RECONNAISSANCE

TOBA, HOMOLKO & KLENE-A-KLENE VALLEYS

C. S. COWAN, 1914

IV

No 10117

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C O N T E N T S.

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Toba, Homolko &
Klene-a-Klene Valleys.

1017 - 1914

Scale 17.75 mi to 1 inch.

Turner L.
One Eye L.
Tatla L.
Le Blanc L.
Loon L.
Eagle L.
Hargrave L.
Bluff L.
Middle L.
Choelquoit L.
Twist L.
Tatlayoko Lake
West Branch
Grizzly Cr.
East Branch
Great Cañon
CHILKO LAKE
Waddington Cañon
Tsuciah L.
RANGE 2
Flat Mt 6000'
Seymour R.
Mansell Bay
Finger Mt 5000'
Salmon Arm
Wakeman R.
Mt Blair 6550'
Mt Lowe 6320'
Beaver Cr.
Bakhemuck R.
Mt Everard 7000'
Sim Cr.
Whashihlas Bay
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Kingcome Mts 5600'
Gwaya
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Grave Pt.
Transit Pt.
Mt Evans 6900'
Southgate R.
Waddington Har.
Watson I.
Nimmo Bay
Mackenzie Sound
Belleisle Sound
Bond Sound
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Mt Smith 7544'
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Mellersh Pt.
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Boulder Pt.
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Mink R.
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Hokish R.
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Sunderland Ch.
Wellbore Chan.
Hardwick I.
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Thurlow I.
P.O.
Lawrence Pt.
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Duck L.
Stella L.
Sonora I.
Stuart I.
Ramsay Arm
Salmon Bay
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Brettell Pt.
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Schoen L.
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Woss L.
Quadra
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Ruby Cr.
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Marina I.
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Zeballos
Crown Mt 6082'
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Sabine Chan.
Strait
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Union Bay
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Hornby I.
Quadra
CUMBERLAND
STRATHCONA PARK
Megin L.
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Zuciarte Cr.
Kyuquot Pass.
Burman R.
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Anutz L.
Nimpkish L.
Ida L.
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Adams R.
Eve R.
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Wolf R.
Doners L.
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Tahsis R.
Megin L.
Mesquiat Har.
Zuciarte Cr.
Kyuquot Pass

The Chief Forester,

Forest Branch,

Victoria, B. C.

Dear Sir:-

I beg herewith to submit the following report on the Forest reconnaissance carried on during the months of April to August in the valleys of the Toba, Homolko and Klene-a-klene Rivers.

SUMMARY OF THE SEASON'S WORK

The party, consisting of Messrs. A. W. Litchfield and G. R. Malcolm and self left Victoria on April 9th., and proceeded to Vancouver, where a consultation with Mr. G. D. McKay, the District Forester, resulted in our outfitting in Vancouver and leaving that point for the head of Toba Inlet, from where we proceeded up the Toba in a canoe, to a point I had previously decided to start from. Leaving instructions for the launch as to our return we reached a point 20 miles from the mouth, and utilized the surveyed boundaries of the timber limits located there to formulate a system of triangulation. We carried out a tour of exploration to the Glacier from which the Toba River emanates, and found on the East bank, some three miles from the head, a fine stand of timber, the property of the Crown. From here, we worked south once more, cruising Tomlinson Creek, and then made an abortive

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attempt to proceed up the north fork, but the hot weather had made the river high and the bottom land was in flood, so we were forced to return after reaching a point 6 miles north of the confluence of the North and South Forks.

We then carried on a reconnaissance of the Little Toba, a stream which carries clear water, and succeeded in getting 9 miles upstream, where the timber peters out, and the side hills come down sheer to such bare bottomland as there is. By this time, our grub was running low and our time for meeting the launch but two days off, so we packed down to the Mouth, and next day proceeded down the river, where we camped with Messrs. Burnes and Stapleton, two handloggers. We were met by Mr. Bury, who came for us under instructions from Mr. G.D. McKay, and proceeded to Lund, there to wait the arrival of Mr. J. Mitchell, who had written me. On his arrival, we proceeded to Shoal Bay, and from there to Loughborough Inlet, where we established a traverse base of 3900', and triangulated the Inlet at a point suitable for the laying of a submarine cable for telephone purposes. A wire from Mr. McKay was received and owing to the miswording by the telegraph operator, it appeared that our party of three were to immediately go to Vancouver, only to there find our mistake. Returning to Lund, we reached the Head of Bute Inlet via the launch North of Lund, and started on a very eventful trip.

My previous knowledge of this river made me anxious to get up as far as I could at once, and start work from the

Mouth of some known creek. We hired an Indian to help us pole our provisions up the river, but a hot sun was bringing the river up rapidly, and he refused to come further than Bella Coola Creek. So we let him take his own canoe down and cached our canoe for the return journey. We cruised and plotted out the river course till we arrived at the mouth of Waddington Canon, which proved to be an effective barrier to our further progress. To reach this point, we had to cross a stream coming from a huge glacier, two miles from the main river. This offered very little opposition to a safe crossing on our journey northwards, but coming back was a very different story. The creek flows over a wide bed of boulders, and thus thus there were no trees which were capable of being fallen across. We were then faced with the prospect of waiting for low water or going without grub. Game just at this point was scarce, and the hot weather gave every indication of having come to stay, as the succeeding days proved. We then built a raft, with which we intended to get below the mouth of the stream. and land there. However, our intentions were set at naught by the strength of the river current, and an overhanging alder tree finished the work by sweeping off the crotch of the stern sweep, and we were at the mercy of the current. Shooting several of the larger rapids safely, I was in hopes that all was well, and the worst over. But the climax came when the river split into several streams, and we were swept on to a log-jam in the river's centre, and after a few strenuous and exciting moments, we all got safely on to the

main log-jam, saving two of the packs, the instruments and a belt axe. At this point, the river bed made a steep grade, and with two smaller log-jams below us, it did not look as if chances for getting away were favorable. But we set about building another raft, cutting out all the logs we would, and binding them together with strips of a canvas ground sheet and a packsack. We slept on the log-jam, and during the night the river rose and carried out the two jams that looked like wrecking our forlorn hope of getting onto the main shore. We set off next morning at four, and after going down stream a couple of miles, we wrecked the raft on to a favorable log, and from there made shore, first swimming a side stream of about 150' in width.

We had so far saved our field notes, instruments etc., and now set off for the mouth, 36 miles south. We had some considerable difficulty in crossing the Eckheimick, or as it is locally named, the Ice River, but surmounted all obstacles by a little perseverance. We reached the river mouth on the fifth day from the time of setting out on the first raft, and in order to reach the Indian Village, we were forced to resort to raft building again. We got across safely, and landed at the Village, where we had a supper of dried oolichanns, and then set out to cross the Inlet to Southgate River, where a logging camp was in operation. The Inlet, however, proved too rough for the little canoe we found, and we had to go hungry for another night. Next day we caulked up a flat bottomed boat, and safely got across

to the Southgate Co's camp, where we were welcomed by Mr. Traft Bernard, the Manager. After a day's rest, Malcolm and I set out up the river, to finish our work and if possible, recover what stuff we had ~~cached~~ cached on the log-jam. This latter, however, proved impossible at that stage of the water, and we had to let the outfit go. Mr. Walter Cromwell, one of the Fire Wardens, came for us and took us to Heriot Bay, from which point Mr. D. Connell took us to Shoal Bay. Acting under instructi ons from Mr. McKay, we took passage in the Cassiar for Glendale Cove, and from that point, we started on the Klene-a-Klene river survey.

Hot weather was now in full force, and the creeks were badly swollen, and it was only after 5½ days of strenuous work that we succeeded in getting our supplies and canoe up to the Canon Mouth, about fourteen miles from Tide water.

This trip up the river was divided into two stages. We first made Third Lake divide, and cruised the chain of lakes that are situated between the low range of hills that divide the main stream and the main range of mountains. We then poled, lined and waded the river till we got the canoe up to the head of the navigable portion of the river, and from there cruised up to Canon Creek, 9 miles north, where further progress was impossible. Finishing all the accessible work in this portion of the valley, we retraced our stops, and tried to cross the river. This proved to be impossible, and we had to run for it, only finding safety when we reached tide water, and hour and three quarters after starting out. From this, the speed of the current can be noted.

Later, we proceeded to Glendale Cove, and from there to Alert Bay, via the Government Launch "Geraldine R." We then took passage to Victoria, via Vancouver, thus closing the season's work.

METHODS EMPLOYED IN RECONNAISSANCE.

The compass, clinometer and aneroid were the instruments used in mapping the country. A system of triangulation was used wherever possible, and the topography was sketched in from high peaks. On the Toba River, the existing surveys sanswered for our base lines, but on the other river valleys, a paced base had to answer in absence of any known surveys. ROugh traverses were run on all the larger creeks, and were paced and checked wherever possible.

The aneroid was used in conjunction with a clinometer, the elevation establishing a base line, and the clinometer furnishing the angles of the triangle. There was unfortunately, no method of checking in the rise of the river bed, but a system of equations was made to answer the purpose. An index map was made in camp, and the contours transferred, the interval being 250 feet.

AREA COVERED

An area of 265 sguare miles, or 229,600 acres can be roughly reported, of which 175,000 acres were carefully examined. This does not include the snow and glacier covered areas. The areas were divided as follows: To Toba, 50886 acres of which 22,000 acres were timbered. The Homolko Valley survey accounts for 71,489 acres, of which 22,832 acres were heavily timbered, and 28,000 acres were lightly covered with forest growth and were considered in-

accessible for present days logging conditions. The area of 44,441 acres was contained in the Klone-a-Klene Valley; 18,604 acres being timbered. It will be some time before the timber in this valley will pay for its cost of operation; the country in general being rough and rocky. The Homolko will be a logging centre shortly, according to local reports as to the intentions of the Tide-water Logging Co., which holds the majority of timber limits in this valley under control. The areas are as follows:-

for estimate of timber on 25 T.L.s. in Toba valley see file ☒1000. by J.D. Gilmour, 1912.

VANCOUVER FOREST DISTRICT

	Toba	Homolko	Klene-a-Klene.
	Acres	Acres	Acres
Timber held under licence	23,835	22,850	16,000
Crown Timber	4,135	3,155	12,624
Total timberland	26,970	25,970	28,624
Non-commercial timber	13,123	16,670	11,571
Burnt area	320	325	1,990
Alder & cottonwood bottoms	8,014	10,625	760

(over)

Vancouver Forest District (Cont'd.)

	Toba	Bonaparte	Klaase-a-kloma.
	Acres	Acres	Acres
Waste lands (gravel bars)		17,404	
river and lakes	1,720		1,476
Open meadow & swamps	140	387	
TOTAL AREA COVERED	50,386	71,489	44,441

TOPOGRAPHY

Toba River

The whole of the country traversed during the season was of a very rough and mountainous nature. The Toba River flows through a valley that extends from 10 to 60 chains on either side of the river bank till a point 39 miles from tide water is reached. The valley from there to its source 10 miles North is practically devoid of bottomland. The river bed rises slowly at an estimated grade of 0.15% for 36 miles of its course; above this point it makes elevation faster, and is impassible for canoes. The side hills rise sharply from the bottomlands, and are but lightly covered with soil. A peculiarity of this valley is that from contour 500 to 750, heavy down timber is met with. The only explanation that seems feasible is that the

spring snowslides culminate at this point, and weaken the root holdings. Both below and above this point the timber continues.

Tributaries:

Two large tributaries flow into the Toba; the North Fork and the Little Toba.

The Little Toba - enters the main river seven miles from tide water, and carries, possibly, about 200 cubic second feet, which increases with the spring freshets. This stream must emanate from some snow fields; coming down clear and fresh. For two miles from its mouth, it makes only a moderate grade, and past this point it increases till it makes 500' in one and three quarter miles. Above this point it flattens out, and the valley is composed of alder bottom and beaver lakes , with side hills rising at a slope of 30° - 80°. Six miles above the junction of the Main and Little Toba, the timber peters out, and the side hills rise in the form of sheer bluffs, bare and inaccessible.

The North Fork

A glacial stream, carrying, at the time of our visit, 800 second feet, flows through a valley of approximately 60 chains in width, which is devoid of merchantable timber from a mile above the confluence of the two Forks. From this point, the mountains ascend in the form of sheer bluffs, and the bottomland is alder swamp and beaver meadows, which at the time of our visit, was in a state of flood. This was influenced, to a great extent

by a huge log-jam, which had "backed up" the water to a height of three feet, forcing the river to cut a new channel.

Tomlinson Creek , 5 miles above the North Fork, was cruised for 5 miles, but the valley does not carry timber of any merchantable quality or quantity. This stream contains about 60 C.F.S.

Homolko River

The Homolko, a river noted for its "dirtiness", was in flood when our party tackled it, and carried possibly 28,000 C.F.S. For some 9 miles from Tide water the West bank is a thickly timbered flat with a width of 30 - 60 chains to the side hills. This is covered with a heavy growth of cedar, douglas fir, and hemlock; which is of excellent quality and quantity. Above this point, to Waddington Canon, the timbered flats and slopes are scattered, and the side hills do not carry any good timber above an elevation of 500' - 800'. Above these elevations, scrubby fir, hemlock and jack pine occur. On the east bank, adjoining and south of Cedar River, a large well timbered flat occurs, the species being cedar, douglas fir and hemlock and spruce.

Tributaries:

The principal tributaries are: Beaver, 70 C.F.S.; Grizzly, 1200 C.F.S.; Bella Coola, 800 Cubic ft. per Second; Glacier 750 C.F.S.; and Palmer Creek 240 C. F.S. ; on the west bank and Ice or Eckheimick and Cedar Rivers on the East

Bank. Ice and Cedar emanate from the same glacier, but spread and flow round the North and South boundaries of a small rocky hill.

Klene-a-Klene River.

The Klene-aklene River, which debauches into the head of Knights Inlet, is another fast glacial stream, with a valley of 60 - 100 chains in total width. The whole of this bottom, however, contains the numerous streams into which the river splits; indeed, it is difficult to follow any one stream. About 16 miles from Tidewater an huge glacier occurs, which fills up a large valley. About 50% of the total flow comes from this mass of ice. The water flows over an enormous gravel bar, shaped like a triangle of sorts, whose base of 130 chains is on the river proper, and whose apex terminates in the glacier 160 chains from the base. From 14 mile point, a Box canon occurs, with walls from 250-500' in height, and a river bed of 80' - 100'. The west bank of this is practically of no Forest value, but the east is fairly well timbered, albeit on rough, broken and rocky country. Above the outlet of Sixth Lake, 19 mile point, the side hills become steep, but are fairly well timbered up to 1500' elevation. Heavy rock slides occur throughout this country, and keep down the averages.

Climate

The three valleys examined are in the Coast Wet Belt.

While no accurate figures are obtainable, the annual precipitation is in the neighborhood of 110 inches. Snow falls in the Toba in January, and remains generally till the beginning of March, while in the Homolko and Klene-a-Klene valleys the end of December to the end of March or the first week in April is general. From local information obtained, the snow fall on the Toba is from 1 to 3 feet, and in the two other valleys from one to 5', as one recedes from the Coast.

CONDITIONS OF SETTLEMENT

Toba River Valley

There are no settlers in any of the portions visited during the seasons' work, for the two trappers, who were "squatting" can hardly be classified in this category. While the majority of the available land is held under timber licence, yet a large part of the bottom lands carries only a light covering of merchantable timber, in various small scattered stands of 2 - 6 acres, and is elsewhere covered only by a dense coat of straight tall alder and cottonwood. Such land would, I believe, be of greater service to the province as agricultural land, than being held up by the licence holders. The soil is a silt deposit, covered with from 1" to 6" of humus, and can evidently grow everything in the way of garden truck. Potatoes, carrots, cabbage, cauliflower, tomatoes, cucumbers and squash all do equally well. These two men, Messrs. Owens and Russell, had about 4½ acres of land cleared, and had grown the above mentioned truck with success. I can

personally vouch for the quality of the potatoes, cabbage, carrots and tomatoes; all being of splendid size and quality. The drawback from a scheme of settlement to this valley is the danger of overflow, which at certain times of the summer threatens the low lands. This danger, during the past three years, however, seems to have diminished for some cause or other, and at no time does the overflow last any length of time; the water receding at night in every known case. The river is navigable for canoes and light draught gasolene launches for the whole arable length of the valley. I was given to understand that some 60 or 70 families participated in a rush to settle on this land, and numerous cabins give evidence of their belief in the ultimate possibilities of this valley. Indeed, one enthusiast took up a horse and buggy, as well as all the paraphanalia for the up-keep of a general store. However, a cruiser sent to examine the land returned the licences as timber. While this is theoretically correct, yet the bottomland may be taken from the licences, and still not reduce the timber to any extent.

The Homolko River Valley

The Homolko River Valley for 12 miles of its course carries some fair agricultural land on the West bank, with a width varying from 10 to 60 chains. The soil is the usual silt deposit, with a covering of humus varying from 2" to 8 inches in depth. Part of the area, consisting of approximately 800 acres is logged off, and has grown up in alder and willow. A

large open meadow of about 100 acres is about 8 miles from tide water, and the soil therein is of a silty nature, with a covering of black loam from 8" - 10" near the main hills, and a similar depth of humus nearer the river. The river is navigable for canoes and gasolene boats, but is rather dangerous at high water. The remainder of the agricultural soil is heavily timbered. About 1200 acres of similar soil lies south of Cedar Creek, but this country is broken up more, and also carries a heavy growth of timber.

The Klene-aklene River Valley.

The bottomland in the Klene-a-klene valley is cut up badly by the ever-changing course of the river. Indeed, the river practically flows from hillside to hillside; cutting up the whole of the bottomland into numerous islands. This practically cuts out any possibility of a settlement for some time to come.

ROCKS AND FORMATION

Almost without exception, the rock met with was granite, with occasional slips of serpentine.

Rock slides were numerous on both the Homolko and Klene-a-Klene Rivers, and as a result, the timber is not in any large consistant stand. This particularly applies to the Klene-a-klene; where rock slides have spoiled every stand of timber that was of more than ordinary forest value. These occur on the Lake portion of the valley and the canon up to Canon Creek.

While the side hills of the Homolko River above Bella Coola Creek are devoid of merchantable timber, the draws from which the tributaries to the main stream flow, are without exception, well timbered. The soil covering of the Homolko side hills is exceedingly light, hence the poor quality of forest growth. Straight bluffs render climbing exceedingly difficult and dangerous.

FOREST SPECIES

The following species were met with during the seasons' work:

Douglas Fir	Psuedotsy a taxifolia
Western Red Cedar	Thuja plicata
Sitka Spruce	Picea Sitchensis
Western hemlock	Tsuga heterophylla
Mountain hemlock	Tsuga mertensiance
Western White Pine	Pinus monticola
Balsam and White Fir	Abies Amabilis
Lodge Pole or Jack Pine	Pinus Contorta
Cotton wood	Populus trichocarpa
Mountain Birch	Betula fontinatis
Yew	Tasus brevofolia
Yellow Cedar	Chamaecyparis Nootkatensis

The Douglas Fir was encountered throughout the whole of the country traversed. This is, in general, a sound growth, and continues to an elevation of 2000' - 2500', where it becomes scrubby and gives way to other species. It is mostly found on well drained flats and side hills, and favours a Western aspect. Trees with a diameter of 8 feet were found on the Homolko River, but the average D.B.H. was 34", with an average height of 80' - 90'. Most of the fir encountered was healthy, and grew straight and clean.

Western Red Cedar. This is , in common with the Douglas Fir, and Hemlock, the species most to be met with on the Coast Range. It is, as is well known, mostly a bottomland tree, but will grow favorably on a sheltered slope where moisture conditions are favaurable. Trees vary considerably in size, specimens 10' in diameter being encountered, but the average diameter met with was 36". Maximum heights run to 140' and average 90'. The Cedar that has been logged off in the Toba and Homolko Valleys show unusually sound stumps, but occasional trees are afflicted with heart rot, dead tops, or are hollow-butted. It is often twisted as to grain, and tapers considerably at the butt. The deduction for defect of cedar logged in these valleys would possibly be 15%, which is very much lower than is usually allowed in cedar logging.

Most of the cedar encountered was mature, and ready for the logger. This applies particularly to the Homolko Valley.

Sitka Spruce This species was found growing on the bottom lands: being very scattered and occasional in the Toba, and Homolko

Valleys, and occasional stands of 5.20 acres in the Lake portion of the Klene-a-klene Valley. It was generally found in conjunction with Balsam, Hemlock and Cedar. Where a tree was isolated, it was found to be mature and of a good girth, 6 feet in some cases, but had it branches growing low. On stands of close growth, it grew straight and tall, averaging 36" and 90' - 120' in height. When growing on the side hills, it develops into a scrubby twisted tree, and would fail to class among valuable timber. Occasionally, on the Klene-a-klene, it was found up to an elevation of 1200', but rarely does it grow to any consequence above an elevation of 750' - 900'. On the shores of Fifth Lake, and in the low divide between Fifth and Sixth Lakes, a good stand of Spruce is encountered, the trees averaging 38' and 120' in height, growing straight and clean. This was the only tree stand of spruce encountered and covered an area of 9 acres.

Western Hemlock This type of tree, common to the Coast District, makes about 40% of the growth encountered. It is found growing under all sorts of conditions, in the bottomlands and on the side hills, often to the exclusion of the more merchantable timbers. In all three valleys, it is a common type, but the lower reaches of the Homolko are not covered with this tree to anything like the extent it flourishes in the portions above Grizzly Creek. It is found up to 3,500' , where it deteriorates into a scrubby twisted cripple. An average D.B.H. of 30" and 80' - 90' in height was noted during the season. For years it has not been logged,

but lately the operators are booming it in common with the Cedar, Douglas and Spruce.

Black or Mountain Hemlock. This was encountered solely as an Alpine growth, with occasional trees on the crests of rocky hills up to 1200'. As a rule, the growth does not become general below 2,000, where the tree takes possession to the exclusion of the lower types. It was seldom found growing to a size above 30" and 60' - 80' in height, and was, in general, rather of a scrubby nature. It was not found in such quantities or locations that would warrant its being noted as anything but an Alpine growth and is not adapted to the needs of the Lumber operators.

Western White Pine. This valuable timber, was occasionally encountered in the flats, favouring a rather moist bottomland. But the main growth of this species occurs above an elevation of 1000'. In the Toba Valley it occurs above 2,500 and runs in a long narrow strip all the way up the East Side; being rarely encountered on the West. On the Homolko large Pine trees were found on the flats, ~~very rarely~~ and in nearly all cases these isolated specimens were fully mature, and from 4' to 5' in diameter, with a height of 80'-130'. North of Bella Coola Creek, however, it is found above 700' elevation, and does not grow to any appreciable size, averaging 10" - 12", with a height of 80' - 100'. The bole has very little taper and carries its scale well. This wood is of first class quality, and is apparently free from any disease.

It does not make any appreciable percentage of the Forest growth, and except for the isolated cases cited, is hardly an accessible growth.

White or Lovely Fir (Abies amabilis) This is generally a sub-alpine tree, growing above an elevation of 700'. True stands were not encountered on the Toba or Homolko Rivers, it being generally found growing with other species. The Toba generally does not carry any appreciable percentage of this type. The Homolko north of Grizzly Creek has scattered balsam, as this tree is generally named. In the Klene-klene Valley, on the East shores of Fourth and Fifth Lakes it is found growing to the exclusion of Douglas Fir, and reaches a maximum diameter of 36". The average, however, is much lower, 20" in diameter Breast High and 75-100' in height. Above 2000' the White Fir, or Balsam, becomes a smaller growth, 10" - 14" and 75' is about the average. Above 2000' to 3500' it becomes as mere scrubby growth, barely growing more than 35' in height.

Lodgepole, or Jack Pine. This was found in general on the high rocky portions of the ranges, and as a second growth in the few burns that were encountered. Pure stands of this type grow on all the rocky, lightly soil-covered ridges of the Homolko and Klene-a-Klene Rivers, and occurs as an Alpine type above 3500' It grows to a maximum diameter of 10" and a height of 65'. It averages, however, 5" X 30'.

Cottonwood This type was found almost exclusively in the Bottomlands. The majority of this growth encountered occurred in the Toba Valley; growing to a maximum height of 130', with a breast high diameter of 4'. It is sometimes met on the lower elevations, but never above 500'. The average size is 20" by 80' - 90'.

Yellow Cedar This was found exclusively on the Alpine slopes, especially in the Toba Valley. It was seldom found growing larger than a diameter of 10", with a height of 50' - 80'.

Other Species Mountain Birch, Yew and Alder were encountered, of which Alder formed by far the greater percentage. It is found in the bottomlands of the Toba and Klene-a-klene almost to the exclusion of every other tree growth, and to the same extent on the bottomlands of the Homolko. A maximum growth of 24" x 80', with an average of 8" x 80' was general.

Mountain Birch was found occasionally on the Toba and Klene-a-klene Rivers, but was met with greater frequency in the Homolko Valley. It favors moist bottomland, and was often found growing on the numerous rock slides that occur between Bella Coola Creek and Waddington Canon. It rarely attained a greater girth than 14", but occasional specimens were found up to 32".

Yew was only rarely met with, growing either above 2700' or on the swampy flats. Barely a dozen trees were noticed during the entire season.

Undergrowth Dense growths of Salmonberry, willow and Devils Club were encountered in all these valleys, making back packing even more laborious than is usual. Devils Club in the bottom lands is very thick, growing to a height of 10' - 12', with a diameter up to 3 inches. Very rarely an open patch of land was met with. Beaver swamps and meadows are common in the Toba and Homolko Valleys.

Forest Types Forest conditions throughout these valleys are practically alike owing to the same climatic conditions obtaining.

Douglas Fir and Cedar Type This type is common to the three valleys surveyed, and is found on the well-drained bottomland and lower slopes of the side hills. Cedar grows to about 700' above which the Hemlock takes its place, while Fir above 1500' becomes stunted and above 2,000' is superceded by the ubiquitous hemlock. Western Hemlock is more often than not found with this type of forest, and occasionally a spruce intrudes.

Spruce, Hemlock and Balsam This type of forest was only noticed on the East shores of Fourth and Fifth Lakes, Klene-a-klene Valley. On the East bank of Fourth Lake, it was found from water level to 500' contour, and was in the form of a young forest. Half a mile North of Fifth Lake on the low divide to Sixth Lake, a stand of spruce and very mature cedar was noted, the stand extending over 9 acres. The fault of this valley is the huge rock slides which isolate the various stands.

Above the 500' contour the spruce gives way to equal

proportions of Balsam and Hemlock, continuing to 3,000' above lake level, where the timber becomes scrubby and intersperced with Jack Pine. Timberline is generally located between 55 to 60,000'.

Bottomland Type This is a common on all the lower lands, and consists of Cedar, Douglas Fir, and Hemlock, in proportions Cedar 35%, Douglas Fir 35%; Hemlock 30%. This type continues to 250' contour, where the Cedar gives way to Hemlock. Alder and Cottonwood take complete possession of all the lands that are liable to periodical inundations, as well as to the land but slightly above water level.

Spruce, Hemlock and Balsom Types This type favours a well sheltered slope where the maximum of moisture is to be obtained. It is an uncommon forest in the country cruised this year.

Quantity of Timber An estimate of the timber in the Toba River places it as 604,000,000, of which 64,000,000 is Crown property, the remainder being covered by surveyed timber licences. The Homolko Valley has 500,000,000, which is all covered by timber licence. The Klene-aklene- Valley contains 300,000,000 as far as we cruised, out of which 90,000,000 are Crown property. All the readily accessible timber on the Toba is taken up, with the exception of 64,000,000 of Crown timber, which is situated some 10 miles

North of the last survey. Other lightly timbered areas exist, cruising 8 - 10 million, which is not included in the above estimate, on account of inaccessible and rocky country.

Location of timber with reference to Ownership

Almost without exception, the timber lands in these valleys are held under licence, except the 64 million feet on the head of the Toba already referred to. The timber in the latter valley can be driven down the river, but only a small percentage of the Homolko and Klene-a-klene timber can be readily logged. It is, I understand, the intention of the Tidewater Company to construct a logging railroad to log those licences lying south of Beaver Creek and Ice River at an early date. Above these points timber is inaccessible from a present day standpoint.

Burned over lands.

Very little of the timber has been destroyed by fire in these districts. A strip of 320 acres in the Toba valley has been burned, and is growing up in alder and jack pine. Three hundred and sixty acres in the Homolko is a burn ofalate period, possibly 15 years, and has, at present, no second growth. About 1900 acres in the Klene-a-klene Valley has been so destroyed, and a thick second growth of hemlock and cedar is coming in. The burn dates 25 years. Twelve hundred acres of the burn in the Klene-a-klene would probably have carried an average of 18,000 feet per acre, Unfortunately it occurred about 6 miles from tide water, and was therefore inaccessible. The great majority of the

timber is left standing, though now of little value commercially. A light second growth of hemlock, cedar and fir is coming in on this area.

Reproduction

Reproduction over the burned areas is generally fair, hemlock taking precedence over growth of cedar and balsam. Jack pine on the rocky soil of the Klene-a-klene valley is a general type that is coming in.

Agricultural Lands

The bottom lands of these valleys is the usual silt deposit common to the glacial rivers of the Coast, and is of 3 to 10 feet in depth, and in the case of the Toba, on a sub-strata of gravel. As before noted, there has been no actual settlement of any of the districts cruised, but the difficulty in utilizing the rivers may have been a prime factor in preventing any settlement. The Homolko Valley land is, well timbered and therefore no settlement was possible before the land is logged. In the case of the Toba, on the North and West Banks
from what is known as the"Big Bend" (which can be readily noted from a glance at the map) to a point 9 miles south of the headwatersis a strip carrying a little merchantable timber; the covering being mostly alder and cottonwood. Again on the south and east banks from a point 5 miles north of the junction of the Little Toba andToba Rivers, another large flat commences and continues up to the same point as the bottomland on the opposite shore. On this bank, however, one or two larger areas of timber are

encountered. These two strips contain approximately 8,614 acres, and in my opinion would be of more actual value to the Province as a means to establishing a settlement, than being held, as they are at present, under Timber Licences. A thin covering of humus, from one to six inches, is above the silt, which has come from a granite formation. As previously mentioned, two trappers who have made their homes in this valley, 12 miles from tide water, are very enthusiastic about its agricultural possibilities and with good reason, for they can grow everything in the line of garden truck that is grown in B. C., One of them, Mr. Dave Russell, sowed 2½ acres in grass and clover for an experiment, and the result has certainly justified his belief in the land. The Homolko land, containing a total agricultural area of 6,260 acres of which 2,655 acres reaches practically from tide water to a mile north of Beaver Creek on the West bank, and 1764 acres adjoining and south of Cedar River. The remaining area is scattered as far North as one mile south of Waddington canon in parcels of 224, 228, 787 and 448 acres. Nearly all this land is either heavily timbered or, in the case of the west bank near tide water, has been logged off. The clearing on this area, in contradistinction to that of the Toba, would be expensive, slow and heavy work. The formation of the soil is the same as that of the Toba, with the exception of that close to the side hills, which is covered with a black loam from 4 to 10 inches in depth. The greater contained areas are not very liable to flood, being some 3 feet above the high waters of the hot seasons. The Klene-a-klene may be said to

contain practically no agricultural land. What there is, has been, during two years experience in this valley, has been inundated at the periodical high waters. In addition to this, the bottom is cut up by a most bewildering sequence of sloughs, till at high water, it is one mass of small islands, which would make the life of any settler very precarious indeed. There was hardly an acre of bottomland which did not show traces of being covered with water to a depth of from one to three feet during the recent hot weather.

In case of the Province taking action in the future, re the Toba River lands, it would be well to state that, in the writer's opinion, a forty acre lot would be sufficient to render a quick return from the soil, besides being of an area which would not only support a family, but would be of such an area, that clearing would loom up as something possible to accomplish. The numerous beaver swamps would require very little effort in order to free the soil from water, and in any part of the valley, a lateral 2.5 to 4' deep would practically drain the strip in which it is situate.

OTHER RESOURCES

Apart from the value of the timbered areas, there is no apparent resource, other than the possible development of Hydro-electric power. On the Toba River, 2 miles south of the glacier from which it springs, a narrow box canon is situate, and a dam constructed here, giving a created head of 40' would have

the assistance of the grade of the river, & in 30 chains, a head of 78' would be obtainable. This power would only be available in the hot weather, and it is very doubtful if such a plant would ever be worth the expense of construction. The Little Toba, a ~~w~~ clear-water stream, contrary to the main river, which carries a thick sediment of silt, could be utilized for power purposes readily. 5 miles from its confluence with the main stream, a steep gully affords an excellent dam site, and in one mile of distance an hydraulic head of 520' is obtainable. Above this point, the valley widens out at a very low grade. It is noticeable that above the areas that might be flooded by~~a~~ a possible storage reservoir, that very little timber of any merchantable value is encountered. A cross section of this tream gave 315 cubic second feet as the volume. This was at an average water stage.

Of the other power possibilities encountered, storage was not feasible, and the streams in every case depended on the run-off from glaciers. Power could be developed on Grizzly Creek, Bella Coola Creek and Palmer Creek on the Homolko, while Waddington Canon, itself, offers an excellent site for a dam, but as the country beyond was not explored, there is not sufficient data on which to base an estimate of its possibilities.

The chain of lakes in the Klene-a-klene Valley, situate on the East side, offer excellent power development opportunities. ~~A~~ A head of 650' is obtainable in 2½ miles of horizontal distance, and a dam site may easily be found. Third Lake, connected with

Fourth and Fifth Lakes offers itself as a natural reservoir, and a run-off of 240 second feet was estimated for on Mussell Creek, its outlet to the Klene-a-klene. Sixth Lake might also be utilized for Hydro-electric purposes, and a hydraulic head of 440' in a mile and a quarter is obtainable. This outlet enters into the Klene-a-klene Canon to the North.

The country has been extensively prospected, but nothing very startling has resulted from the labour so expended.

Perhaps under this heading, the salmon packing industry should also be mentioned. The Cohoe salmon run thickly up the Toba Inlet during the season, and during the months of August and September the Inlet is dotted with these miniature villages afloat.

Bute Inlet is not extensively fished, but Knights Inlet, with its cannery situated at Glendale Cove, 25 miles from the head, is a big humpback, Cohoe and Sockeye cannery. Dog salmon are also packed, and during the latter part of August, 1914, when the fish run was at its height, it took all the efforts of the cannery operators to cope with the amount of fish caught. This is the first year that dog salmon have been canned, and this helped to swell the output to what the manager expected would create a record for this cannery, even though this was not the year of the Big Run. This company also fishes concessions at Salmon and Adams Rivers, Vancouver Island, but the main catch comes from the Cove itself, and the entrance to the Klene-a-klene river. In this river, the salmon evidently reach the Lakes, and get up the Canon to their spawning grounds.

Trapping is also carried on, the Toba river Valley conceding beaver, marten and bear, while the Homolko and Klene-a-klene are also trapped, indications showing that mink, marten, beaver and bear were also the chief contributors to the fur supply. Marten from this district do not bring a good price, the skins being light in colour. Bear from the Toba are generally poor, while in the Homolko and Klene-a-klene Valleys, the skins reach a splendid condition.

GAME

Bear, black and grizzly, deer and grouse (willow) and mountain goats are plentiful in all these valleys, while in the side streams, trout are of a good size and fight well. The Toba deer were found to be wild, and hunting them became hard and careful work. Goatsabound on the mountain summits, and during the evening, when they come down to feed, it was no uncommon sight to count 6 or 8 of them on a slide. The deer in the Homolko were, in contra-distinction to their brothers of the Toba, very easily approached, indded, on one occasion, two deer followed our party for about half a mile, running ahead, and stopping to peer at us through the brush, and getting as close to us as 30 feet. Geese were also found in this valley, while wolves were thick. Cougar are reported to be plentiful also, but we only saw one track to indicate their presence. Grizzly are to be met with in the heigh-

borhood of the glaciers. One was seen near Bella Coola Glacier, which must have been ~~nearr~~ ~~22~~ 12 feet from tip to tail. Bear, wolves, geese, ducks are to be readily encountered in the valley of the Klene-a-klene, but deer are none tooplentiful. The Lakes, however, are alive with trout, running up to 14" in length. These refused to take a fly, or bait, but succumbed to the lure of a piece of red rag bound round a hook. They are of the mountain variety and are fierce fighters when hooked. In the river bar near the glacier, a by species of trout exist, and grow to 18-20 inches and 2 - 4 lbs. Grouse (Willow) were thick in all three valleys, and more particularly in the Homolko.

COST

The cost of the actual field season is as follows:-

Lodgings & meals etc. 8 men	$210.70
Launch hire	77.25
Transportation	137.00
Food supplies	147.60
Material and Equipment	16.50
Freight and Hauling	41.00
General expenses	6.00
	$636.05
Salary of self	470.00
" " two assistants	717.50
	$1,823.65

An area of 166,716 acres being embodied in this report, it will be seen that the season's reconnaissance cost a little more than one cent per acre.

Respectfully submitted,

Chas. S. Cowan.

A. R.C. E.

KLENE-A-KLENE RIVER
KNIGHTS INLET.

SCALE 1 INCH = 1 MILE

Sparsely timbered.
Straight Cañon face.
Canon Creek.
Seventh Lake
28 M
40%
D30%
D30%
Sixth Lake
1250'
Bare perpendicular Bluffs.
Gravel Bars.
Fifth Lake
Fourth Lake
Alder Bottom
Elev 1300'
Third
Gravel Bar
25 M
40% C30% D30%
Badly
Broken country
Glacier
Peak
2000'
2000'
Glacier
Boundary of Range. Elevation 6200'