elevation of 5000; and flows in
a southerly direction for some two hundred miles to Observatory Inlet, its point of discharge into the sea. From the mouth to a point some fifty miles up river where the Naas cuts through the Coast Range, the valley is a typical U-shaped glacial one. It varies in width from one to three miles and the sides rise generally with steep broken slopes, culminating in a series of peaks, which align either side of the valley. Up river beyond the Coastal Range, the valley gradually broadens out till at a point some ten or fifteen miles above the mouth of Brown Bear Creek, it is over thirty miles from range to range. Going north, it again narrows down to a width of four to six miles at Meziadin Lake. Above this Lake, it alternately widens and contracts until the Blackwater River is reached above which it becomes much divided into secondary valleys, which assume the character of the usual narrow steep-walled mountain valleys.

Below the distinctly mountainous portion at the headwaters of the river, the valley floor is of a rolling undulating conformation broken considerably by a series of slate ridges into a system of varied sized ravines, and flats, which have a general northwest and south-east strike.

The general trend of the mountain ranges is north and south with the exception of more or less isolated off-shoots, which have no regular conformation.

The elevation of the valley proper ranges from 0 in the lower Naas to 1600' at Blackwater junction, while above the
valley floor a series of progressively narrowing terraces rise to a general elevation of from 4000 to 5500'. This terraced nature of the valley walls continues throughout the area.

The Naas River, which drains the bulk of the country under consideration, is one of the largest northern rivers, being at Aiyansh about five hundred feet wide, some 5' in average depth, and with a four mile current. It partakes of the nature of both a glacier fed stream and one draining a large area, which condition has a marked effect upon its time of flood. Nearly all of its western tributaries take their waters from the glacier fields of the Coast Mountains, while its eastern feeders have more the character of drainers of large catchment areas.

That portion of the area examined, which is drained by the Skeena River, is very mountainous, having an elevation of 3200' to 3500' in the main valleys, and rising by steep slopes to heights of over 5000'.

Geology of the Region.

Glacial action has exerted a very marked influence upon the topography of the region covered. During the glacial period the land surface up to an elevation of over 3000' was covered with a great sheet of ice, moving very slowly in a general direction of South 30° East. They dug into the underlying rocks and formed a system of roughly parallel great glacial valleys, each of which is in turn made up of a succession of long narrow ridges and valleys. The present dying glacier field in the Coast
Range is a remnant of that great ice sheet.

The soils of the region all bear characteristics of having been glacier-made. Moraine deposits of glacial-till intermixed with gravel and boulders is the common type of upper bench land soil. The soil conditions are not uniform over any large area; the depth, composition and moisture varying greatly. The underlying slate divides the lower valley into a series of dry, shallow soiled ridges with intervening swales, of deep, rich vegetable loam. In lower Naas, immediately along the river deep, rich silty deposits of considerable extent exist and are undoubtedly the best agricultural lands in the valley. On some of the wider first benches, extensive flats of gravelly red clay loam with a mixture of sand are found, and in places, particularly along water-courses, deep gravelly clay deposits are exposed.

In regard to the underlying rocks of the region, their occurrence and formation run in belts. From its mouth up to near Gwinahaw, a small Indian Village, about 50 miles up river from Observatory Inlet, the Naas Channel has been cut through the great granite batholith which parallel the general coast line. From Gwinahaw to its head the valley is mainly underlain by sedimentary rocks generally conceded to be of the Cretaceous or Pre-cretaceous age.

Black slates are practically the only sedimentary rocks
encountered from the coast granites to a point some 18 miles above the mouth of the Cranberry River, where a thick bed of tufaceous sandstone outcrops. Northward from this point the number and thickness of the sandstone strata increase and north of Vile Creek they become the chief underlying rocks.

The same coal bearing formation which is found in the Ground Hog Basin seems to extend over into the headwaters of the Naas as has been evidenced by the discovery of coal seams on Panorama Creek and near Cabin 7 on the Little Naas.

Throughout the valley the sedimentaries have been much folded into long ridges which usually have a north or northwest strike. Along the western portion of the watershed adjacent to the zone of contact with the coast granites, the sedimentary rocks have been more metamorphosed than elsewhere. Quartz and calcite veinlets and scattered crystals of pyrite were noted at several places in these metamorphosed sedimentaries.

Igneous rocks were noted in four places above Gwinahaw where the coast granites cease. First, in the vicinity of lava and sand lakes a granitic dyke, an off-shoot of the coast granites, is exposed. Second, a flow of black basaltic lava extends from a peak down the Tseaxe River Channel to the Naas where it spreads out in a giant kidney shape, covering an area of about eighteen square miles. This flow pushed the Naas River two miles to the West of its original channel.
Geologically speaking, this lava flow is of a recent age. It is basic, greyish black in colour and in places shows a porous structure. The streams flow from the adjoining hills into the lava plain have made deposits of alluvium sufficient in places to support tree growth, but with this exception the bed is devoid of vegetation other than mosses and lichens.

The third occurrence of igneous rock is about 7 miles north and one east of Aiyansh where a narrow intrusive dyke of black basalt has been exposed by the removal of the overlying slates by glacial action.

The fourth and last occurrence of this class of rock, consists of a bed of greyish tertiary acidic lava, covering an area of about 6 sq. miles and lying just north of the mouth of the Cranberry River. The surface of this bed is much glaciated showing that it is older than the Tseaxe flow.

Climatic Conditions.

In that portion of the Naas lying west of the Coast Range the climate is typically that of the Coast wet belt. The rainfall is heavy and the percentage of dark cloudy days is high.

East of the Coast Range, the climate somewhat resembles that of the semi-dry region of the interior.

Perhaps the best manner to present climatic conditions is to describe a typical year's weather in the vicinity of the present settlement and note points of variance in other portions of the area.

In the vicinity of Aiyansh, the first snows come in the higher elevations in early October and gradually work down the
slopes, reaching the flats and lower levels about November 5. The
weather may moderate at this time and melt these early snows, but by
December 10th, the permanent snow-fall occurs. The average fall of
snow is from two and a half to five feet, in the valley proper, while
from ten to fifteen feet may fall in the mountains. Navigation may
close as early as the middle of November, but usually the rivers
do not freeze up permanently till late December or early January.
February and March are months of bright clear days and cold nights.
The average winter temperature is from $5^\circ$ to $10^\circ$ below zero, while
extremes of $30^\circ$ below for short periods have been noted in January.
In late March the main Naas begins to break up and by April 15 is
usually open for navigation. By the middle of May the lower levels
are cleared of their snow except in the dense timber where patches
exist till June. Heavy late frosts may be expected until the middle
of June, while summer frosts have been known to cut down early gardens
late in summer. The months of May, June, July, August and early
September are fairly dry and clear weathered with occasional showers,
August being the month of greatest fire danger. The average summer
temperature lies between $50^\circ$ and $90^\circ$ with a maximum of $110^\circ$. Late
September, October and November are the months during which the bulk
of the rainfall, which is estimated for the year at 25 inches, occurs.
Fall frosts may be expected in late September, but they do not become
severe till early October.

The snowfall increases in the Upper Naas and Ground Hog country
reaching a depth of 6' to 8' in the lower levels. At Cabin 7 on the
Yukon Telegraph Line, slightly over twelve feet of snow fell last winter.

No meteorological observations have been conducted systematically in the region and these notes are the result of observations on the ground from May to November, and enquiry from dependable local residents. Rev. J. B. McCulloch, a missionary of thirty years residence in the country, furnished considerable information along this line.

**Conditions of Settlement and Development.**

Prior to 1912 there were no real attempts at settlement made. Occasional white trappers, prospectors, and land stakers visited the country, but permanent residence was not attempted until the spring of 1912, when some six or eight pre-emptors settled in the vicinity of Aiyansh. During the season just passed about 60 pre-emptors took up places in the southern end of the pre-emptors Reserve and are nearly all making bona fide attempts to establish themselves permanently.

The Indian population of the area numbers about nine hundred souls, who live principally in the following villages:—Kincolith, Aiyansh, Greenville, Gwinahaw, Gitlakdamicks, and Blackwater.

The great bulk of the region explored this year is uninhabited except by an occasional Indian trapper, prospector, or land looker.

The country is fairly well supplied with trails for foot travel, consisting mostly of worked over Indian trapping lines, but for horse travel are decidedly poor, except in the very driest times.
The Dominion Government has constructed two telegraph lines across the area, one being the Stewart Kitsumgallum Line, which has a permanent station at Aiyansh and the other being the Yukon Telegraph Line, which traverses the headwaters of the Naas and has operators stationed approximately every twenty miles.

The Naas is navigable for shallow draught boats from its mouth to a point some three miles above Aiyansh, where it is contracted into an impassable canyon.

In regard to mail service, there is a bi-monthly delivery made to Aiyansh, throughout the year, and a monthly service to the B. C. Anthracite Coal Co. Camp on Courrier Creek during the summer months only.

Some twelve thousand dollars have been expended by the Dominion Government on the construction of a concrete fish ladder at Meziadin Falls with the idea of assisting the salmon over this chief obstacle in the route to the spawning grounds in Meziadin Lake. It might be suggested here that the local Fire Warden be deputized as a game warden and instructed to prevent the ruthless slaughter of salmon which is annually done at these falls by the Indians.

Land speculators have acquired by purchase practically all the good land in the valley outside of the Pre-emption Reserve and Indian Reservations. As usual throughout the Province, a large part of the best agricultural lands in the Naas is tied up in Indian Reserves on which practically no pretence at improvement is made.
Much of the best timber is held under lease or licence purely for speculative purposes. In all there are at present about 339,880 acres of lands, which have been alienated in the following ways: Purchase - 197,950 acres, Pre-emption - 9760 acres, Timber Limits and Licences 81,330 acres, Coal Lands - 36,480, and Indian Reserves - 14,360 acres.

The labour supply is limited to the local pre-emptors, who are dependable and efficient. The Indian labour is not satisfactory, being decidedly inefficient and shifting, but in spite of this fact, the local road superintendent saw fit to employ Indians on the trails built this season in the Naas in preference to the white pre-emptors who needed the work.

Forest Conditions

General:

Of the area examined this season fully two-thirds may be rightly classed as absolute forest land fit only for the production of timber, being practically all too poorly soiled and too rough in contour to permit of cultivation. The forest is comparatively simple in composition, there being in all a total of fifteen species of which three, spruce, hemlock and balsam, make up the bulk of the stand.

List of Forest Species:

The species of forest trees found on the area consist of the
following arranged in order of their abundance:

1. Tsuga heterophylla - Western hemlock.
5. Abies lasiocarpa - Alpine fir (balsam).
6. Populus trichocarpa - Cottonwood.
7. Pinus contorta - Jack or Lodgepole pine.
8. Tsuga mertensiana - Mountain hemlock.
11. Thuja plicata - Western red cedar.

Several varities of willow, alders, ashes, and a species of cherry occur in shrub form.

**Local Description of Species:**

**Tsuga heterophylla - Western Hemlock.**

This tree was found from the mouth of the Naas to a point some ten miles north of Blackwater Lake, which seems to be its Northern range limit. It is ubiquitous over the entire area and succeeds in almost every site from sea level to 3000', except in very wet situations. It seeds prolifically and was by all odds reproducing more abundantly than any other species. The average
D. B. H. is from 20" to 30" and average height from 110' to 140', although larger trees were not uncommon. The species is ravaged greatly by fungous diseases, fully 30% of it being defective. Great tolerance, excellence of reproductive powers and hardihood combine to make western hemlock the dominant tree of the Naas forest.

*Abies amabilis - Lovely Fir.*

Lovely fir, commonly known as balsam, occurs throughout the area from saltwater to the vicinity of Meziadin Lake. It is essentially a tree of low elevations seeking the better soiled, well drained benches and slopes up to 2000'.

In height it runs from 120' to 140' and in diameter from 20" to 40". The growth is rapid, clear and clean and with a gradual taper, except on the poorer sites near the upper limits of its zone, where it is inclined to become scrubby.

It is a heavy seeder and with-stands the competition of the hemlock better than any other species. Usually it occurs in composition with spruce, cedar and hemlock, but over limited areas pure stands are found. Fungous diseases effect the tree to some extent, the defect from this source averaging 10%.

*Picea engelmanni - Engelman Spruce.*

This spruce was found throughout the area east of the Coast Range usually at elevations above 2000' and below 4000'. In the lower elevations it attains a height of 90' to 120' and
a diameter of 20" to 40", becoming more poorly developed as the upper limits of its zone are approached. It is a good seeder, but reproduces on the whole very poorly in spite of the fact that it is quite tolerant. It is found as an admixture in the typical spruce-hemlock-balsam forest of this region.

**Picea sitchensis - Sitka Spruce.**

Sitka spruce is found from sea level to 2000' from the Naas mouth to the vicinity of the Cranberry River, occurring rather sparingly east of the Coast Range. In the lower parts of the valley, particularly in Tseaxe River valley it often reaches a diameter of 3' to 5' ft. and a height of 120 to 150 ft., while its average height and diameters run 100 to 125 ft. and 25" to 40" respectively. This spruce attains its best development in rich moist river bottoms and is usually associated with cedar, lovely fir and hemlock. On the whole it is reproducing poorly throughout its range, being unable to withstand the competition of hemlock and fir.

**Abies lasiocarpa - Alpine or Balsam Fir.**

The term "Alpine" when applied to this species in this region is somewhat confusing, because the tree does not confine itself to alpine situations. In the Upper Naas and Ground Hog country it occurs from 1000' to timberline, which is usually 4000', while in the Lower Naas and particularly west of the Coast Range it seeks the higher elevations almost entirely. On the better sites this tree averages 20 to 40 inches in diameter and 80 to 120 ft. in
height, growing gradually small and more poorly developed as timber line is approached, where it becomes a stunted wind-torn cripple.

In the Ground Hog country it composes fully 60% of the forest and is an important tree throughout the area. It suffers markedly from snow break and fungous diseases, the latter defect amounting 10%. The tree was found growing on a variety of soils and sites, doing best on well soiled moist benches. Often pure stands of considerable area were encountered in the higher elevations and also on the lower terraces. It is a moderately good seeder and withstands quite successfully the keen competition of the ever-present hemlock.

*Populus trichocarpa* - Black Cottonwood.

Black cottonwood occurs in extensive pure stands in the lower valley in the vicinity of Gwinahaw adjacent to the river and on islands in the stream. It is essentially a tree of low moist situations, although small groups and individuals were found high up on well drained slopes and benches apparently entirely in contradiction to its usual habitat. Sandy river bottoms and bars afford the best conditions for its development, where it often reaches a diameter of 5 to 6 ft. and a height of 80 to 120'. It is the most rapid grower of any species found and reproduces splendidly on moist sandy bottom lands.

*Pinus contorta* - Jack Pine.
In the region under consideration, jack pine is essentially a tree of lower elevations, which is unusual. It is not found above 2000' and seldom above 1500', generally seeking the dry benches, ridges and flats where the soil is poor, shallow, and rocky. The species is found throughout the area south of the Blackwater River and east of the Coast Range. Some quite extensive pure stands were found which had reached the tie size, but generally it exists in small groups and patches and runs from 8 to 12" in diameter. As is well known, fire produces conditions suitable for its reproduction by opening up the crowns and exposing the mineral soil. Lodgepole, together with aspen forms the usual type which temporarily restocks the burned areas.

Tsuga mertensiana - Black or Mountain Hemlock

This species occurs throughout the area from timberline down to an elevation of 3000' and is usually a stubby heavy butted defective tree of little or no merchantability. It is very tolerant, hardy and virile. Near timberline it assumes a sprawling, wind-crippled shrub form, but as site conditions become better further down the slopes, it will often attain a diameter of 20" to 30" and a fair, though very tapered height."

It is essentially a non-merchantable tree, very useful for protection purposes.

Picea mariana - Black Spruce

This tree was found principally in the Ground Hog Basin where it
finds its characteristic sites in wet bogs, muskegs, lake shores and alpine meadows. It rarely reaches a diameter of over 29 inches and averages 10 to 16, while in height it runs about 40 to 60 feet. It is tolerant, but is reproducing very poorly.

**Populus tremuloides** - Aspen.

Aspen was found east of the Coast Range throughout the area usually in composition with Jack pine on old burns. In the Tseaxe and Cranberry valleys closely grown well developed groves were noted. It seeks dry loamy soiled hillsides, but will persist on shallow rocky sites. In diameter it rarely exceeds 8 inches and in height, forty feet. This tree together with Jack pine, several species of willow, birch and cottonwood, forms the light timber cover over much of the better agricultural valley lands.

**Thuja plicata** - Western Red Cedar.

The Northern interior range limit of Western Red Cedar crosses this region in the vicinity of the Cranberry River, above which none was found. In the Tseaxe Valley and in the vicinity of Dragon Lake a considerable quantity of first class merchantable cedar is found in mixture with spruce and hemlock. Specimens five feet in diameter were found on moist loamy bottom lands, but the average diameter and height run about 30" and 120' respectively. The occurrence of this important tree was very scattering; no pure stands of any extent were found and it gradually peters out entirely below the Cranberry. It is reproducing only sparingly.

**Betula Alaskana** - White Birch.
The identity of the birches was not definitely established, but it is believed this was the chief one found. It occurs throughout the area from Blackwater River south on the lower levels and benches where the soil conditions are fresh, deep and of a loamy composition. In diameter it averages 6 to 10 inches and in height, 25 to 40 ft. On the Cranberry River and in the Lower Skeena quite extensive areas were found over which it formed the major part of the stand, but usually it occurs as a minor constituent. The reproduction is very poor on the whole.

Betula pumila, or Mountain Birch, was found along streams in the higher mountain ravines and flats as an unimportant shrub.

Forest Types

From the mouth of the Naas up to where it cuts through the Coast Range the forest naturally divides itself into four more or less distinct types; namely, the bottomland, lower slope, upper slope and alpine.

The bottomland type, lying from sea level to 1000', is a composition of the following species in the percentages as named: Sitka spruce, 25%; cedar, 15%; Western hemlock, 40%; and cottonwood 20%.

The lower slope type of forest is composed of spruce 30%; Western hemlock 50%; lowly fir 15%, and cedar 5%, and lies from 1000' to 2500' above sea level.
Between 2500' and 3500', the upper slope type is found. Its stand is made up of Western hemlock, lovely fir, sitka spruce, and a sprinkling of engelman spruce and cedar in the order of abundance named.

Above this type, lies that of the unmerchantable alpine, the stand of which is composed of black hemlock, alpine fir, engelman spruce, and a scattering of western hemlock in its lower limits. The timberline occurs usually at 4200' although this may vary in places by a few hundred feet.

East of the Coast Range the forest is not so simple in its formation, a number of sub-types coming in with the variance of local site conditions.

Speaking broadly the forest may be classified into the following types and sub-types:

1. Bottomland Type.
   (a) Temporary Burn sub-type.
   (b) Muskeg
   (c) Spruce Swale
   (d) Jack Pine flats
2. Lower Slope Type.
3. Upper Slope Type.
   (a) Muskeg Sub-type.
4. Alpine or Timber line Type.

The bottom land type proper is found below 1000' extending from the main river valleys back to the foot hills. Western
hemlock and spruce (sitka in the lower Naas and engelman in Upper) compose 50% of the stand while balsam and lovely fir, cottonwood, jack pine, cedar, and a small admixture of hardwoods make up the other half. It is in this and the lower slope type that practically all the merchantable timber is found.

Peculiar local site factors result in the production of four sub-types; namely, the temporary burn sub-type, the muskeg, the spruce swale, and the jack pine flat.

Burned areas in this locality become temporarily restocked with jack pine and poplar provided the soil is well drained. This is simply a transitory type which reverts in the course of a few decades to the original spruce-hemlock-balsam forest. The steps in the transition from burn to permanent forest are too well known to warrant repetition.

In protected swales and hollows where the soil is deep, moist, and rich in vegetable mold, quite extensive stands of pure sitka spruce are found, and they have been designated as the spruce-swale sub-type. The occurrence of this sub-type is limited to the Lower Naas and its total area is rather small.

On dry sandy benches and flats in the vicinity of the river are found areas covering a square mile or so of pure jack pine, 60 to 80 years old, which have attained a fair size and have the characteristics of a permanent stand. These areas have been classed as being of the jack pine flat type of forest and while they do not constitute a large part of the stand in any one locality, in the aggregate they are of considerable area.
The bottomland muskeg subtype is composed principally of spruce, with a sprinkling of pine and fir, and is unimportant. It occurs around the edges of swamps, muskegs, and bottomland lakes.

The lower slope type of forest east of the Coast Range is made up of Sitka spruce, hemlock, cedar up as far as the Cranberry, lovely fir and engelman spruce, between elevations of 1500′ and 2500′. It carries much of the merchantable forest and is largely accessible.

Western hemlock, balsam fir, engelman, spruce and at its upper limits black hemlock comprise the upper slope x type, which extends from about 2500 to 3500′ in elevation. It contains much timber which will one day be utilized for pulp, although under present market conditions much of it is eliminated from the merchantable class.

A muskeg sub-type has been introduced into this main type, to take care of the black spruce-balsam fir forests of the Ground Hog Basin. This type is locally important in that it contains timber which will be needed for the future mining and railway development of the region.

The alpine types, which extend from 3500′ to timber line, is made up of the following principal species: - Balsam fir, Black hemlock, engelman spruce and a sprinkling of Western hemlock in the lower limits. The timber is largely non-merchantable and is valuable chiefly for protection purposes.
Quantity of Timber.

While the quantity of timber in the Naas Valley is small for such a monstrous area when viewed from the coast standpoint, it is nevertheless very important to the future development of the region. The Upper Naas contains a vast amount of timber admirably suited for pulp purposes, which is readily accessible to projected railroad routes. When transportation becomes available the development of these pulp forests will prove an attractive commercial enterprise.

In the region explored approximately 2800 sq. miles or 1,792,000 acres of timberland, averaging 5 M. per acre, exist. The total stand is estimated at 3,354,700 M. ft. B.M. of which spruce comprises 1,870,000 M., hemlock 2,275,000 M., cedar 350,000 M., and balsam and lovely fir 2,275,000 M. Of this amount about 70% may be classed accessible, the remainder being rendered inaccessible by local topographical conditions.

In the appendix of this report are given a number of tabular statements among which is an estimate table by sections which shows clearly where the largest tracts of merchantable timber exist, but it can be briefly stated here that the valleys of the Tseaxe, Tohatin, Cranberry and Upper Naas between Neziadin River and a point fifteen miles above its mouth contain the finest bodies of timber in the region.

Agents Destructive to the Forest

Fire:
A little over 12% or 261,700 acres of the forest area have been burned over within the last seventy-five years. Figuring conservatively, it may be safely assumed that of the area 200,000 acres carried originally an average stand of 5 M. ft. B.M. per acre which would at present have a local stumpage value of one dollar per M. making a total loss of about $1,000,000 to the Crown. The losses from soil deterioration, erosion, and loss of growth which would have taken place had the stand not been destroyed are incalculable.

On the whole the burned areas are restocking as satisfactorily as could be expected under natural conditions. Jack pine and poplar, hemlock, spruce, balsam and in the Lower Naas some cedar are regenerating the burned lands with success, except in some of the higher elevations where soil deterioration and erosion have reached such a condition that young growth cannot be established itself.

In regard to probable causes for this great loss, it may be stated that careful enquiry and local observation have led to the obvious conclusion the Indian is largely responsible. A diversity of opinion exists concerning the attitude of the Indian towards fire. The local missionary, Mr. J. B. McCulloch, who has resided thirty years among the Nascars stoutly maintains that it is the carelessness and viciousness of the white man which is responsible for the Naas Valley fires. He argues that the Indian is desirous of maintaining his hunting grounds in their natural state and is therefore careful with fire. However, this statement may be
taken as coming from an ardent champion of the Indian, who is prone to lay the blame at the door of the white man. It is a well known fact that around nearly every Indian smokehouse, village, or temporary camp and along every Indian trail evidences of criminal carelessness with fire exist.

During this season my party had occasion to travel for a few days, about a half a day, behind a band of Indians and an excellent opportunity was afforded to study their childish indifference to fire hazards. They built big camp fires in dangerous places and on breaking camp made absolutely no attempt to put them out or leave them in a semi-safe condition.

The other chief cause of fires is of course the carelessness and often times deliberate viciousness of roving land-lockers, prospectors, trappers and packers. Mr. McCulloch states that about twenty-five years ago a party of gold seekers who went into the Kitsumgallum Lake Country via the Tseaxe Valley, either carelessly left a camp fire, or purposely set a fire to simplify prospecting, which ravaged the greater part of the Naas Valley in the vicinity of Aiyansh. He states that the conflagration ran from Tseaxe River to Dragon Lake, then jumped the Naas River and the shifting wind carried it down the West side to below the Schumarl River. The burn is not clean, many patches of virgin timber having escaped.
In the Upper Naas between Meziadin Lake and the Yukon Telegraph line very few whites have travelled and here the Indian, and to a limited extent, lightning are accountable for the fires which have occurred.

Avalanches and Snowslides.

In the mountainous parts of the area explored, snowslides and avalanches have done considerable damage. This is particularly noticeable in the Ground Hog mountains where through the medium of fire many slopes have been rendered favourable to slides.

In places these avalanches are extending their wrecking zones farther down the slopes each year. It is obvious that the forest mechanically pins the mantle of snow to a slope and that when it is destroyed conditions conducive to slides result. In the Ground Hog country, the gold stampedes of 1898 fired large areas and burned off the protection forests on many slopes, which are now slide-ridden to an extreme.

Wind Damage.

Two types of wind damage were noted; namely, that of ordinary wind throwing and that of local cyclones. In the vicinity of Cabin 6 on the Yukon Telegraph Line and on Nelson Creek a tributary to the White River, areas of eighty and two hundred acres have been blown flat by local cyclones. Much of this was merchantable stuff, but of course before it can possibly be removed, disease and insects will have completed the ruin.
The forest throughout the area examined has suffered from wind throwing in the usual typical manner. Individual trees, groups, and in cases sizeable patches of apparently sound trees have been toppled over, checked and broken. Around the edges of burns, it was common to find a barrier of windfalls thrown down in a jumbled mess as a result of the sudden exposure of the stand by fire.

River Work.

The sources of damage resulting from stream work, which were noted, divide themselves into two classes, first that of cutting away banks on which timber stands and cutting new channels through the forest and second that of killing the stand by deposits of boulders, silt, etc. during times of highwater. The loss from the first mentioned source is enormous in the aggregate, as the vast volume of drift and debris seem in river jams and on bars will affirm. The second class of destruction is particularly in evidence along the courses of the many swift torrential glacier streams which act as main feeds to the Naas. These streams in times of high water often break away from their regular channels and make heavy deposits of boulders, sand, silt, etc. upon the forest floor to a depth sufficient to kill the timber. The loss from this source is of course inconsiderable, when compared with some of the other destructive agencies, but in the aggregate over a large mountainous area, such as this is, it does assume sizeable proportions. It is obvious that with unregulated removal or other form
of destruction of the protecting forest cover the loss from this source would become great, as is evidenced in some European countries where protection forests have been mismanaged.

**Lightning.**

The work of this agent of forest destruction was noted in two large burns in the vicinity of Meziadin Lake and in numerous individual trees which had been struck. The combined destruction from this source is small in comparison with that of other agents, but the few burns which do exist serve as a warning of what enormous loss could result from this agent in an excessively dry season.

**Fungal Diseases.**

The loss from disease is heavy in the forests of the Naas River. Hemlock is particularly infected and in this species the defect factor often amounts to 30%. Spruce and balsam are also subject to disease varying greatly in extent in different localities. The following species of saprophytic and parasitic fungi were found on the area explored: - Polyporus volvatus, Fomes unguolatus, Trametes pini, *Laetiporus* speciosus, and *Elvingia* megaloma.

The capacity of fungous diseases for forest destruction is too well known to warrant discussion here, but it is possibly permissible to repeat that it is their slow unpretentious manner of destruction which goes assiduously on and is impossible to combat that makes it a real menace to our forests.
Insect Damage

At least two species of dendroctonus and one pissodes were in evidence during the summer. While no extensive areas were noted which had been killed by insects, many groups and individuals were seen which had been destroyed by insects. Balsam fir seemed to suffer greatest. This was particularly noted in the vicinity of Cabin 7 on the Yukon Telegraph Line where for several miles along the trail fully 25% of the balsam was dead and its bark full of characteristic borings and galleries. On nearly all the recent burns the fire killed stuff is being ravaged by insects.

Reproduction of Forest

Regeneration of burned over lands is on the whole succeeding as well as could be expected under natural conditions. The ubiquitous hemlock is found throughout its range to be the chief form of reproduction. With the exception of balsam and cedar in the Lower Naas, none of the other species can withstand the keen competition of hemlock and are usually replaced by it. The growth of this chief regenerator is slow in both height and diameter, on the average slower than that of the same species on the coast. As has been stated before, jack pine and poplar in mixture are temporarily restocking the drier poorer soiled flats and benches. All stages of the transition
from this temporary type to the original forest are to be found represented on the areas.

In the decadent and semi-decadent stands a healthy natural reproduction is coming in under the old forest, being particularly dense and thrifty where natural openings in the crown cover occur. This is chiefly hemlock and balsam with a sprinkling of spruce and cedar. Poplar, birch, and cottonwood reproduce themselves in favourable sites in a very successful manner. Particularly in the Lower Naas cottonwood is coming in on sandy river bars, islands, and bottoms. In the poplar and cottonwood stands the growth is wonderfully rapid, often as much as 4" a decade on the better sites.

Agricultural Conditions

The Naas Valley has recently received a wide and somewhat spectacular publicity as a land of phenomenal agricultural possibilities. The reason for this lies obviously in the fact that a large part of the best acreage is held by realty firms who are anxious to exploit it. Needless to say a great deal of misinformation has been circulated along with the authorized dependable facts.

The following discussion of agricultural conditions of the area investigated this season is based upon six months' observation on the ground, inquiry of dependable settlers, and a study of present and probable future developments. It is realized that the information presented here on this great subject is very meagre and incomplete.

In all there are some 200,000 acres of land in the Naas Valley
which is sufficiently well-soiled and level enough in contour to permit of agriculture in some form, practically all lying between Mezadian Lake and the Coast Range. Of this two hundred thousand acres approximately thirty-five percent can be considered strictly first class, the remainder being removed from that class by the underlying much folded slate, which breaks up the surface into a more or less regular series of parallel ridges. It is in these swales between the ridges and along stream bottoms that the best land is found.

Practically all the good unalienated land in the valley suitable for cultivation lies within the Pre-emption Reserve. The pre-emptions as surveyed this season, which represent fairly well average land conditions, contained from 40 to 80 acres first class land to the quarter section, the remainder being suited for grazing.

On the whole the Naas Valley is too broken up to permit of extensive farming; it is essentially a country of small mixed ranching, for which it is admirably adapted. The ground does not freeze to a depth of over a foot and by May 15, it is thawed and sufficiently warmed to commence cultivation and planting. The intermittent spring and summer showers are in practically all localities sufficient to eliminate the necessity of any form of irrigation. Small fruits, berries, general garden truck, tubers, root crops and hardy cereals have been raised with great success by Mr. McCulloch and a few of the early settlers. Barley,
millet and field corn are likely crops.

A considerable area of the Naas Valley beyond a doubt has soil suited for orcharding, but whether or not climatic conditions are right remains for the settlers to prove by experimentation. Several pre-emptors have this season brought in a variety of seedlings and are going ahead with the solid pioneer's faith in the country as a future orcharding community. The chief danger lies of course in the summer frosts which blight the bloom and in the prevailing strong winds which blow up river in the summer. It is believed the Naas will never become a producer of fruit for export, but beyond a doubt a limited number of hardy varieties can be successfully grown for local markets.

The necessity of feeding for five months out of the twelve largely eliminates stock-raising on a big scale. However, the region is admirably adapted for a limited stock industry.

The natural summer forage is abundant and highly nutritious. Peavine, vetches, red top, wild timothy, shepherds purse, wild celery, and a variety of fleshy annuals make up the bulk of the forage crop which at present annually goes to waste. There is every reason to believe that the summer forage will be utilized in part at least just as soon as the valley ranchers have a few acres of land cleared and are able to raise hay for winter feeding. The length of the feeding season varies with the condition of the forage, the severity of the winter, the fall of snow, and the character of the spring weather, but it usually
extends from Nov. 15 to April 10. Summer ranging of market herds will undoubtedly be carried on as soon as transportation facilities are made available. Cattle trails to high land grazing areas should some day be built co-operatively by the Forest Branch and settlers and thus make available many comparatively inaccessible lookouts and at the same time assist in converting the present annually wasted forage into meat beef, tallow, hides, mutton and wool.

Dairying is an industry for which local conditions are admirably suited. Silage and root crops for feeding purposes can be grown in abundance. Lack of ready transportation to local markets is of course at present the effective means of blocking the establishment of this business. For a few years it will have to be taken up only as a side line in mixed ranching.

In regard to the country lying above Meziadin Lake, it cannot be recommended as suitable for agricultural purposes. With the exception of small isolated flats along the main river and at the junctions of a few of the larger tributaries, there is practically no land properly soiled and contoured to permit of cultivation. This statement is also applicable to the Ground Hog country, where 10° of frost is not an unusual occurrence in mid-summer. Open grassy meadows are found throughout the area, which afford an abundance of summer feed for pack-trains and thus are of great assistance in the preliminary development of the country where the freighting in of horse-feed would be impossible.
The markets open to Naas ranchers are at present limited by the lack of transportation facilities. Prince Rupert, a city of 7000 inhabitants and the commercial centre for the region, lies distant from Aiyansh some 125 miles by water and affords the best ready market. The Granby Bay Smelting Co. employs in the neighborhood of eight hundred men in its development work at Goose Bay on Alice Arm, and is certainly ready to purchase local produce. The canneries at the mouth of the Naas, which, at present, import all their food stuff at great cost from the "outside" are in the market. Stock on foot can be driven over existing trails to Kitwanga and Kitsumgallum via the G. T. P. where there are ready markets.

With the development of the Ground Hog Coal Fields and mining properties in Alice Arm, Portland Canal and vicinity; the probable railroad construction through some portion of this area in the near future; and the markets already mentioned, there should be no great difficulty in the way of the Naas Valley farmer in the matter of disposing of his products.

Mining Industry.

The mineral resources of the region are as yet little known. The contact zone of the coast granites with the sedimentaries which crosses the Naas below Gwinahaw and extends up the Western side of the river, shows very good indications of being commercially mineralized. Several good prospects of silver, lead and zinc ores have been discovered at the head of Kinskooch River and Aiyance
Creek. Gqlena prospects have been reported in the vicinity of Lava Lake and at the headwaters of the Kitwanga pool River.

The White River country was the scene of a small placer stampede, purely local in character. About one hundred men from Stewart went in, but little work was done and very little gold taken out. Remains of old workings are in evidence along most of the creeks. At the present time, a few hydraulic leases have been secured in the best pieces of ground, but as yet no actual development work has been done.

The Stewart-Portland Canal Mining district lies thirty-two miles by trail from Meziadin Lake, and as is well known is a camp with a future. With the completion of the smelter at Goose Bay an opportunity will be afforded the mines of this district for shipping and smelting ores at a reduced cost which should be a stimulus to development.

The famous Ground Hog Coal Fields about which a great volume of misinformation has been circulated, lies at the headwaters of the Skeena, Naas, and Stikine Rivers and is estimated by the Provincial Mineralogist to cover an area of 2000 sq. miles of which 40% lies in the Skeena drainage, 40% on the Stikine and the remainder on the Naas watershed. Up to the present time the prospecting and development work has consisted merely of numerous small tunnels driven along exposed seams and of surface stripping of exposures and cut crops for the inspection of coal experts. No prospecting
No prospecting to any depth has as yet been done, but it is understood that at least one of the interested syndicates plans to conduct legitimate diamond drill prospecting next season. This investigation should form a basis for a real estimate of the value of the fields.

Other Industries and Resources.

The fishing industry is an important one to the district. It provides employment for practically all the Indians on the river and easily ranks next to mining in importance. Salmon, halibut, and herring are canned and variously prepared for market by the three canneries near the Naas mouth.

The lumber business of the region is limited to one dilapidated steam sawmill operated by the Indians at Aiyansh who cut only enough for use in the village. The canneries at the mouth of the river import all their boxshocks, and construction lumber which in the aggregate amounts to considerable. There is no reason why a small efficiently managed mill could not be established in the Naas and operated on a paying basis. The canneries and settlers would provide the market.

The hydro-electric power possibilities of the area under consideration are, on the whole, good. Many streams exist with a sufficient flow and fall and proper reservoir sites to provide power for future development. Attached hereto are copies of preliminary reports on a number of the better sites as submitted previously.
Water Power Data.

Tseaxe River Falls

These falls are situated five miles from the point of confluence of the Naas and Tseaxe Rivers. They occur in the form of a steep cascade with a total fall of approximately 15 ft. Extending below the falls for some 200 yards is a rapid with a drop of ten additional feet. A flow of lava has constricted the river into a shallow canyon-like channel from the mouth to a point some 12 miles upstream. The estimated flow in June was 100 sec. ft. The basin above the falls is of an average width of 1/8 mile.

Cranberry Falls

The falls are located on the North Fork of the Cranberry River about 7 miles from the junction of the North and South Forks. The head at the falls consists of a straight drop of 15 ft. and an additional drop of 10 ft. in a 300 yard rapid below the falls. The estimated flow in August 1913 was 175 sec. ft. The banks at and below the falls for a distance of 100 yards are perpendicular and of rock, while upstream they are very low (5' to 6') and of earth. The valley is unsuited for reservoir purposes.

Brown Bear Falls.

These falls lie about 1 mile upstream from the point of confluence of the Naas River and Brown Bear Creek, which is situated some 50 miles up-river from Aiyansh.
A straight drop of 20 ft. with a rapid of 150 yds. below, having a drop of 10 ft. additional constitute the head available. In August, the creek was very low and at this time the flow was estimated at 30 sec. ft.

The walls at the falls are of rock and 20' high. At the Falls the creek is about 20' wide.

Meziadin Falls.

Meziadin Falls are situated on Meziadin River about 1/4 mile from the point of confluence with the Naas. Meziadin River drains a lake of the same name, which is 12 miles long and averages 2 miles in width and is suitable for reservoir purposes.

The falls consist of a cascade of some 200 yds. in length, having a head of 25 ft. over which 300 sec. ft. were running in August. Below the falls the banks are steep, but above, the left bank flattens out directly from the river and extends back for a distance of 2 miles with little or no raise. The river is 60 ft. wide at the falls, and 3 ft. deep, while below the cascade it widens out 100 to 125 ft.

Vile Creek Canyon Rapids.

These rapids are some 2½ miles long and extend from the mouth of the stream, at its junction with the Naas, upstream. They lie in a box canyon, which is easily 150' deep in most places. From the head of the rapids to the foot there is a drop of some 50 feet.
Railroad Situation

Railroad charters have been applied for covering routes from Stewart to Ground Hog Coal Fields and from Nasoga Gulf near Naas Mouth to Ground Hog via Naas River.

Up to the present time, thirteen miles of steel have been laid from Stewart toward the Bear River Pass which is only 1700' in elevation, but is blocked by live glaciers making necessary the construction of an expensive tunnel. A number of preliminary reconnaissance railroad surveys have been made for Stewart to Ground Hog, but construction has been indefinitely postponed.

It is understood that Mr. L. McRae made an investigation of the Nasoga Gulf route for McKenzie and Mann and recommended against it. He condemned the route on the basis that it did not open up sufficient agricultural acreage or other resources which would provide enough tonnage and also for the reason that the cost of construction would be excessive.

At the head of the Kinsloopch River lies a pass 2250' in elevation, which one day may be utilized. It is about twelve miles distant from Alice Arm where good harbour facilities are available and is free from glaciers and snowslides.

Two other possible railroad routes should be mentioned, extending from the G. T. P. at Kitwanger to the Naas via Kitwangool Lake and that from the same line into the interior via Lava Lake.

The tourist traffic in the country is at present practis-
ally nil on account of the lack of easy transportation and proper accommodation.

With the advent of railroads, it may develop at such places as Meziadin Lake where the scenery, fishing, mountain climbing, and fair hunting combine to make it a future possible summer resort.

Game.

It is not true that the Naas River country is a hunter's paradise, as has been stated in several presumably authoritative accounts. However, the game is generally speaking, fairly plentiful.

From Meziadin Lake south black bear, timber caribou, and mountain goat are found, while of the smaller game, which is more plentiful, grouse of several kinds (sooty-blue-ruffled and spruce) water fowl in season, and rabbits exist.

North of Meziadin Lake the moose is found in moderate abundance. Grizzly and cinnamon bear have been killed in the region, but they range chiefly in the headwaters country.

Of the predatory animals, wolf, skunk, fox and wolverine are the chief ones.

Mink, marten, otter, fox (black-cross and rea), ermine, and beaver are trapped with considerable success.

The ubiquitous ground hog is slaughtered annually in great numbers chiefly by the Indians for skins for robes and for grease which is highly prized as a food. The porcupine, which is found principally in the Lower Naas and is presumably protected by statute for the succour of the hungry explorer, prospector, or
landlooker, who might be temporarily "up against it" for grub, is never allowed to pass the greedy eyes of the Indian, no matter how much food he may have on hand at the time.

A word might be said here in regard to the attitude of the Indian toward the game question. He looks upon the game of the forest and the fish of the stream as an inexhaustible reservoir of food which has been placed on earth for his pleasure, and profit alone, and which he may ravage or husband as he sees fit. Usually the prodigality of this childish race and his jealousy of the incoming white man leads him to waste ruthlessly these natural food producers. A number of instances of the criminal waste of the Indian were noted this season and two typical cases are presented to illustrate his prodigality and jealousy.

Below Macdiain River Falls, thousands of salmon rest in the back eddies and protected shore nooks on their way to the spawning grounds. A small band of Kitwancool Indians have a permanent camp here and every year they gaff thousands of salmon using only a few and leaving the bulk to rot on the banks. The foreman of the construction of the Dominion Fish Ladder has often seen a half dozen of these woods-children rush down to a favorite fishing eddy, and gaff like mad for an hour or more and then, taking a few salmon for immediate use, leave the heap to putrefy.

In September this year, one Blackwater Indian slaughtered fourteen moose near Anthony Creek, and took only the hides. He
explained his purpose as follows: "I hallo want cultus whiteman to get my moose." This ruthless waste of meat in a country where struggling pioneers have to pay twenty cents per lb. to get supplies in from Hazelton should not be tolerated.

**Means of Communication.**

The route of travel into the Naas Valley is from Port Nelson or some other cannery calling point up river by means of small gasoline launches to Aiyansh. The distance is about sixty miles and the rates are as follows:— Passengers with less than 100 lbs. baggage—eight dollars a head and freight, two to three cents per lb., depending on quantity and season of year.

The country is fairly well supplied with trails, although many are little more than blazed Indian trapping lines made over into passable foot-trails.

From Kitsumgallum on the G. T. P. twenty-five miles of wagon road has been built to Kitsumgallum Lake, from which a good horse trail extends to Aiyansh via Lava Lake, a distance of thirty miles.

The ancient "Grease Trail", over which the Indians have packed salishan grease for centuries, from the Naas to the Interior, runs from the southern end of the Pre-emption Reserve to Kitwagar on the G. T. P. via the Cranberry River and Kitwanool Lake, a distance of some ninety miles. It is a fair horse trail, having been improved recently by the Government.

Branching off from the Grease Trail at Mile 50 is a passable horse trail, 53 miles in length, extending to a cable crossing on the main Naas, about a quarter mile above the mouth of the Meziadin
River from which point travel is made by canoe up Meziadin River and Lake, a distance of 17 miles, to the trail to Stewart, which lies distant 32 miles from the North end of Meziadin Lake.

Access to the Northern portion of this country is to be had from Hazelton, from which a wagon road extends 32 miles to Cabin 1, from which a poor trail follows the Yukon Telegraph Line to Dawson City.

The Ground Hog Trail branches off from this line about halfway between Cabins 6 and 5 at a point some 125 miles north of Hazelton. The B. C. Anthracite Camp in the center of the present development work is 30 miles by trail from the branching point.

Poor trails extend from this camp down the Skeena to Jackson Camp and up-river into the Klappan and Stikine country.

On the Ground Hog Trail a summit of 5500' is crossed and it forms the chief obstacle on account of early and late snows. The usual freighting charge is twenty dollars per cwt. from Hazelton to Ground Hog and yet even at this apparently exorbitant rate the packers make very little profit.

A new trail is under construction from the north end of Meziadin Lake up the east side of the Naas to Ground Hog Basin via Cabin 6 and the Anthony-Bierness Creek Pass. With the completion of this trail a shorter and presumably better route will become available. The estimated distance from Cabin 6 to Stewart is 100 miles, while Hazelton, the present supply point, lies 150 miles distant.
Winter travel is made by dog-team over the natural water routes and freighting charges are somewhat cheaper at this time of year.

A very poor foot trail follows the Dominion Telegraph Line from Aiyansh to Alice Arm, a distance of 30 miles.

A valley wagon road is projected from Gwinahaw, the head of easy river navigation, up the east side of the Naas to the lower end of the Pre-emption Reserve.

The telegraphic means of communication and mail services have already been dealt with.

Protection and Improvement of Area.

At the present time, the management of the area resolves itself almost entirely into protection, but with the influx of settlers and increased development which this vicinity is bound to experience in a very few years, it will become a problem of many phases.

The protection force on the ground this year consisted of three fire wardens, one having headquarters at Aiyansh, covers the Naas from Meziadin Lake south; another covers the Stewart, White River and Meziadin Lake country; and the third is responsible for the Upper Naas and Ground Hog country. The two former men are under the direction of the Prince Rupert District, while the latter is responsible to the Hazelton Office. The work of these men was on the whole, creditable, consisting of patrol entirely. The first incumbent of the position of Fire Warden in the Lower
Maas was dishonest and inefficient and the local settlement, adverse to the policies of the Forest Branch, aroused by this man's actions will require years to change.

In regard to the possible improvement of the protection system, the following suggestions are presented. In a country such as this is, far from the District Headquarters, and with very poor means of communication, it is obviously impossible for the District Forester to give much personal supervision to his protection force. He is forced to depend entirely upon the integrity of his Fire Wardens whom he seldom sees, except at the beginning of the fire season. Naturally then a trustworthy non-political man with a knowledge of the lay of the country must be chosen who will perform the work assigned to him and will not, as was the case in one instance this summer, take advantage of his trust.

The present patrol force is sufficient for present needs considering the comparatively light hazard and the men and money available.

Instructions should be issued to patrolmen to post more fire notices in more advantageous places and in a better manner. This season notices were seen in many places which had apparently been "Stuck Up" hurriedly in poor shape and with no regard to their location.

It is suggested that patrolmen be instructed to pace off trails on their beats and put up simple blue crayoned mile posts, giving the distances to principal places. This minor improvement will not interfere to any great extent with the regular patrol and will be an
appreciated convenience to travelers. It will also give a series of fairly accurate points from which to locate reports on fires, improvements, etc. A well put-up fire notice should be fixed near these posts. Along this same line, it would be well to put direction signs at trail forks, and near foot-logs, fords, campsites, pastures, and cabin locations.

It is essential to have the warden realize the importance of his job and the value of the property he is protecting, and if he is a proper man he will respond with an increased efficiency.

In regard to lookouts, the country abounds in both primary and secondary station sites. Obviously, with the present available force a system of permanent primary lookouts cannot be established and it is doubtful whether the hazard will justify it for some years. There are numerous strategically located secondary lookouts which afford extensive views of the valley and which are comparatively easy of access. They are a very important factor in the protection system. A number of these have been located roughly on the map accompanying this report with the idea of suggesting further locations by local field men who know the country more in detail. A few of the principal primary lookouts have also been located which will be utilized as soon as settlement and development with their resultant hazard justifies more intensive protection.

In the matter of trails for patrol purposes, the country is fairly well supplied for present needs. With the completion of the
new horse trail from Meziadin Lake to Ground Hog, a formerly inaccessible area, containing much valuable Crown timber will have to be patrolled on account of the fact that much of the Ground Hog freighting will be done over this route. From Mile 50 on the Kitwanger trail a very poor Indian foot-trail leads up the Wespior and into the Naas via the Gwinhagees River. It is recommended that this trail be improved for horse travel in the near future as it will connect with the new Stewart-Ground Hog Trail and afford a needed patrol route. The cost of this work would be comparatively small, averaging less than one hundred dollars a mile. With the exception of this project and a few short pieces to connect up certain secondary lookouts with main existing lines of travel, no other trail improvements are recommended for the present.

The Forest Branch has absolutely no fire fighting equipment in the country and the need for at least a few tool caches is a real one. There should be tools for at least twenty-five men in the vicinity of Aiyansh, where the danger is greatest and where a supply of white labour is available. Gradually as funds become available and as settlement increases, a system of combination tool-cache-camp cabins should be built along the main routes of travel.

The need for telephone lines is at present largely hypothetical, but if settlement in the Naas continues during the next few years as it has this year, a co-operative line from Meziadin Lake to Aiyansh,
a telegraphic point of connection with the outside world, will become an essential cog in the protection system. It is useless to project other possible lines as their need lies too vaguely in the distant future.

It is recommended that the Superintendent of Dominion Telegraph Lines be asked to issue orders to the operators and linemen on the Yukon Telegraph Line and on the Stewart Line to the effect that they co-operate in the matter of fire protection. These men are stationed approximately twenty miles apart through a poorly patrolled area, which contains a vast quantity of Crown and private timber, and they are in a position to assist materially in protection with but little extra work on their part.

In regard to comparative fire hazard in the different parts of the area it can be generally stated that in a country like this, with its widely scattered unstable population of roving Indians, pre-emptors, trappers, prospectors and land exploiters, the real value of the forest is held very lightly. The prospector sees in fire a means of easily clearing brush and exposing the formation. The pre-emptor in this northern country fires his unprotected slash in the driest, most windy times and usually cares little how far the blaze runs. It might be stated here that this mx season there was an absolute disregard among the Naas settlers for the fire laws. One old timer casually remarked that he took a delight in "dropping a match and seeing the Red Boy ramble up the mountain." The packer and Indian seldom give a second thought about the safety of their camp fires.
Obviously steps must be taken to educate the local public in the needs of fire protection. Habitual offenders against the fire laws should be made examples of. Fire Wardens should work with the settlers and endeavor by good service to secure help and co-operation.

It is suggested that the District Forester on his inspection trips give talks on protection and the work of the Forest Branch in general before the Naas Valley Improvement Club, an organization of representative settlers. This should tend to stimulate co-operative public sentiment, which is indeed badly needed in the Naas. It is further suggested that the District Forester request local missionaries to give talks to the Indians in their native tongues on fire protection and the policies of the Branch. It might be advisable to post a few notices in the Nascar language in the villages. The Dominion Forest Branch has taken up the practice of appointing leading Indians temporary Fire Wardens with a nominal badge and presenting them with an attractive badge. This idea should work in the region under consideration.

The need for ranger stations is not pressing, but steps should be taken to provide for the time when they will be essential to administration. Practically all the best sites, on which hay and vegetables for ranger use could be raised, are now held by private parties. Detailed information could not be secured in a reconnaissance of this sort sufficient to fix accurately the location of needed ranger stations; however, a number of locations have been designated on the map suggestive of where stations should be.
be in the near future.

Forest Reserves.

The greater portion of the area covered by this season's reconnaissance, owing to its roughness, its heavy stand of timber, and lack of soil suitable for agriculture, is chiefly valuable for forest purposes, in fact much of it can be classed as absolute forest land. A large part of the upper slope type and all of the alpine type is strictly protection forest and the preservation of this cover must be maintained if excessive erosion, snowslides, and floods are to be avoided. In the Ground Hog and Upper Maas country the deleterious effect of destruction of protection forest is sadly boldly in evidence. The contention that a vast acreage of land which is now under heavy timber should be classed as agricultural, if its soil is good, seems ill-founded for the reason that the great expense of clearing is not justified by the present market value. It should be noted that much of this land immediately along rivers, when cleared of its forest cover is liable to be rendered non-agricultural by stream work.

The establishment of a forest reserve in this country where over nine billions of merchantable timber exist would have for its primary object the protection and conservative harvesting of the timber crop. The conservation of a supply of timber for future local development is not a real factor in the question because the country will never support a large permanent population; it is
essentially one suited for timber growing. The great ultimate objects of placing this area in forest reserve are to secure the protection of the many steep slopes in which this country abounds from excessive erosion, the maintenance of an even water supply for lakes and rivers, and the establishment and protection of a second crop after the present stand is removed.

Under present conditions the inhabitants of this region do not know the status of vacant Crown lands. They are prone to regard it as a vast wilderness of forest and mountains, which is hardly worth protecting. The mere establishment of a reserve even if no additional protection is given, would cause people to be more careful. Land speculators are pushing further north each year and are securing, often for illegitimate exploitation, the alienation of lands which are chiefly valuable for forest purposes.

It is recommended that the entire area covered by this year's reconnaissance be placed under forest reserve with the provisional clause that all lands lying within the area, which upon examination are found to be chiefly valuable for agriculture, shall become available for pre-emption. Accurate boundaries of the proposed reserve cannot be described in detail for the reason that the area is bounded largely by mountain ranges and indefinite country of a type which does not contain conditions sufficiently pronounced in character to afford delineating lines. It is believed that this area will ultimately become a part of a larger forest reserve.
Detailed Discussion of Area by Sections.

The magnitude of the area and the diversity of its timber and agricultural resources make it necessary to divide it into ten sections in order to reduce the information collected to a useable and convenient compass. The division is along lines more or less arbitrarily chosen for convenience in mapping and description.

Section 1 - Naas Valley - Coastal Sheet.

This section comprises a total of some 147 sq. miles of country, of which 105 sq. miles may be classed as forest land, 35 sq. miles as barrens, water surface, and waste land, 5 as burns, and the same amount as being suitable for agriculture. The territory lies in a narrow U-shaped glacial valley, extending from the Observatory Inlet through the body of the Coast Range. The valley sides rise with steep slopes, broken in places by precipitous bluffs and cliffs, to the mountain masses which line either side.

The limited agricultural area lies at the north end of the section immediately along the river.

The single burned area covering some 3000 acres is about ten years old and is very probably the result of Indian lassitude. It is restocking moderately well with hemlock, spruce and balsam.

The timber is varied in quality and quantity running from 3 to 10 M. per acre on the average, with patches carrying 15 M.
per acre. An estimate of the stand in this section is as follows:

59840 acres averaging 3 M ....... 179,520 M
9500 " " 10 " ....... 95,000 M

Total .................. 274,520 M

Approximately 30% of this may be considered inaccessible at the present time and the stuff classed as accessible is on the whole difficult of logging. The stand consists of hemlock, spruce, balsam, cedar, and cottonwood in the named order of abundance. Most of the merchantable timber lies in the bottom land and lower slope types where fully 70% is of sawlog size, the remainder being second growth suitable for pulp. As the elevation rises above 2000, the timber becomes more of a pulp size. Some fair piling and cedar poles are found.

It is very probable that saw and pulp mills will be located at the mouth of the river because suitable sites, harbour facilities, power, water, and a vast supply of raw material are available.

Summary of conditions.

<table>
<thead>
<tr>
<th>Description</th>
<th>Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-statutory timber land</td>
<td>59840</td>
</tr>
<tr>
<td>Statutory</td>
<td>9500</td>
</tr>
<tr>
<td>Burned area</td>
<td>3240</td>
</tr>
<tr>
<td>Barrens - water surface</td>
<td>21910</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>94,490</td>
</tr>
</tbody>
</table>

Section II. - Lava Lake and Naas Valley Sheet.

The Naas Valley from T.I.K 40905 to Zoul Zap Indian Reserve and the Tseaxe Drainage from its head to an East and West line drawn from through the north boundary of the Zoul Zap I. R. are included in this section which has a total area of some 275 sq. miles.

There are 39,780 acres of timberland varying an average stand of 4 M. and 36,720 acres running 10 M. to the acre, which make a total of 710,910 M. B. M. Of this total estimate practically 30% may be considered inaccessible. Practically all of the accessible merchantable timber lies below an elevation of 2000' although in certain favoured gulches it extends to 3000'. In the Upper Tseaxe Valley in the vicinity of Lava and Sand Lakes the best body of spruce and cedar found on the entire area is located. Although some 18,560 acres of these timbered lands are held privately and include much of the best stuff, there yet remains a considerable area unalienated which should be marketable in a comparatively few years. On the lower flats and benches a good clean growth of spruce, cedar, and hemlock averaging 34" D.B.H. and running often in excess of 20 M. per acre is found. As the elevation of the merchantable timber zone increases the timber becomes more of a pulp and tie size.

In the Naas Valley proper exists quite an area of first class cottonwood suitable for pulp, which is held largely as pulp leases. The bottomland and lower slope types chiefly make up the stand.
About 15,480 acres have been burned over during the last twenty-five years, purely the result of Indian carelessness and criminality on the part of prospectors. In 1912 in the vicinity of Lava and Sand Lakes a party of prospectors ravaged over 2000 acres of timberland, much of which carried over the statutory amount.

The area suitable in contour and soil for agricultural purposes may be roughly estimated at 10,900 acres of which nearly all lies along and adjacent to the Naas River. Much of this land carries timber in excess of the statutory limitation, but it is safe to predict that within a very few years active logging will clear away the stand and make it available for pre-emption. Here a general statement applicable to the entire Naas might be made to the effect that all lands when logged off, should be reserved from purchase or lease until properly examined and classified.

The final classification of the area is as follows:

<table>
<thead>
<tr>
<th>Description</th>
<th>Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Timber land - statutory</td>
<td>36,790</td>
</tr>
<tr>
<td>&quot;         - non-statutory</td>
<td>39,780</td>
</tr>
<tr>
<td>Burned over lands</td>
<td>13,490</td>
</tr>
<tr>
<td>Barrens waste and water surface</td>
<td>84,830</td>
</tr>
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<td>Total</td>
<td>174,890</td>
</tr>
<tr>
<td>Agricultural land</td>
<td>10,920</td>
</tr>
</tbody>
</table>
Timber Estimate

36,790 acres averaging 15 M
39,780 " " 4 M

551,850 M
163,120 M
710,970 M

Section III. - Aiyansh and Dragon Lake Sheet.

This portion of the Naas Valley, bounded on the north by an east and west line, crossing near the mouth of the Gwinadal River and on the South by a similarly drawn line cutting the north end of the Zoul Zap I. R. and shut in on the East and West by high mountain ranges, contains the bulk of the settlement. Nearly all the present occupied pre-emptions are located in the southern end of the Pre-emption Reserve which extends onto this sheet and in addition some 450 Indians reside in the villages along the river.

The agricultural land area is roughly estimated at 42,500 acres of which possibly 25,000 may be classed as first class. The reason for this striking reduction lies in the fact that the valley floor is broken up repeatedly by slate ridges which vary from the sharp steep sloped sort to the rolling gentle sloped type. These slate ridges are poorly soiled and fit only for grazing. Some 14,360 acres of Indian reservations are included in this section and they contain much of the best agricultural land.

The usual spruce, hemlock, balsam, and cedar of the lower slope and bottom land types comprise largely the merchantable stand.
Jack pine flats varying in extent are found. The Crown still retains the ownership of the bulk of the merchantable stuff in the vicinity. Some 12,800 acres have been staked and surveyed as timber limits, but on the whole they are poorly timbered. In all there are some 75,000 acres of timberland, carrying a total stand of 549,510 M.B.M. of which 30% may be classed as inaccessible, the remainder being isolated by unloggable slopes. In the vicinity of Dragon Lake and around Ginhamock Lake, there are fine stands of spruce.

Fire during the last fifty years has burned over 40,360 acres of what was once largely merchantable spruce and hemlock forest, as is evidenced by the numerous patches of virgin timber which have escaped destruction.

The burns are being restocked by the temporary jack-pine-poplar type over much of the area, while in places hemlock and spruce reproduction form a dense mat.

<table>
<thead>
<tr>
<th>Summary of Conditions</th>
<th>Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Timberland statutory</td>
<td>45610</td>
</tr>
<tr>
<td>&quot; non-statutory</td>
<td>29470</td>
</tr>
<tr>
<td>Burned areas</td>
<td>40360</td>
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<tr>
<td>Barrens and water surface</td>
<td>61320</td>
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<tr>
<td>Total</td>
<td>176760</td>
</tr>
<tr>
<td>Agricultural lands</td>
<td>45490</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Timber Estimate</th>
<th>M. ft² B.M.</th>
</tr>
</thead>
<tbody>
<tr>
<td>29420 acres averaging 3 M</td>
<td>88410</td>
</tr>
<tr>
<td>45610 &quot; &quot; 10 M</td>
<td>456100</td>
</tr>
<tr>
<td></td>
<td>544,610</td>
</tr>
</tbody>
</table>
Section IV. Kinskooch - Cranberry Rivers Sheet.

This sheet includes the drainage areas of the Kinskooch, the Techetin, and the Gwinhadal Rivers, typical glacier fed streams flowing into the main Naas from the west; the major portion of the Cranberry watershed which is the principal eastern tributary; and a small portion of the headwaters of the Seaskinnist River, making a total of 493,000 acres.

The area of statutory timber land embraced in this sheet is estimated at 103,680 acres, which carry an average stand of 7 M. ft. B.M. making a total of 725,760 M. ft. B.M. of which 80% is accessible to future lines of R.R. transportation. There are in addition to this some 189,180 acres of timberland under-running the statutory amount, which carry 567,540 M. ft. B.M. of which about 60% may be considered accessible. The latter area includes much upper slope and alpine forest, which cuts down the average stand per acre.

Practically all the present day merchantable "stuff" is found in the bottom land and lower slope types and consists of spruce, hemlock, balsam and a sprinkling of cedar. There are 17,600 acres held as timber limits, and they contain much valuable timber.

This section has suffered more from the ravages of fire than any other portion of the area explored, there being a total of 90,910 acres burned over during the last 75 years. The old Grease Trail has for centuries been a main route of travel and
the forest land along its route has been fired unmercifully. A large part of the Kinshooch and Gwinhalal River valleys have been devastated by fire and aside from the loss of much valuable timber, the erosion along these torrential streams has been greatly augmented. It is not unfair to assume that the childish prodigality of the Indian is largely responsible for the fire damage in this section.

On the whole the burns are restocking fairly successfully with hemlock, balsam, and some spruce. Jackpine and poplar thickets occur on these areas in all stages of transition. Cedar has here reached its northern interior range limit and its reproduction consists only of very scattered individuals.

The percentage of barrens, water surface and waste land runs high, there being an estimated total of 109,290 acres. Much of this alpine country produces an excellent forage crop and could support a large number of stock for a few months in summer and early fall.

Agriculturally, the area is important, it being roughly approximated that there are 65,270 acres capable of some form of cultivation. In common with the lower Naas, the land is broken up considerably by the surface folds of the underlying blockslates which greatly reduce the amount of first class arable land.

Some 84,500 acres have been surveyed for purchase and with the usual cupidity of the typical land exploiter much of it is now in the market as fruit lands, while in reality it consists of heavily timbered, poorly soiled hemlock ridges.
Summary of Conditions

Timber land statutory

Timberland non-statutory

Barrens, waste land and water surface

Burned area

Total

Agricultural land

Timber Estimate

103680 acres averaging 7 M.

189180 " 3 M.

Section V. Brown Bear Creek - Naas - Flat River Sheet

There are roughly some 703 sq. miles of territory lying along the main Naas between the White and Cranberry Rivers and extending from the Coastal Range on the west to an arbitrarily drawn eastern boundary about 30 miles east of these mountains.

The stand is conservatively estimated at about one and a half billion ft. of which easily 70% can be put on the market as soon as transportation becomes available. There are 140,750 acres of statutory timber land carrying an average stand of 6 M per acre and 191,160 acres running about 3 M per acre, which make a total of 331,310 acres of timberland. Less than 2000 acres have been staked as timber limits and some 18 sections are held privately as purchase lands.
As usual in this region the merchantable forest is found chiefly in the lower slope and bottom land types and consists principally of balsam, hemlock, and spruce of fair size. The timber on the whole is best suited for pulp purposes, although some sizeable tracts of saw log stuff are found.

Fires have destroyed a little less than 45,000 acres of forest land and it is safe to say the responsibility may be laid about equally against Indians and whites. The regeneration consisting of the ever present hemlock with spruce, balsam, and Jack pine in mixture, is of average success. The burns as mapped are not absolutely clean, patches of original forest varying in size from one to several hundred acres having escaped, but it is impossible to establish with any degree of accuracy the occurrence and fantastic shapes of these patches. They lie mostly along streams in protected gulches and ravines.

There are 39,310 acres of possible agricultural land situated along the east side of the Naas and in the Brown Bear Creek country. The contour is broken to a considerable extent by a series of low ridges and hillocks which cut down the first class land area by fully 30%.

**Summary of Conditions**

<table>
<thead>
<tr>
<th>Description</th>
<th>Acres</th>
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</thead>
<tbody>
<tr>
<td>Timber land statutory</td>
<td>140,150</td>
</tr>
<tr>
<td>&quot; non-statutory</td>
<td>191,160</td>
</tr>
<tr>
<td>Barrens, water surface and waste land</td>
<td>74,340</td>
</tr>
<tr>
<td>Burned area</td>
<td>44,260</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>649,910</td>
</tr>
</tbody>
</table>
# Timber Estimate

140,150 acres averaging 6 M. per acre \[ \text{M. ft. B.M.} \]

<table>
<thead>
<tr>
<th>140,150 acres</th>
<th>6 M. per acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>140,150 M. ft.</td>
<td></td>
</tr>
</tbody>
</table>

191,160 acres averaging 3 M. per acre

<table>
<thead>
<tr>
<th>191,160 acres</th>
<th>3 M. per acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>573,480 M. ft.</td>
<td></td>
</tr>
</tbody>
</table>

Total: 1,414,380 M. ft.

---

**Section VI. Moziadin Lake, White River - Sheet**

Some 718 sq. miles (469,648 Acres) of territory are included on this sheet which stands first in the matter of quantity of available timber; there being 1,659,510 ft. B.M. standing on 346,250 acres of forest land, of which 209,920 acres may be classed as statutory. The stand consists mainly of hemlock, balsam and spruce in the named order of abundance. It is mainly of pulp wood size, although patches of sawlog stuff do exist. Some 19 sq. miles have been staked as timber limits.

The arable land consists of a long narrow three-fingered strip, embracing 35,920 acres, lying along the main Naas River, around the lower end of Moziadin Lake and in the valley of the White River. Some 53,440 acres are recorded on the latest blue-print as having been surveyed for purchase and fully 60% of it carries timber in excess of the statutory limitation. Much of this purchased land is unfit for agricultural purposes and is chiefly valuable for forest purposes.

In the neighborhood of 21,910 acres have been laid waste by fire within the last 75 years.

Lightning has been the cause of considerable damage and, aside from its destruction of individual trees, has been known to have set two fires which, together burned over about five sq. miles. Along the
route of the new trail now being constructed from Meziadin Lake to Ground Hog Basin many fires have been purposely set to clear away the brush and presumably to simplify construction. The local road supervisor certainly knew these fires were being set and yet took no steps to have the practice discontinued. Carelessness of Indians and pioneers are largely the cause of the remaining burns.

**Summary of Conditions**

<table>
<thead>
<tr>
<th></th>
<th>Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Timberland statutory</td>
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<tr>
<td>&quot; non-statutory</td>
<td>139,330</td>
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<tr>
<td>Barrens, water surface and waste</td>
<td>91,430</td>
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<td>Burned areas</td>
<td>21,910</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>459,640</strong></td>
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</table>

**Timber Estimate**

<table>
<thead>
<tr>
<th></th>
<th>M. ft. B.M.</th>
</tr>
</thead>
<tbody>
<tr>
<td>206,920 acres averaging 6 M.</td>
<td>1,241,520</td>
</tr>
<tr>
<td>139,330 &quot; &quot; 3 M.</td>
<td>417,990</td>
</tr>
<tr>
<td></td>
<td>1,659,510</td>
</tr>
</tbody>
</table>

Sections VII. Lower Gwynagases - Upper Naas Sheet.

A total of 379 sq. miles (242,560 acres) have been included on this sheet, which consists of a roughly rectangular piece of country extending along the main Naas from its forks to a point some 25 miles further up-stream.

With the possible exception of small isolated flats immediately
along the main river, none of the area is fit for agriculture. It is too broken up and poorly soiled and the slopes are generally too steep.

The forest is chiefly valuable for pulp, but fair sawlog stuff does exist on the lower flats and benches. There are 106,930 acres of statutory timberland and 86,800 acres carrying less than the statutory amount, making a total of 193,730 acres on which stand 901,980 M. ft.

B.M.

The blue print shows a total of 14,720 acres held privately as timber limits, none of which have been surveyed. The typical hemlock, spruce and balsam forest continues throughout this area, its better stands being found along the main streams on the lower slopes. As the elevation increases the merchantability decreases and in keeping with the parts of this area, the forest gradually dwindles down to a scrubby twisted cover, obviously unfit for lumber or pulp, but immensely valuable for protection purposes. The accessible timber in this region is admirably suited for pulp manufacture, there being a large percentage of balsam and spruce of suitable size, in addition to the predominating hemlock. It is believed that one day this Upper Naas country will become an important pulp producer on account of the following facts:- There is a vast supply of suitable raw material; feasible transportation routes exist; and an abundance of waterpower is available.

From a high lookout in the group of mountains just south of the Naas Forks, it appeared that good timber, broken occasionally by fire and muskeg, extends up the West Fork as far as the eye can reach.
Fire has damaged the forest to the extent of 9470 acres, which is a comparatively small loss. Hemlock, balsam, a sprinkling of spruce, and in places pine and poplar are restocking the burned over lands with fair success. Practically the only travel through this trailless country is done by Indians, who are accountable for the fire loss.

Summary of Conditions.

<table>
<thead>
<tr>
<th>Description</th>
<th>Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Timberland statutory</td>
<td>106,930</td>
</tr>
<tr>
<td>&quot; non-statutory</td>
<td>86,800</td>
</tr>
<tr>
<td>Barrens, wasteland, water surface</td>
<td>39,990</td>
</tr>
<tr>
<td>Burned over lands</td>
<td>9,470</td>
</tr>
<tr>
<td>Total</td>
<td>163,190</td>
</tr>
</tbody>
</table>

Timber Estimate

<table>
<thead>
<tr>
<th>Description</th>
<th>M.f.t. B.m.</th>
</tr>
</thead>
<tbody>
<tr>
<td>106,930 acres averaging 6 M.</td>
<td>641,560</td>
</tr>
<tr>
<td>86,800 &quot; &quot; 3 M.</td>
<td>260,400</td>
</tr>
<tr>
<td>Total</td>
<td>901,980</td>
</tr>
</tbody>
</table>

Section VIII. Blackwater - Upper Naas Sheet

This sheet includes a strip of country from the vicinity of the Yukon Telegraph Line south along the Naas to the Mouth of Mike Creek, a total of 490 sq. miles (313,600 acres). The conformation of the country is broken by box canyons in which flow torrential mountain streams. These, together with the occasional mountain spurs, which extend right out to the river and drop off
in a series of bluffs and precipices, form the chief obstacles to logging and transportation.

With the exception of a small doubtful tract of 900 acres at the confluence of the Brown and Naas Rivers, possibly a few hundred acres in the Blackwater, and scattered isolated flats along the Naas, the region is impossible for agriculture.

There are in all 218,310 acres of potential timberland of which 92,900 acres may be classed non-statutory and the remainder, 125,410 acres, statutory. The total stand is estimated at slightly less than one billion feet composed of hemlock, spruce, and balsam. About 20% is rendered inaccessible on account of the local topographical conditions.

About 10,000 acres have been burned over, during the last 75 years and, as is common throughout the region, the burns lie adjacent to Indian smoke-houses and trapping trails.

<table>
<thead>
<tr>
<th>Summary of Conditions</th>
<th>Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Timberland statutory</td>
<td>125,400</td>
</tr>
<tr>
<td>&quot; non-statutory</td>
<td>92,900</td>
</tr>
<tr>
<td>Barrens</td>
<td>84,740</td>
</tr>
<tr>
<td>Burned over lands</td>
<td>10,550</td>
</tr>
<tr>
<td>Total</td>
<td>313,600</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Timber Estimate</th>
<th>M. Ft. B.M.</th>
</tr>
</thead>
<tbody>
<tr>
<td>92,900 acres averaging</td>
<td>273,700</td>
</tr>
<tr>
<td>125,410 &quot; &quot;</td>
<td>752,460</td>
</tr>
<tr>
<td></td>
<td>1,031,160</td>
</tr>
</tbody>
</table>
Section IX. Southern Ground Hog Mt. Sheet.

In all 420 sq. miles (268,300 acres) are covered by this sheet, which includes the narrow valleys of the East Naas to a point some five miles above Anthony Creek, and Mooney or Little Naas Creek, as far up as Cabin #7, the main Naas as far as the Mouth of Blackwater River, and the Southern portion of the Ground Hog country.

The merchantable timber is confined to a narrow strip along the main stream courses and extending up the slopes to an elevation of about 2500'. There are 39,960 acres of statutory timberland and 194,260 acres carrying an average of 2 M. per acre, making a total estimate of less than a half billion ft. which is practically all pulp wood stuff.

The area cannot be considered as agricultural because aside from its rough topography, it is climatically unfit. The operators along the telegraph line and the Indians near Blackwater Lake each year make an attempt to grow a few early vegetables, but usually have them cut down by summer frosts, which are not of uncommon occurrence. Hay crops and possibly a few hardy "cereals" could be matured.

About 11,000 acres have been burned over during the last 20 years and they are in restocking as well as could be expected.

<table>
<thead>
<tr>
<th>Summary of Conditions</th>
<th>Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Timberland statutory</td>
<td>39,960</td>
</tr>
<tr>
<td>&quot; non-statutory</td>
<td>97,130</td>
</tr>
</tbody>
</table>
Barrens, water surface and waste land 120,980
Burned over lands 10,920

Total ....... 263,990

**Timber Estimate**

<table>
<thead>
<tr>
<th>Acres</th>
<th>M. ft. B.M.</th>
</tr>
</thead>
<tbody>
<tr>
<td>97,130</td>
<td>194,260</td>
</tr>
<tr>
<td>39,960</td>
<td>239,760</td>
</tr>
</tbody>
</table>

434,020

Section X, Ground Hog Basin Sheet

This sheet includes the Skeena River drainage from a point about 5 miles up-river from the mouth of Biernes Creek to near the mouth of Moss or Kluatantam River and the headwaters and of Anthony and Panorama Creeks, which are Haas tributaries. The country is mountainous to an extreme and the valleys are narrow and steeply sloped. The whole country has an elevation of from 3500' to 5500' with the exception of a few peaks which rise to elevations of slightly over 6000' in some cases. A total area of 217 sq. miles is embraced in this section of which about half is classed as barren and waste land.

The timber on the area is estimated at about 90 millions and consists of black spruce, engelman spruce, and balsam fir almost entirely. There are some 9700 acres of timberland lying in an elongated strip along the Skeena River, which averages 5 M. per acre. The remainder of the forested area consists of dwarfed
patchy timber broken by open muskegs and marshes and dwindling out at timberline, which lies at about 4500' elevation. This timber, poor as it seems when judged from the coast standpoint, will one day be invaluable to the future mining and railroad development of the locality.

The area is entirely unfit for agriculture on account of its adverse climatic conditions, 50 to 100° of frost not being uncommon in the middle of the growing season. The wild hay crop is hardly sufficient for ranching purposes, although it does afford an abundance of summer forage.

In the neighborhood of 16,600 acres have been burned over within the last two decades and is restocking poorly to balsam and spruce.

A considerable portion of the section is subject to snowslides and their devastating influence has been materially augmented by past fires which have destroyed the protection forests on the higher slopes.

<table>
<thead>
<tr>
<th>Summary of Conditions</th>
<th>Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Timberland statutory</td>
<td>9,740</td>
</tr>
<tr>
<td>&quot; non-statutory</td>
<td>41,720</td>
</tr>
<tr>
<td>Barrens</td>
<td>70,720</td>
</tr>
<tr>
<td>Burned over lands</td>
<td>16,600</td>
</tr>
<tr>
<td>Total ............</td>
<td>138,780</td>
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</table>

<table>
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</tr>
</thead>
<tbody>
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<td>41,720 acres averaging</td>
<td>41,720</td>
</tr>
<tr>
<td>9,740 &quot; &quot; 1 M</td>
<td>48,700</td>
</tr>
<tr>
<td>5 M</td>
<td>90,420</td>
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</tbody>
</table>
APPENDIX

Brief Notes on conditions along Route of Travel from Cabin No. 6 on Yukon Telegraph Line to Hazelton.

This trip of 140 miles was made late in October with heavy packs on our backs, over the Yukon Telegraph Trail, which, at the most favorable season of the year is bad enough, but at late in the Fall it becomes little more than a streak of mud from end to end. The weather was bad, snow and rain falling nearly every day on the way out.

The following observations were made along the trail under conditions which obviously did not permit of careful work and they are presented with the understanding that they are decidedly general.

The Yukon Telegraph Trail during its course traverses the various types of forest found in the country and gives one a fairly good idea of average conditions. From Cabin 6 to Blackwater Lakes which lie in a low pass between Skeena and Naas Rivers, the forest differs in no marked extent from that of the Upper Naas, which has been previously described. When one crosses the divide into Skeena drainage, a marked increase in the occurrence of spruce is noted. Hemlock is practically absent from the stand until Poison Mt., halfway between Cabins 4 and 5, is reached. This location seems to be the crossing point of the hemlock range line. From the Skeena-Naas Divide to Poison Mt. the forest is composed of the following species in the following percents of total stand: Spruce, 50%; balsam, 40%; Jackpine
3 %; Black Hemlock, 5%; and hardwoods, 2%. The bulk of the low-land type average from 5 to 10M per acre, with patches in particularly favourable sites running easily 20 M. Below Poison Mt. western hemlock gradually increases in occurrence till in the vicinity of Cabin 3 it has reached its average importance in the Skeena River Forest, which is about 15% of the total stand.

From Poison Mt. to the confluence of the Bulkley and Skeena Rivers, the stand consists of the following mixture;—Western hemlock, 15%; Spruce, 28%; Balsam, 35%; cedar, 10%, and hardwoods 5%. Of the hardwoods, birch is by far the most important commercially, being used almost exclusively for fuel in Hazelton and vicinity, where the current price is $8 per cord delivered.

Cedar comes in about 40 miles north of Hazelton and occurs almost entirely back from the immediate vicinity of the river on the secondary benches and on the foothills, up to an elevation of 1500'.

As usual a large part of the country along this route of travel has been burned over within the last 50 years and much of it recently. The mountains which closely align the streams and often crowd them into canyons, drop precipitously down to the valley floors, affording a great draft to fires started along the trail, which have as a result often burned clear up to timber-line. Many of these areas are not restocking satisfactorily on account of the fact that the former very shallow soils covering the underlying rocks have been badly eroded and otherwise rendered unfit for regeneration.
Little or no agricultural land exists above Cabin 1, but below this point extends the valley of the Kispiox, which is already well known as a promising agricultural district.

Need for Further Exploration in Region

From interviews with packers, prospectors, trappers and surveyors, who have worked through the country lying to the north of the region investigated this year, it seems very probable that there are timber lands of considerable extent and fair quality existing in the Upper Stikine and Klappen Valleys. Landstakers are pushing further north every year and by their operations are securing the alienation of vast areas of lands, chiefly valuable for forest purposes. Mr. T. H. Taylor, B.C.L.S., reports spruce and balsam of fair quality averaging about 18" in diameter in the vicinity of the Klua-tan-tan River, and in the Dawson Creek valley, a tributary of the Stikine.

Mr. D. O. Wing, B.C.L.S. engaged during the past season in the survey of base lines in the headwaters of the Stikine and Klappen RIVERS, reports good stands of spruce and balsam in Kluayers and Stikine River Valleys.

If it is planned to explore this country, two alternative methods present themselves; namely, by dogteams leaving early in February, and by pack-horses in late May.
Three toboggans and 12 dogs would be necessary for the transport of sufficient supplies and outfit for a three men party for a season of nine months. The dogs would be used after the snow has gone for packing, each being able to carry 30 to 40 lbs. Game and fish would be relied upon largely for dog feed, which is of course the great problem.

An estimated cost of the suggested exploration would consist of the following items:

3 dog-teams, toboggans, and equipment $500.00
Grub 3 men for 250 days 700.00
Equipment and miscellaneous items 150.00
Wages of 2 field assistants 1500.00
Total $2850.00

It is believed that at least 5000 sq. miles could be covered during the season, which would roughly mean $.56 per sq. mile, a figure well within the bounds of reasonable cost. Grub for the entire season could be taken in by one trip with dog-teams, which would be impossible with a four horse pack outfit.

On account of the fact that several high passes, in which the snow comes early and stays late, exist on the route of travel, the use of horses is economically questionable. It would be impossible to get in earlier than late May and it would be necessary to be out by late September, thus cutting down the working season to 3, or 4 months. There is an abundance of horse feed during the summer.
throughout the region under consideration.

The following estimate is submitted on the cost of exploring by pack horse outfit.

4 horses and equipment $550.00
Grub for 3 men for 130 days 400.00
Miscellaneous items 150.00
Wages for 2 field assistants 750.00

$1850.00

The short working season enforced by the use of horses would probably limit the area explored to about 5000 sq. miles.
<table>
<thead>
<tr>
<th>Section</th>
<th>Statutory Timberland</th>
<th>Non-statutory timberland</th>
<th>Agricultural Land</th>
<th>Burned over areas</th>
<th>Barrens, watersurface, Waste land</th>
<th>Total area sq. miles</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.</td>
<td>95,00</td>
<td>52,840</td>
<td>32,40</td>
<td>3,240</td>
<td>21,910</td>
<td>147.50</td>
</tr>
<tr>
<td>II.</td>
<td>36,390</td>
<td>39,780</td>
<td>10,920</td>
<td>2,460</td>
<td>31,380</td>
<td>273.25</td>
</tr>
<tr>
<td>III.</td>
<td>48,010</td>
<td>29,470</td>
<td>43,490</td>
<td>40,360</td>
<td>61,320</td>
<td>276.20</td>
</tr>
<tr>
<td>IV.</td>
<td>103,690</td>
<td>109,180</td>
<td>65,870</td>
<td>90,910</td>
<td>109,290</td>
<td>770.4</td>
</tr>
<tr>
<td>V.</td>
<td>140,150</td>
<td>141,260</td>
<td>33,310</td>
<td>44,260</td>
<td>73,640</td>
<td>703.0</td>
</tr>
<tr>
<td>VI.</td>
<td>208,920</td>
<td>139,550</td>
<td>35,920</td>
<td>21,910</td>
<td>91,480</td>
<td>718.2</td>
</tr>
<tr>
<td>VII.</td>
<td>106,930</td>
<td>36,300</td>
<td>--</td>
<td>9,470</td>
<td>59,990</td>
<td>379.6</td>
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<tr>
<td>VIII.</td>
<td>125,410</td>
<td>92,900</td>
<td>9,000</td>
<td>10,550</td>
<td>94,740</td>
<td>480.0</td>
</tr>
<tr>
<td>IX.</td>
<td>99,960</td>
<td>97,130</td>
<td>--</td>
<td>10,920</td>
<td>120,980</td>
<td>480.0</td>
</tr>
<tr>
<td>X.</td>
<td>9,740</td>
<td>41,720</td>
<td>--</td>
<td>16,600</td>
<td>70,720</td>
<td>216.88</td>
</tr>
<tr>
<td>Total</td>
<td>684,690</td>
<td>967,510</td>
<td>199,050</td>
<td>261,700</td>
<td>759,300</td>
<td>4394.7 Sq. miles</td>
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</table>

This compilation is the result of careful planimetering and checking by actual counting of sectional areas.
<table>
<thead>
<tr>
<th>Section</th>
<th>Statutory Timberland Acres</th>
<th>Average stand per acre in M. ft. B.M.</th>
<th>Estimate for Statutory Area</th>
<th>Non-statutory Timberland Acres</th>
<th>Average Stand per acre in M. ft. B.M.</th>
<th>Estimate for Non-statutory Area</th>
<th>Total estimate for Section M. ft. B.M.</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.</td>
<td>9,500</td>
<td>10</td>
<td>95,000</td>
<td>59,840</td>
<td>3</td>
<td>179,520</td>
<td>274,520</td>
</tr>
<tr>
<td>II.</td>
<td>36,790</td>
<td>15</td>
<td>551,650</td>
<td>39,780</td>
<td>4</td>
<td>159,120</td>
<td>710,970</td>
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<tr>
<td>III.</td>
<td>45,610</td>
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<td>456,100</td>
<td>29,470</td>
<td>3</td>
<td>88,410</td>
<td>544,510</td>
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<tr>
<td>IV.</td>
<td>103,680</td>
<td>7</td>
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<td>5</td>
<td>567,540</td>
<td>1233,500</td>
</tr>
<tr>
<td>V.</td>
<td>140,150</td>
<td>6</td>
<td>840,900</td>
<td>191,160</td>
<td>3</td>
<td>573,460</td>
<td>1414,350</td>
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<tr>
<td>VI.</td>
<td>206,920</td>
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<td>1,241,520</td>
<td>139,230</td>
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<td>417,990</td>
<td>1659,510</td>
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<tr>
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<td>641,580</td>
<td>36,800</td>
<td>3</td>
<td>260,400</td>
<td>901,980</td>
</tr>
<tr>
<td>VIII.</td>
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<td>6</td>
<td>732,460</td>
<td>92,900</td>
<td>3</td>
<td>278,700</td>
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<td>IX.</td>
<td>39,960</td>
<td>6</td>
<td>239,760</td>
<td>97,130</td>
<td>2</td>
<td>194,260</td>
<td>4349,20</td>
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<td>5</td>
<td>48,700</td>
<td>41,720</td>
<td>1</td>
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<td>904,20</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>824,690</strong></td>
<td><strong>5,593,630</strong></td>
<td><strong>967,310</strong></td>
<td></td>
<td></td>
<td><strong>2,761,140</strong></td>
<td><strong>8354,770</strong></td>
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### Statement of Alienation of Lands in Area Explored

Roughly stated in Sr. Miles.

<table>
<thead>
<tr>
<th>Section</th>
<th>Total Area</th>
<th>Total Alienated</th>
<th>Crown Lands</th>
<th>A.P.</th>
<th>P. R.</th>
<th>T.L.</th>
<th>C.L.</th>
<th>T.R.</th>
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</thead>
<tbody>
<tr>
<td>I.</td>
<td>147.50</td>
<td>20.68</td>
<td>168.32</td>
<td>1.85</td>
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<td>27.50</td>
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<tr>
<td>V.</td>
<td>703</td>
<td>21.70</td>
<td>681.30</td>
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<td>718.2</td>
<td>102.50</td>
<td>615.70</td>
<td>85.50</td>
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<td>19.00</td>
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<td>379</td>
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<td>IX.</td>
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<td>412.3</td>
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<td></td>
<td>4394.7</td>
<td>531.17</td>
<td>3863.63</td>
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<td>15.25</td>
<td>127.03</td>
<td>57.00</td>
<td>22.44</td>
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</table>

**THIS information was taken from the latest obtainable Blue-prints of the area, but is incomplete.**
### CLIMATIC Table for Vicinity of Aiyansh

<table>
<thead>
<tr>
<th>Months for 1913</th>
<th>Mean Highest Temperature</th>
<th>Mean Lowest Temperature</th>
<th>Days Fine</th>
<th>Days Showery</th>
<th>Days Wet</th>
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<td>8</td>
<td>1</td>
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<tr>
<td>June</td>
<td>63°F</td>
<td>41°F</td>
<td>19</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>July</td>
<td>63°F</td>
<td>43°F</td>
<td>21</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>August</td>
<td>55°F</td>
<td>42°F</td>
<td>22</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Sept.</td>
<td>49°F</td>
<td>38°F</td>
<td>16</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>October</td>
<td>48°F</td>
<td>34°F</td>
<td>21</td>
<td>7</td>
<td>2</td>
</tr>
</tbody>
</table>

These data were compiled by K. G. G. Taylor, B.C.L.S., who during the summer of 1913 surveyed a portion of the Naas River Pre-emption Reserve.