

Thus there are found on this ridge a total of 39,000,000 feet, board measure, a very valuable quantity of timber in a country as widely ravaged by fire as this.

Unfortunately this timber is mostly inaccessible at present. That part lying on the plateau and on the west slopes can be easily logged into the Otauwau river three miles to the west, a drivable stream when the log-jams are cleared. The heavy timber, however, lying in the east slopes will either have to be hauled up a steep hill and thence to the Otauwau, or else across the Saulteux muskeg to the Saulteux river. This river is drivable in high water when the log-jams are cleared out. It is unfortunate that two rivers should have to be cleared out. Both of them, owing to the presence of large burnt areas in their watersheds, are subject to alternate periods of very high and very low waters. During their freshets, great quantities of timber and other detritus are carried down. This lodges at elbows and forms huge log-jams which, when the flood subsides, prove impassable barriers. They tower up ten



Photo F. McVickar, 1911.

PLATE 11.—High Water on Saulteux River, showing Log-jam.

to fifteen feet above the ordinary level. Hence considerable trouble and expense will be necessary to get these timbers out.

In or near section 32, township 70, range 4, west of the 5th meridian, is a small area of spruce about one and a half to half a mile wide. This area runs about 5,000 feet per acre over 400 acres, or approximately two million, (2,000,000) feet in all. It is spruce and cottonwood. It is within half a mile of the Otauwau river and can be easily handled when the large patch is logged.

Four miles south of this area is a larger area about two miles running 8,000 feet, board measure, per acre, or 10,000,000 feet in all. This timber is the usual spruce-cottonwood type. It is situated on a ridge three miles southeast of a branch of the Otauwau, to which it can be hauled easily.

On the western boundary of this district on the lower slopes of a high ridge just south of the big *brulé* is an area of 400 acres of spruce and lodgepole pine, which will run 5,000 feet, board measure, per acre, or 2,000,000 feet in all. This timber will have to be hauled three miles southeast down-grade to the main branch of the Otauwau. Three miles south of this, on the summit of the Otauwau valley, is a patch of 1,000 ties of lodgepole pine. These can be taken one mile southeast to the river.

These are all the timbered areas in this district. It will be seen that the accessibility of the greater part of the timber depends on the drivability of the Ottauwau river. Unfortunately, the periods of high water are irregular. No regular spring freshet occurs as in eastern streams. A flood will come and disappear within one week. Therefore, if this timber is to be used, advantage must be taken of every opportunity. This requires constant watchfulness and a state of continued preparedness which will prove costly, and render the extraction of this timber a hazardous task financially.

TABULAR STATEMENT OF TIMBER.

Type.	Area.	AVERAGE PER ACRE.			TOTALS FOR DISTRICT.		
		Ties.	Cordwood	Timber.	Ties.	Pulpwood	Timber.
		Acres.	Pieces.	Cords.	Ft. B.M.	Pieces.	Cords.	Ft. B.M.
Poplar.....	15,000		7.2			108,000	
Tamarack.....	25	40			1,000		
Lodgepole Pine.....	20	50			1,000		
Spruce.....	1,180			15,000			17,700,000
	640			10,000			6,400,000
	2,980			5,000			14,900,000
	400			5,000			2,000,000
	1,250			8,000			10,000,000
Spruce and Lodgepole Pine.	400			5,000			2,000,000
					2,000	108,000	53,000,000

NORTH SLOPES DISTRICT.

This district is bounded on the east by the east divide of Prairie creek, on the north by Lesser Slave lake, on the west by the limit of survey, and on the south by the Swan Hills proper, as evidenced by the appearance of the lodgepole pine as the prevailing type.

The characteristic topographical feature of this district is the presence of numerous spur ridges running north to the lake at right angles to the main range of the Swan hills. Between these are many creeks or rivers which have their origin in the plateau behind.

These creeks are from ten to twenty miles long. They flow for the most part in steep, deep valleys. As they approach the lake, however, the valleys open out forming small park-like glades and prairies of good land. Elbows in creeks and overflow flats bear very large cottonwood and spruce in patches. The hillsides are covered for the most part with aspen and birch in which are scattered spruce.

Between Prairie creek and Sawridge creek, behind the muskeg which borders the southeast corner of the lake is an area of some twelve square miles of poplar country which is agricultural land. This has a gentle slope up to the south. The new government wagon road runs through the centre of it. When the prairie patches are filled this will undoubtedly be settled as it is very accessible from Sawridge.

Nine-mile creek flows between high ridges right to the shore. Only about two square miles on the point can be considered as valuable land. Part of this bears a heavy stand of spruce.

The east divide of Assineau river is formed by a high ridge which extends almost to the shore. On the west side the valley is lower. Good land extends from Assineau river west, north of the twentieth base line. Between Assineau river and Nine-mile point are many acres of shore hay-lands. These also extend westerly to Wappa and indeed form a fringe all around the lake shore, westerly.

The Swan river is, perhaps, the most important stream entering the lake from the south. Its valley carries the lowland poplar type far into the heart of the Swan hills. The lower twenty miles of this river, from Wappa to Swan Creek, has prairie patches on either side from the water. There are some twenty-five square miles of prairie or semi-prairie here.

Above this area are patches of heavy cottonwood and spruce in the river flats, for twenty-five miles up-stream.

West of Swan river the spur ridges running to the lake shore are absent so that, outside of the prairie patches, there is an immense area of clay loam land covered with poplar. This country stretches from Swan river westerly to the end of the lake. Lack of time prevented an examination of this area, but there should be at least 360 square miles of arable land between the lake shore and the hills.

East of Swan river lies the so-called north 'shield' of the Swan hills described before, which, though not agricultural, owing to the roughness of the country, possesses all those elements which go to make up the finest soil.

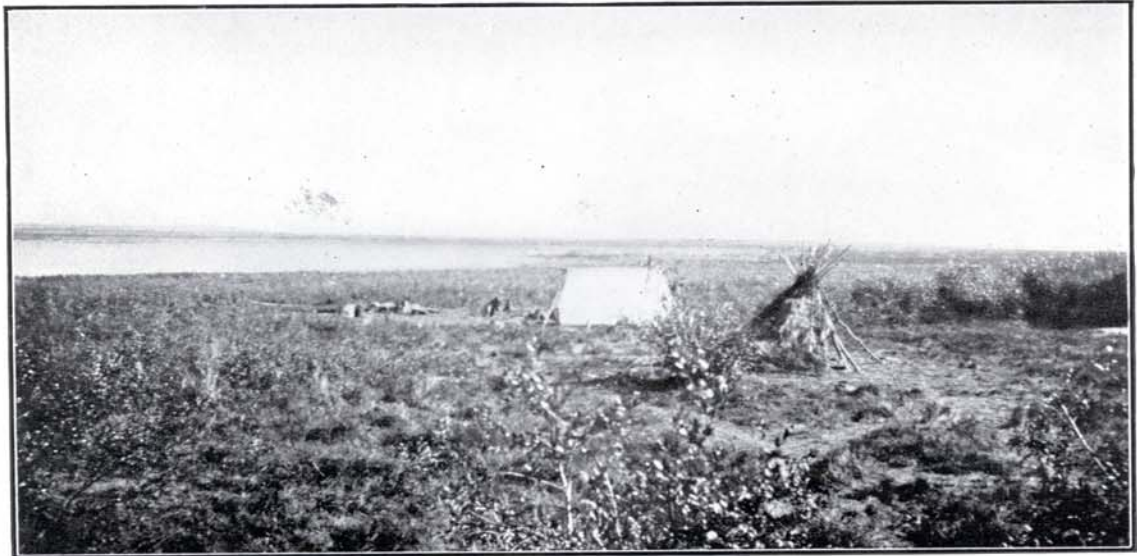


Photo F. McVickar, 1911.

PLATE 12.— The Narrows, Lesser Slave Lake, showing Hay-meadows.

Four main timber-types occur in this region:—

1. Birch.
2. Poplar.
3. Muskeg.
4. Spruce.

The birch type is hardly separable from the poplar, into which it blends. It is found only in isolated localities in small patches, where soil and exposure conditions are suitable. Examples of this type may be seen on the lower slopes of the ridges near the mouth of Nine-mile creek.

The poplar type covers all the northern ends of the spur-ridges coming from the main range. The trees are from three to fourteen inches in diameter at breast-height, with an average of about eight inches. Stands vary in yield according to site conditions; defect, as elsewhere, is bad. The average yield is that worked out above, viz., 7.2 cords per acre. East of the Swan river there are some 135,000 acres of this type within the boundaries of this district. This is a temporary type, the

result of fires in times past. Reproduction of the climax type, i.e., spruce, occurs wherever the humus and light conditions allow. Two rotations will see the spruce again dominant, if fire is kept out.

Muskeg occurs only in small patches. The largest is at the southeast corner of the lake. It occupies an area of some five square miles along the water-front. The plateau between Swan creek and the Assineau river is burnt muskeg. Other small plateaus at the headwaters of the various creeks rising in this district are largely muskeg, all burnt by the great fire described before.

Many patches of valuable spruce timber occur in this district.

Small tracts along Prairie creek will total five million feet in all. This creek is drivable in high water, so that this timber should be fairly accessible.



Photo F. McVickar, 1911.

PLATE 13.—Spruce at Ninemile Point.

The largest quantity of timber, and that, too, the most accessible, is near Nine-mile point on Lesser Slave lake. There are some five areas of timber here. Three of these are at the mouth of Nine-mile creek. The area nearest the point is situated on an alluvial flat formed by the creek. It is heavy spruce and cottonwood, extending over some 183 acres and running to 20,000 feet, board measure, per acre, or 3,660,000 feet in all. Behind it is an area of a swampy nature, mostly tamarack and

black spruce pole growth; it contains, however, 2,000 feet, board measure, per acre of log timber. There are 96 acres of this, or 192,000 feet in all. The third area is behind the second. It is on the lower slopes of a ridge. The timber here is small-size spruce and tamarack, running 5,000 feet, board measure, per acre over 162 acres, or 810,000 feet in all.

These three areas will, therefore, total approximately 4,662,000 feet, board measure. The farthest haul from the lake required to log this timber would be about one and a half miles.

Some two and a half miles west of Nine-mile point are two other areas close together, one on the lake shore, and the other on the lower slopes of the ridge just behind. These two areas are of the same type approximately. They will run 15,000 feet, board measure, per acre. There are about 600 acres here, or 9,000,000 feet in all.

This is also an ideal logging proposition. One road about a mile long through the centre of the tract would suffice to bring all this timber to the lake shore.

The fifth area is very much larger than the others. It is situated on two ridges, one forming the divide between the two branches of Nine-mile creek, and the other separating the west branch from Canyon creek, which flows into the lake about six miles west of Nine-mile point.

This area parallels the lake about one and a half miles back from the shore. It is a rough quadrilateral in shape, about three and a quarter miles long by two miles wide. There are approximately 4,200 acres in the area.

The timber is spruce and cottonwood on the ridge slopes, and spruce and poplar on the tops. The yield varies according to site conditions: samples show timber running from 12,000 feet, board measure, to 30,000 feet, board measure, per acre. Putting the average at 15,000 feet, board measure, per acre (a conservative estimate), this area contains 63,000,000 feet, board measure.

At least three main roads will be required to log this timber, one down each branch of Nine-mile creek and one down Canyon creek.

The shore area around the lake will prove ample for the needs of settlers for some time to come. Therefore, the nearest market for such a quantity of timber will be Athabaska Landing. Inasmuch as this timber is not over-mature yet, it will probably be better to let it stand for some time, until a local demand will require it. This is sure to come in the near future as the country fills up.

About two miles up the Assineau river and a mile west from it is a small area of young timber, spruce and poplar. There are about 600 acres here which will run 5,000 feet, board measure, per acre, or 3,000,000 feet in all. These can be driven down to the lake in high water, or hauled direct two miles.

At the foot of Auger bay, about three miles west of Assineau river is a crescent-shaped area of spruce, with 10 to 15 per cent of tamarack. This area is about three miles long by one mile wide. It fringes the shore sloughs at the point. This timber will run about 12,000 feet, board measure, per acre, or approximately 23,000,000 feet in all; it is practically on the shore, and therefore very handy.

The next timber in this district is to be found on Swan creek. There are five areas here, remnants of a stand which once clothed the entire valley.

Three of these are on the north slopes of the valley and two on the south.

The timber on the north nearest the Swan river has been called Area No. 1. This area is situated on the slopes of the ridge about half a mile back from Swan creek at its nearest point. It is surrounded on all sides by a recently-made *brulé*, the result of the fire of 1910, which burnt much valuable timber. This area contains 665 acres of spruce and poplar.

Area II is next up the creek on the north side. It contains some 570 acres of the same type.

Area III is farthest up the creek on the north side. It covers some 595 acres, approximately.

Area IV is nearest Swan river on the south side of Swan creek. It covers some 987 acres.

Area V is the smallest. It is about a quarter of a mile up-creek from Area IV. It has some 250 acres.

These areas, according to samples taken, run from 15,000 to 30,000 feet, board measure, per acre. Putting the general average at 15,000 feet, board measure, per acre, which will amply discount any defect or loss by windfall, we have:

			Ft. B.M.
Area I	665 acres	.....	9,975,000
“ II	570 “	.....	8,550,000
“ III	595 “	.....	8,925,000
“ IV	987 “	.....	14,800,000
“ V	250 “	.....	3,750,000
			46,000,000

This timber can be skidded into Swan creek and driven from there into Swan river, and thence to the lake, if desired. It is practically all within the boundary of the proposed Swan Hills Forest Reserve. I would recommend that it be left standing a while, for the purpose of supplying the future needs of the Swan River valley settlers. Great care will have to be taken, however, to keep fire out, as the debris of the 1910 fire forms a veritable fire-trap.

Water-power sufficient to drive a small mill can be obtained in Swan creek between three and four miles above Swan river, so that when the demand comes, this timber can be cut *in situ*. This is feasible because the Swan River settlement extends to the junction of Swan creek with Swan river. The farmers could haul lumber themselves from the mill to their farms.

Township 71, range 10, and township 71, range 11, west of the 5th Dominion meridian, have also timber. These areas are situated on the upper slopes of three hills forming the outer edge of the Swan Hills elevations.

The one nearest the Swan river is situated in or near section 9, township 71, range 10, west of the 5th meridian. The timber is on the northern slope of a spur-ridge running easterly to Swan river. It consists of spruce and poplar. The edge of the timber proper is not sharply defined, but gradually changes to poplar, giving a transition zone on either side.

The main area has some 320 acres, which will run 15,000 feet, board measure, per acre, or 4,800,000 feet in all. The transition areas will average 1,000 feet, board measure per acre, over 200 acres, or 200,000 feet, board measure, in all. This timber can be hauled to the Swan river along the north slope of the ridge east four to five miles.

About two miles northwest of this area is a round hill which has on its north-west side some 270 acres of heavy timber, spruce, balsam fir and poplar. This will run 10,000 feet, board measure, per acre, or 2,700,000 feet in all. East of it is a large area of scattered spruce and poplar about 1,000 feet, board measure, per acre over 600 acres, or 600,000 feet in all.

This timber can probably be taken out by an extension of the road required to get at the former area.

The principal timber of this region, however, lies to the west of these areas. It occupies a strip down the middle of township 71, range 11, west of the 5th meridian, the main body being towards the north end of the township principally in sections 27 and 34.

This main area lies on the north slope and at the foot of a ridge adjoining the head-waters of Giroux creek. The timber is spruce and balsam fir, poplar being very rare. It will run 15,000 feet, board measure, per acre over 2,180 acres, or 32,700,000 feet in all.

This timber is mature now and is beginning to get wind-thrown, especially on the slope. It should be cut or thinned as soon as possible. The top of the ridge has a pole stand of spruce and balsam fir over about 400 acres.

The upper part of the south slope of the ridge has an elbow-shaped area of younger growth which will average 10,000 feet, board measure, per acre. There are about 950 acres in this area, or 9,500,000 feet in all.

This timber is rather inaccessible. The nearest way to the lake is down Giroux creek to the foot of Giroux bay. This would require a haul of from nine to ten miles. A good, easy slope can, however, be obtained here.

The Swan river above Swan creek has scattered small areas of spruce in the elbows. These will not average over fifteen acres per area. The average run is about 10,000 to 15,000 feet, board measure. Between the junction of the Klondyke trail, and the Swan River wagon road there are some seventeen such areas. These were examined in detail; the results are given in the table below.

All this timber above Swan creek grows right on the river shore. It can be rolled in and driven down in high water with very little trouble.

Swan River Timber.

Approximate Location.	Area No.	Acres.	Average per	Total.
			Acre.	
			Ft. B.M.	Ft. B.M.
5-70-9-5	I	10	20,000	200,000
"	II	2	15,000	30,000
32-70-9-5	III	4	10,000	40,000
"	IV	1	10,000	10,000
"	V	4	12,000	48,000
4-71-9-5	VI	6	10,000	60,000
"	VII	20	20,000	400,000
18-71-9-5	VIII	10	2,000	20,000
12-71-9-5	IX	80	15,000	1,200,000
"	X	10	10,000	100,000
30-71-9-5	XI	35	20,000	700,000
"	XII	6	12,000	72,000
31-71-9-5	XIII	15	2,000	30,000
"	XIV	28	15,000	420,000
"	XV	10	10,000	100,000
32-71-9-5	XVI	12	10,000	120,000
5-72-9-5	XVII	2	5,000	10,000
				3,560,000

TABULAR STATEMENT OF TIMBER.

Type.	Area.	AVERAGE PER ACRE.			TOTALS FOR DISTRICT.		
		Ties.	Cord-wood.	Timber.	Ties.	Pulp-wood.	Timber.
	Acres.	Pieces.	Cords.	Ft. B.M.	Pieces.	Cords.	Ft. B.M.
Poplar	135,000		7.2			972,000	
	225,000		7.2			1,620,000	
Spruce.....	Prairie Creek.....						5,000,000
	183			20,000			3,660,000
	96			2,000			192,000
	162			5,000			810,000
	600			15,000			9,000,000
	4,200			15,000			63,000,000
	600			5,000			3,000,000
	1,917			12,000			23,000,000
	665			15,000			9,975,000
	570			15,000			8,550,000
	595			15,000			8,925,000
	987			15,000			14,805,000
	250			15,000			3,750,000
	320			15,000			4,800,000
	200			1,000			200,000
	270			10,000			2,700,000
	600			1,000			600,000
	2,180			15,000			32,700,000
	950			10,000			9,500,000
	Swan River below Klondyke Trail.						3,560,000
						2,592,000	207,727,000

SWAN HILLS DISTRICT.

This district, for that part west of Swan river, is bounded on the north by the northmost range of foot-hills of the Swan Hills plateau. East of Swan river it is bounded by the south edge of the great brûlé of 1910 to the neighbourhood of Florida lake in township 71, range 5, west of the fifth meridian.

The eastern boundary is the edge of the high plateau country proper, extending in a general southerly direction from Florida lake to the Sauleux river. Thence it turns southwesterly to a point near the northeast corner of township 66, range 9, west of the 5th Dominion meridian, then southeast again along the range forming the north side of the valley of the Freeman river to the limit of survey. The lower Freeman valley is excluded. The boundary to the south and the west is beyond the line of survey; it is taken to include all that high, broken plateau country similar to the part surveyed.

This district lies within the bounds of the high plateau country exclusively. It may be described as a high plateau of from 3,000 to 4,000 feet elevation, broken by many deep, steep, narrow river-valleys, radiating in all directions. The principal rivers are the Swan, Driftpile and Prairie, flowing north into Lesser Slave Lake, and the Freeman flowing southeast into the Athabaska river. The Sauleux river takes its rise in the eastern extension of this district. The summit elevation of the plateau is a level country with low, isolated ridges of boulder-clay.

No agricultural land occurs in this district excepting, perhaps, one or two isolated areas of from five to ten acres along the Swan river. In general, the whole district is covered with a heavy blanket-layer of boulder-clay. This is so thick that the Swan River valley, although eroded 1,500 feet below plateau level, shows no signs of country-rock.

Drift lignite occurs commonly in the Swan River valley. Stratified seams were seen in the boulder-clay, some as much as four feet thick. Great gravel-bars occur in the beds of all the creeks. Traces of gold were found in most of them, and it is just possible that it may be found in paying quantities later.

Two main timber-types occur in this district:

1. Lodgepole pine (slopes type).
2. Summit-plateau type.

These types were considered before in the general discussion on timber types and need not be gone into again. Approximately 60 per cent of the area is occupied by the lodgepole pine type and 40 per cent by the summit-plateau type.

Fire has done very little damage in this district, probably in consequence of its inaccessibility and the percentage of wet muskeg in its area. Along the Klondyke trail are two small brulés, one in township 69, range 9, west of the 5th meridian, covering about four square miles, burnt last year, and one in township 68, range 8, west of the 5th meridian, covering about the same area.

The only other fire noticed was near the head-waters of the Swan river in townships 66 and 67, range 12, west of the 5th meridian, where some ten square miles have been burnt. With these exceptions and some ten square miles of wet tamarack swamp around Freeman lake, practically the whole area is occupied by one or the other of the types mentioned.

Spruce timber occurs in isolated areas along the Swan river above the junction of the Klondyke trail, which part of the valley lies within the district. These areas were not examined closely, but should run about 250,000 feet, board measure, to a mile of river valley. There are about twenty miles of valley above the trail where spruce occurs. This gives a total of 5,000,000 feet. The north shore of Freeman lake also has a small area of spruce, probably five million feet in all.

TABULAR STATEMENT OF TIMBER.

Type.	Area.	AVERAGE PER ACRE.			TOTALS FOR DISTRICT.		
		Ties.	Cordwood	Timber.	Ties.	Pulpwood	Timber.
	Acres.	Pieces.	Cords.	Ft. B.M.	Pieces.	Cords.	Ft. B.M.
Lodgepole Pine.....	60,000	25	.....	.....	1,500,000	.....	.....
	1,156,000	.....	5	.....	.....	5,780,000	.....
Spruce.....	Freeman Lake	.....	.....	.....	.....	.....	5,000,000
	Swan River Valley....	.....	.....	.....	.....	.....	5,000,000
					1,500,000	5,780,000	10,000,000

UPPER SAULTEUX DISTRICT.

This district is bounded on the north by the south limits of the Otauwau river district, i.e., township 69 approximately: on the east by a line drawn from the north-east corner of township 69, range 3, west of the 5th meridian, to the northeast corner of township 67, range 5, west of the 5th meridian, approximately: on the south by township tier 67 approximately, and on the west by the edge of high plateau country proper, i.e., the east boundary of the Swan Hills district.

This district is the eastern slope of the Swan Hills plateau. It varies from high, broken ridges on the west down to flat muskeg on the east side. The Saulteux river and its branches drain the whole district.

The district as a whole is underlain by the usual boulder-clay. Sand ridges occur towards the southeast.

South of the Saulteux river in township 68, ranges 5 and 6, west of the 5th meridian, is a slope of gradually rising poplar country, which has areas of good land. This region is, however, too isolated and surrounded by impassable muskegs to be of any value agriculturally. Three main timber-types occur in this district:

1. Poplar-pine.
2. Poplar.
3. Spruce.

The poplar-pine type occurs over all the district north of the Saulteux river. It is mostly pole stuff of lodgepole pine, jack pine, and poplar from two to eight inches in diameter at breast-height. Muskeg occurs in spots between ridges. The percentage of species is about 50 per cent poplar, 35 per cent lodgepole pine and 15 per cent jack pine. This timber is mostly rather small for pulp yet, but will cut five cords per acre over 72,000 acres, or 360,000 cords.

South of the Saulteux river is the poplar type. This is the ordinary type seen in the north slopes district, i.e., poplar with slight admixture of spruce, and, here, pine, also. It will run about 7.2 cords per acre, the same as the rest. There are some 60,000 acres of this type, or 432,000 cords in all.

Several areas of spruce occur in this district, the largest being in the valley of the Saulteux river, mostly in township 68, range 6, west of the 5th Dominion meridian. This timber is a narrow strip along the river with a wide patch at the east end, at the junction of a tributary coming from the north. The tract is very hard to get at and was not cruised, but there will be at least 5,000 acres running 10,000 feet, board measure, per acre, or 50,000,000 feet in all.

The southeast corner of the district has a small area of timber, about 200 acres, and running 10,000 feet, board measure, per acre, or 2,000,000 feet in all. Where the Prairie Creek trail crosses the Saulteux is another small area of ten acres, running 10,000 feet, board measure, per acre, or, altogether, 100,000 feet, board measure. One and a half miles northeast of this spot is another small area containing about 50,000 feet, board measure, and one mile still farther northeast is a slightly larger patch of some 100 acres, containing about 1,000,000 feet. In the northeast corner of this district are two other small areas of spruce. These two will total about 300 acres at 10,000 feet, board measure, per acre, or 3,000,000 feet in all.

All this timber is practically inaccessible for the present at least, because the Saulteux river, especially in the upper part, is not drivable, unless a good deal of time and money were to be spent on improvements. The bed of the river is a succession of gravel-bars, covered only by very high water. Most of these bars have huge accumulations of driftwood which sometimes form jams across the river.

TABULAR STATEMENT OF TIMBER.

Type.	Area.	AVERAGE PER ACRE.			TOTALS FOR DISTRICT.		
		Ties.	Cordwood	Timber.	Ties.	Pulpwood	Timber.
		Acres.	Pieces.	Cords.	Ft. B.M.	Pieces.	Cords.	Ft. B.M.
Poplar pine.....	72,000		5			360,000	
Poplar.....	60,000		7.2			432,000	
Spruce.....	5,000			10,000			50,000,000
	200			10,000			2,000,000
	10			10,000			100,000
	5			10,000			50,000
	100			10,000			1,000,000
	300			10,000			3,000,000
						792,000	56,150,000

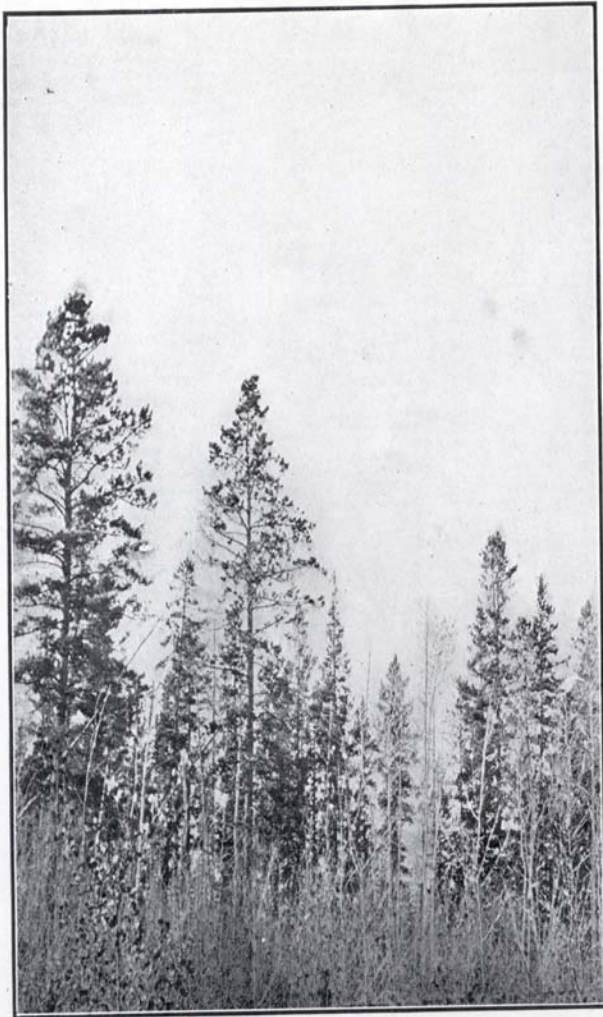


Photo D. Roy Cameron, 1911.
PLATE 14.—Lodgepole Pine Remnants near Deep Creek.



Photo D. Roy Cameron, 1911.
PLATE 15.—Lodgepole Pine Ridge in Height-of-Land Type.
(Tp. 67, Rg. 8, w5M.)

VERMILION CREEK DISTRICT.

This district is bounded on the north by the Upper Sauleux district, on the west by the Swan Hills district, on the south by the limit of survey and on the east by a line drawn southerly down the middle of range 5 from township 67.

The district is, on the whole, flat, but descends by gradual steps to the southeast. It is drained by several small creeks flowing easterly or southeasterly. The most important of these are Soda creek, Vermilion creek and Deep creek. The last-named forms the south limit of the district. The muskeg predominates over the ridges in the northern half of the district and vice versa to the south. At Deep creek comparatively dry land is reached. South of here is good land to the Athabaska river.

No agricultural land occurs in this district, although it is bounded on the southeast by poplar country; fair land extends southerly to Athabaska river.

This district is covered entirely with the height-of-land type explained before, ridges of lodgepole pine surrounded by muskeg. The stand is young, spindly pole stuff, mostly under four inches in diameter at breast-height, and not capable of yielding even pulpwood yet. With the exception of three places along the Klondyke trail, no fires have occurred in this country for many years.

Some five square miles in the northwest corner of the district in township 67, range 8, west of the fifth Dominion meridian, have been burnt recently. Three square miles have been burnt in township 65, range 7, west of 5th meridian, and a considerable area (some twelve square miles) along Deep creek, at the south end of the district, in township 65, range 6, west of the 5th meridian. Good reproduction of lodgepole pine occurs on these last two burns. No pulpwood, cordwood, tie-timber, or saw-timber occurs in this district.



PLATE 16.—Burn showing Lodgepole Pine Reproduction. (Tp. 65, Rg. 7 w5m).

Photo D. Roy Cameron, 1911.

COUTTS RIVER DISTRICT.

This district is bounded on the north by the Lesser Slave River Valley district, on the west by Upper Sauleux and Vermilion Creek district, and on the south and east by the limit of survey.

Coutts river runs through the centre of this district lengthwise. The Sauleux river runs along the northwest side. The main part of the district is occupied by the valleys of these rivers and the watershed between them which consists of low ridges. The north part of the district is low, mostly muskeg. A long, low ridge forming the east rim of the Coutts River valley is taken as the east side of the district.

Most of the district is sand or stones. The northern end has boulder-clay ridges and muskeg. No agricultural land occurs in this district.

Most of this district is covered with a pure stand of jack pine pole growth. This will run over the entire area, 25 ties and 5 cords of wood per acre. There are some 90,000 acres, or 2,250,000 ties, and 450,000 cords of wood.

North of this sand region is an area of partially burnt jack-pine-poplar country mixed with muskegs. Sixty per cent of the country is timbered with five cords of pulpwood per acre. There are, altogether, some 24,000 acres of which 14,400 are timbered. This gives 72,000 cords of pulpwood.

North of this tract, again, at the extreme north end of the district, is muskeg with ridges of jack pine pole stuff, too small to be of use yet. There are some twenty square miles of this type.

TABULAR STATEMENT OF TIMBER.

Type.	Area.	AVERAGE PER ACRE.			TOTALS FOR DISTRICT.		
		Ties.	Cordwood	Timber.	Ties.	Pulpwood	Timber.
	Acres.	Pieces.	Cords.	Ft. B.M.	Pieces.	Cords.	Ft. B.M.
Jack Pine.....	90,000	25	5	.....	2,250,000	450,000	.....
Poplar, Jack Pine and Spruce	14,400	.....	5	.....	.....	72,000	.....
					2,250,000	522,000	.....

PROPOSED FOREST RESERVES.

From the foregoing report it will be seen that there are large areas of non-agricultural land both north and south of the lake. These areas are, in general, more or less elevated regions and form the head-waters of streams draining in every direction. The question of the preservation of the forest cover, so that as even a flow of water as possible may be insured, is an important one in this district because the main drainage streams are navigable rivers. Of late years, the continual denudation of the country containing the head-waters of the Lesser Slave River tributaries by fire has given rise to alternating conditions of very low and very high water, which has proved very harmful to navigation. Indeed, things have come already to such a pass that every bad storm means a miniature freshet, and a week's rain, a swollen torrent, bringing down trees and driftwood of all kinds, which is a menace to navigation. The principal rivers causing this are the Moose, Driftpile, Sauleux and Otauwau.

The effect of these varying conditions is felt especially keenly in that part of the Lesser Slave river between Sauleux Landing and the mouth of the river at Mirror landing. Between these two places is a twenty-mile stretch of river, which is one continual succession of rapids. On this stretch the government has already expended over

\$100,000 on wing dams to divert water into one channel so that the river will be navigable for small, light-draft steamers. The floods of the last year or two (effects of recent fires) have been especially severe, and have destroyed many of the dams and shifted others.

The steamers can ascend these rapids only when there is an even average flow of water. At present the water is usually very low or very high. Inasmuch as the development of this country depends, for the present at least, on communication by water, the importance of preserving stream-flow is manifest.

Besides this direct effect on navigation, these freshets are filling the beds of smaller creeks and tributaries with gravel and driftwood, spoiling them for driving purposes. In many cases they are tearing away acres of good alluvial land in the flats towards their mouths.

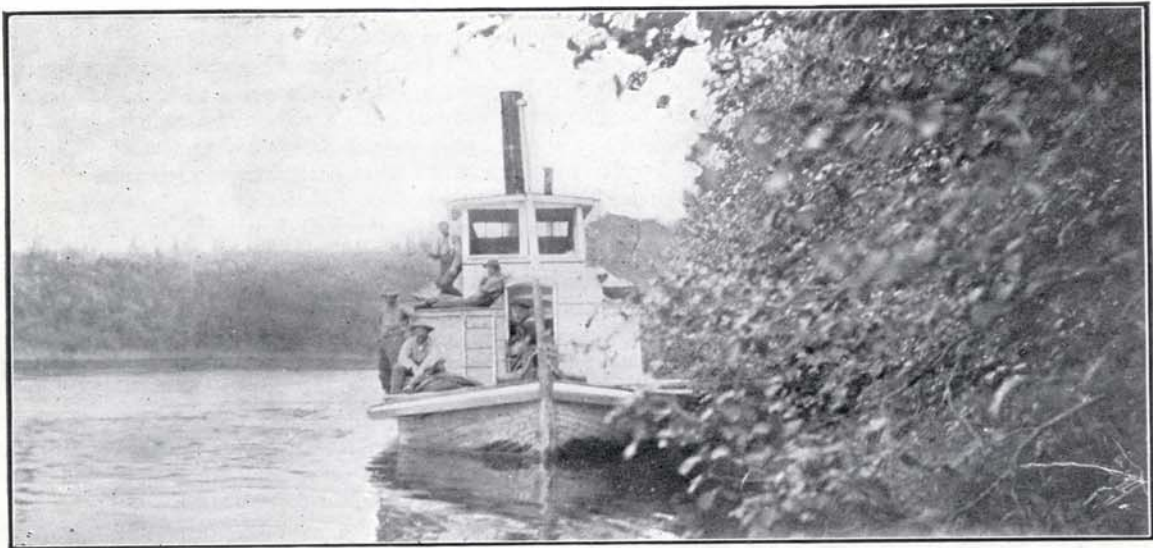


PLATE 17.—Steamer on Lesser Slave River. Photo F. McVickar, 1911.

The recent fires have another effect which, while not felt so directly at present as the floods, is yet in the long run more disastrous in its consequences. I refer to erosion. In that part of this report dealing with soil conditions, the northern face of the Swan hills is described as a large area of land much broken by cross-ridges and deep ravines, but covered to a considerable depth with a fine clay loam soil mixed with stones. This region is a spruce site of the first quality, but since the second fire, which occurred in 1910, erosion is rapidly stripping off this fertile soil and laying bare the underlying boulder-clay.

Great as the damage already done by fire is, it is insignificant when compared with possibilities for destruction which are rapidly becoming probabilities as the country fills up.

When it is considered that practically the whole interior country of the Swan hills is covered with a stand of young timber which will double its yield in twenty years, and that the increasing use of the Klondike trail as a route to enter the Peace River country is jeopardizing this stand more and more every year, it is easy to see how imperative is the necessity of adequate fire-protection. In the same way, the Wabiskaw trail is a constant menace to the pine and spruce areas on Martin mountain.

Within a few years the prairie lands over toward the Peace will be filled. When this time comes, the tide of immigration which at present neglects the Lesser Slave

Lake country will turn in this direction. It is certain that large areas of land around Lesser Slave lake and the Lesser Slave and Athabaska rivers are suitable for agriculture. These areas will undoubtedly be settled in the next twenty-five years.

When this time comes, the Swan Hills country will be surrounded by settlements on three sides at least, viz., north, east and south. It will, therefore, be the natural source of timber supply for these communities, and, indeed, practically the only source of supply available. To a great extent, therefore, the future welfare of a large section of the country depends on the conservation of timber in the Swan hills. The same is true to a lesser extent for the Martin Mountain country, where settlement will probably, for some time at least, be confined to the south side.

For these reasons—namely: (1) that the areas in question are absolute forest land, unsuitable for agriculture; (2) that it is of the utmost importance that they be kept covered with a forest growth to regulate water supply; (3) to prevent further erosion, and (4) provide an adequate timber supply for the future—I beg to recommend that forest reserves be established on these areas as soon as possible.

In the case of the lands included within the boundaries given for the proposed Martin Mountain reserves, only the Martin Mountain elevation was taken. North of Lesser Slave lake it is possible to find non-agricultural lands extending from the west end of the lake east clear to the Athabaska river, and north for an indefinite distance. This country, however, outside of Martin mountain, is flat and largely muskeg. It is also out of the track of travel, and therefore not in any especial danger from fire.

A westward extension might be made to the agricultural land west of the lake. Lack of time prevented examining this, so the reserve, as recommended, is cut off at the west side of Martin mountain.

The north and east boundaries are arbitrary. They were taken to include in a general way the watershed between the Lesser Slave and Wabiskaw waters.

The southern boundary was mapped in as carefully as was possible in a country where surveys are infrequent.

From the above it will be seen that this reserve is of the nature of a nucleus to which extensions may be made west, north or east, as the need arises. In its present shape it includes the most important country for reserves purposes north of the lake, as far as watershed protection and timber supply are concerned.

These same remarks apply in a general manner to the Swan Hills reserve also. Here the north boundary, east of Driftpile river, and the southeast boundary were mapped in to include approximately all the non-agricultural land. Lack of time prevented an examination of that part of the reserve west of range 12, more than a general view with the aid of field-glasses afforded. The reserve lines given west of this range, therefore, are purely arbitrary, and are mapped in to include only the headwaters of the many streams flowing out of the Swan Hills to the north, west and south. They are conservative boundaries; a further examination of this district will probably show the advisability of including more land in the reserve. However, a safe nucleus has been taken to which additions can be easily made.

FIRE PROTECTION.

The present system of fire protection around Lesser Slave lake is totally inadequate. Two men have to guard a district 200 miles long by 25 miles wide. This country is travelled nearly every day by immigrants and settlers, both of whom are notoriously careless with fires. To make matters worse, the trails are very poor—almost impassable most of the time—and labor to help fight fires once started is very difficult to secure.

No patrol of any kind is exercised along the Klondyke trail, which has settlements at either end.

There are certain points surrounding these proposed reserves, which are danger zones. These are:

1. Lesser Slave River Valley.
2. North Shore of Lesser Slave Lake.
3. Swan River Settlement.
4. Settlements at the West End of the Lake.
5. Logging Camps in Township 35, near northwest corner proposed Swan Hills reserves.
6. Fort Assiniboine Settlement.
7. Klondyke Trail.
8. Assiniboine Trail.
9. Wabiskaw Trail.

Any system of fire protection, to be efficient, must have some provision for patrolling these points. The schedule of ranger districts given below has been drawn up to ensure this protection. It provides for seven rangers and a chief ranger to supervise them and correlate their work. The districts proposed are as follows:—

I. LOWER LESSER SLAVE AND ATHABASKA RIVER VALLEY.

Headquarters.—Mirror Landing.

Range.—From Moose lake and Moose portage on the east to Sauteux landing on the west, and south from Mirror landing up the west side of the Athabaska as far as the Akuinu river. The object of this district is to provide a patrol along the travelled trail from Athabaska landing to the Peace river. In off seasons some improvement work can be done in building pack-trails north to the east end of Moose lake, and south up the Athabaska river, which is too swift for canoes.

II. EASTERN SWAN HILLS.

Headquarters.—Sawridge.

Range.—From Sauteux landing to Sawridge and south over the Assiniboine trail, which is much used by Indians, as far as possible. This district will guard the main road and the eastern part of the Swan Hills reserve, including the valuable timber in township 71, range 3, west of the fifth meridian.

Improvements will be needed on the Assiniboine trail. A little money spent here will open up a large area of hitherto almost inaccessible country.

III. LESSER SLAVE LAKE.

Headquarters.—Sawridge.

A small stern-wheel, light-draft steamer is badly needed to patrol the lake-front on both sides. The trails are such that it is almost impossible to get around the lake shore with any speed. This boat can efficiently patrol the whole lake and will prove more economical in the long run than rangers with pack outfits winding slowly around the beach on either side.

IV. MARTIN MOUNTAIN.

Headquarters.—Mouth of Martin creek.

Range.—Wabiskaw and Muskeg Creek trails.

This ranger could occupy most of his time doing trail-improvement work on the Martin Mountain reserve, such as improvement of the Halfway Creek trail and a look-out on Martin mountain. It is important, if the reserve is established, to have some man on guard, even if just to show the public that the Forestry Branch is alive to its duty in this regard. There is enough travel over the Wabiskaw trail by Indians to justify a patrol.

V. SWAN HILLS NORTH.

Headquarters.—Swan River Settlement.

Range.—Along wagon roads, Assineau river to Driftpile river, south up Swan River valley to Soda creek on Klondyke trail and to Freeman lake.

This is one of the most important districts. It guards the Klondyke trail right to the head of the Swan Hills reserve, and insures against carelessness of settlers in the Swan River valley who at present are unwatched. The Klondyke trail, in ordinary years, is in pretty good condition. Some improvement work done on the Freeman lake trail and a trail up Inverness river will open up a large section of the interior plateau country.

VI. WEST END OF LAKE.

Range.—Driftpile river to Little Smoky river, and country around Snipe lake.

This district is to guard the settlements at the west end of the lake and the timbered country around Snipe lake, where there are many timber berths. It will also serve to lessen fire danger in the northwest corner of the reserve.

VII. SWAN HILLS SOUTH.

Headquarters.—Deep Creek.

Range.—Fort Assiniboine to Soda Creek on Klondyke trail, Lower Freeman river, and down Athabaska to Akuinu river.

This district is primarily to guard the southern half of the Klondyke trail. Several trails are badly needed here, also, to open up the southeast part of the reserve, e.g., one from Deep creek to the Assiniboine trail and one from Deep creek to Freeman lake.

From the above it will be seen that no provision is made for patrolling that part of the reserve west of range 12. This part of the reserve is so inaccessible and isolated at present, that the fire danger is not very great. Further information regarding trails, &c., in this district is necessary before ranger districts can be planned.

The above districts are based on the assumption that the forest reserves will be established in the near future. If this is not done, it will be sufficient for the present to combine districts I, II and IV into one.

The first necessity is a patrol of the Klondyke trail, for which two rangers are needed, one at each end. Whether reserves are established or not, it is advisable that besides these rangers a chief ranger should be appointed to supervise them and keep them to their work. A man is needed to supervise and control trail-building, if for nothing else.

TRAIL IMPROVEMENTS AND EXTENSIONS.

The following improvements and extensions of existing trails are suggested as advisable and necessary where forest reserves are established.

IMPROVEMENTS.

(These are urgently needed to open up the reserves.)

1. Moose Portage trail. Moose Portage to east end of Moose lake. Seven miles.
2. Assiniboine trail. Sawridge to junction with Klondyke trail. Eighty miles.
3. Otawau trail. Sawridge to junction with Assiniboine river. Fifty miles.
4. Wabiskaw trail. Mouth of Martin creek to 20th base line. Twenty miles.
5. Half-way Creek trail. Lake shore to summit of Martin mountain. Five miles.
6. Muskeg Creek trail. Lake shore (northeast corner) easterly to Driftwood river. Twenty five miles.

7. Freeman Lake trail. From where Klondyke trail reaches Swan river, up said river, and across to Freeman lake. Thirty five miles.

PROPOSED EXTENSIONS.

I. Primary. (Urgently needed).

1. Moose lake. From Mirror landing to the west end of Moose lake. Fifteen miles.
2. Martin Mountain. From Lily lake (west summit of Martin mountain), to the west branch of Muskeg creek. Ten miles.
3. From Lily lake (west summit of Martin mountain) to Wabiskaw trail in or near section 7, township 76, range 5, west of the 5th meridian. Five miles.
4. Athabaska River. From Mirror landing south up river to mouth of Akuinu river. Twenty-five miles.
5. Otauwau River. From mouth of Otauwau river up stream to timber ridge in southwest corner township 71, range 3, west of the 5th meridian. Fifteen miles.
6. Nine-mile Creek. From mouth of the Nine-mile creek up to timber ridge, and across to meet Assineau river trail at 19th base line, thence up west branch Assineau river and across to Swan Creek trail near southeast corner township 72, range 9, west of the 5th meridian. Fifteen miles.
7. Giroux Ridge. From section 7, township 72, range 9, west of the 5th meridian, up Upset Creek to timber ridge in township 71, range 11, west of the 5th meridian. Ten miles.
8. From mouth of Inverness river upstream to summit of Table mountain, near southeast corner township 70, range 11, west of the 5th meridian. Fifteen miles.
9. From where Klondyke trail crosses Soda Creek to Otauwau trail where it reaches Saulteux river, somewhere in township 68, range 5, west of the 5th meridian. Twenty miles.

II. Secondary.

1. From west end Moose lake to join Muskeg Creek trail at Driftwood river, thence northwest to Divide lake. Thirty miles.
2. From Otauwau timber ridge, southeast corner, west to where Assiniboine trail crosses Otauwau river. Ten miles.
3. From Prairie creek trail below Hay mountain up Prairie creek to head-waters and across divide to head-waters of Swan creek, then down this creek to Swan River trail. Twenty miles.
4. From where Klondyke trail crosses 17th base line, easterly to Assiniboine trail somewhere in west of the 5th meridian. Fifteen miles.
5. From Deep creek westerly to Freeman lake trail near Freeman lake. Twenty miles.

The above extensions are divided into primary and secondary, those urgently needed and those advisable when a reserve is established, for the purpose of opening up the reserve.

LOOKOUT STATIONS.

In connection with some of these more important trails, there are certain places where lookouts should be established. Such places are:—

I. West Peak of Martin Mountain.—About a mile west of Lily lake at the head of the present Half-way Creek trail is a rounded elevation forming the west peak of Martin mountain. From the summit of this, an unobstructed view can be obtained in any direction. A lookout here would be of immense advantage in protecting the Martin Mountain country. It would be more efficient than a patrol beat of many days journey, and is only six miles from the lake.

II. High Peak.—This ridge is about two miles southwest of Florida lake. It is situated in or near section 14, township 71, range 6, west of the 5th meridian. From

its summit a magnificent view can be obtained north to Sawridge, east to Moose lake and the Athabaska valley, and south to the Athabaska valley. It is situated about fifteen miles south of Sawridge. Eight miles of the Otawau trail will need improving to render this accessible.

III. Table Mountain (House Mountain).—This mountain is an isolated ridge of the same elevation as the main range. It overlooks the south side of the lake west of the Swan river and the most of the Swan river, Driftpile and East Prairie river-valleys.

Some fifteen miles of trail up the Inverness river will be needed to reach this place, but it is a most strategic point and should be made available as soon as possible.

IV. Brulé Ridge.—This is where the Klondyke trail crosses the range forming the east side of the valley of the Swan river. From here a view is obtained up the Swan River valley to its head-waters and also over all the height-of-land country to the southeast, and the Sauteux River head-waters. This locality is right on the Klondyke trail, so that no trail building is needed. It will serve as the end of the northern rangers' patrol. A small cabin should be built here, so that the ranger could stay overnight. Good feed for horses is found half a mile below the summit.

These four lookouts are of the first importance. Small towers should be built, say, thirty to forty feet high. Below these should be cabins where rangers can stay overnight. In all cases good feed for horses is obtainable within a couple of miles of the lookout.

When the reserves are established and organization is begun, other lookout points should be made available. These four are, however, strategically placed and will be a good beginning for an efficient patrol. In connection with these, telephone lines should be constructed as soon as possible to connect them with the nearest settlements and points where aid can be obtained.

One of the first changes to be made when the reserves are created is to require the rangers to live on the reserves. In this way, their home life and outside interests are correlated with their work, and greater efficiency and enthusiasm results.

APPENDIX 1.

GENERAL TIMBER STATEMENT.

District.	Pulpwood.	Ties.	Timber.
	Cords.		Ft. B.M.
Moose Lake	4,320,000	16,000	4,820,000
Lesser Slave River Valley		5,000	2,500,000
Martin Mountain	14,288,000	227,000	12,700,000
The Narrows.	734,000		1,720,000
Otauwau.	108,000	2,000	53,000,000
North Slopes.	2,592,000		207,722,000
Swan Hills.	5,780,000	1,500,000	10,000,000
Upper Saulteux.	4,680,000		56,150,000
Vermilion Creek.			
Coutts River.	522,000	2,250,000	
	33,024,000	4,000,000	348,612,000

APPENDIX 2.

LODGEPOLE PINE.

Lodgepole pine in its natural habitat is a valuable tree. Seed from the mountains has been tried for planting purposes in the prairie provinces, but with indifferent success because climatic and site conditions are so different from those prevailing in its range.

In the Lesser Slave region, however, lodgepole pine is found growing under climatic and site conditions which are more eastern than western.

On lower elevations the lodgepole pine is confined to the borders of swamps and wet places, or to heavy soils. On light, dry soils the jack pine drives it out, but no doubt if planted here it would do well. On the whole, the lodgepole pine is a better timber than the jack pine, which it exceeds in cleanness, height and diameter-growth. Seed gathered from thrifty lodgepole pine growing on lower elevations in the Lesser Slave Lake country would, in all probability, prove much hardier and more successful for planting on the prairies than seed gathered in the mountains. This is an experiment worth trying on some of the prairie reserves.

APPENDIX 3.

VOLUME TABLES.

Diameter Breast-high.	White Spruce.		Tamarack. ³	Jack Pine. ⁴	Lodgepole Pine. ⁵	Aspen. ⁶
	In.	Ft. B.M. ⁷		Ft. B.M. ⁷	Ft. B.M. ⁷	Ft. B.M. ⁷	Cub. Ft.
6	50 ¹	25 ²	20	15	50	5.3
7	55	35	30	20	60	6.7
8	65	40	40	30	70	8.3
9	75	50	55	40	80	10.7
10	85	65	70	60	90	14.2
11	95	80	85	80	100	18.5
12	115	100	100	110	110	22.5
13	135	120	120	140	135	27.2
14	160	140	135	155	165	
15	200	165	155	165		
16	260	185	170	175		
17	340	230	190	185		
18	400	260	210	195		
19	460	315	230			
20	510	400	245			
21	550	460	255			
22	575	500				
23	595	530				
24	610	550				
25	625	570				
26	630	580				
27	640	590				
28	645	595				

¹South shore of Lesser Slave Lake.
Slave Lake.

⁴Athabaska River.

²North shore of Lesser Slave Lake.

⁵Swan Hills, best sites (young timber).

³North shore of Lesser

⁶Volume used length.

⁷Decimal 'C' Scribner rule.

APPENDIX 4.

MODEL ACRE AND YIELD TABLE.

The Model Acre has been constructed from data obtained in spruce stands, site I, near Nine-mile Point, Lesser Slave lake. Average age, height and volume are from stem-analyses of about twenty-five trees; the number of trees per acre column has been compiled from results of strip surveys covering about twenty acres. From this table the average tree is found to be 13.4 inches.

From these data a rough yield-table has been constructed, more for the purpose of showing the conditions of growth of spruce in this district than for any special value as an accurate statement of yield. The decimation rate is only approximate. It was obtained by using a curve of reduction in the number of trees per acre in the model acre as a basis for younger ages.

For older ages, the top of the curve had to be rounded off, inasmuch as decimation of trees after arriving at merchantable size is much slower than for younger stands. The decimation factor for stands over eighty years was, therefore, obtained from this interpolated curve.

Yield statements, especially for younger age-classes, are high. This is, however, borne out by actual conditions. This table, in general, bears out the statement made that no better locality for growing white spruce can be found in Canada than the south shore of Lesser Slave Lake.

MODEL ACRE.—WHITE SPRUCE.

Diameter Breast-high.	Average Age.	Average Height.	Trees per Acre.	Average Volume.	Total Volume.
In.	Yrs.	Ft.		Ft. B.M.	Ft. B.M.
8	59	75	18.8	65	1,222
9	63	78	18.4	75	1,380
10	68	80	17.9	85	1,521
11	72	84	17.4	95	1,583
12	76	87	16.4	115	1,886
13	81	88	15.0	135	2,025
14	85	89	13.0	160	2,080
15	90	91	10.2	200	2,040
16	96	92	7.2	260	1,872
17	101	93	4.6	340	1,564
18	111	96	2.8	400	1,120
19	114	98	2.0	460	920
20	118	100	1.4	510	714
21	122	102	1.0	550	550
22	127	105	0.6	575	345
23	133	106	0.5	595	298
24	140	108	0.4	610	244
25	147	110	0.2	625	124
26	154	111	0.1	630	63
			147.9		21,351

YIELD TABLE.—WHITE SPRUCE.

Age.	Average Diameter Breast-high.	Average Height.	Volume.	Number trees per Acre.	Yield per Acre.	Yield corrected by Curve.
Yrs.	In.	Ft.	Ft. B.M.		Ft. B.M.	Ft. B.M.
60	8.0	82	65	197	12,805	12,800
70	10.5	84	90	176	15,840	15,800
80	12.9	87	130	157	20,410	19,900
90	14.9	90	195	130	25,350	25,300
100	16.8	93	320	114	36,480	36,500
110	18.9	97	450	103	46,350	46,300
120	20.6	101	535	100	53,500	53,500
130	22.3	105	580	97	56,260	56,300
140	24.0	108	610	95	57,950	58,000
150	25.4	110	625	94	58,750	58,800

APPENDIX 5.

TABLE OF AGE OF SPRUCE SEEDLINGS.

Height.	Age (years).	Height.	Age (years).
0' 4"	4	1' 7"	6
5	4	8	6
6	4	9	6
7	4	10	7
8	5	11	7
9	5	2' 0"	7
10	5	1	8
11	5	2	8
1' 0"	5	3	9
1	5	4	9
2	5	5	9
3	5	6	10
4	5	7	10
5	6		
6	6		

APPENDIX 6.

THERMOMETER.

Month.	Extreme Maximum	Average Maximum.	Extreme Minimum.	Average Minimum.	Days of Frost.
June 3-30 inclusive.....	87	72	35	44	0
July.....	85	73	29	49	3
August.....	86	70	26	39	7
September 1-24 inclusive.....	78	67	22	34	11

APPENDIX 7.

BAROMETER.

Month.	Average.	Extreme Maximum.	Extreme Minimum.
June 3-30 inclusive.....	27·10	27·85	26·64
July.....	27·12	27·66	26·73
August.....	27·16	27·54	26·78
September 1-24 inclusive.....	27·11	27·51	26·61

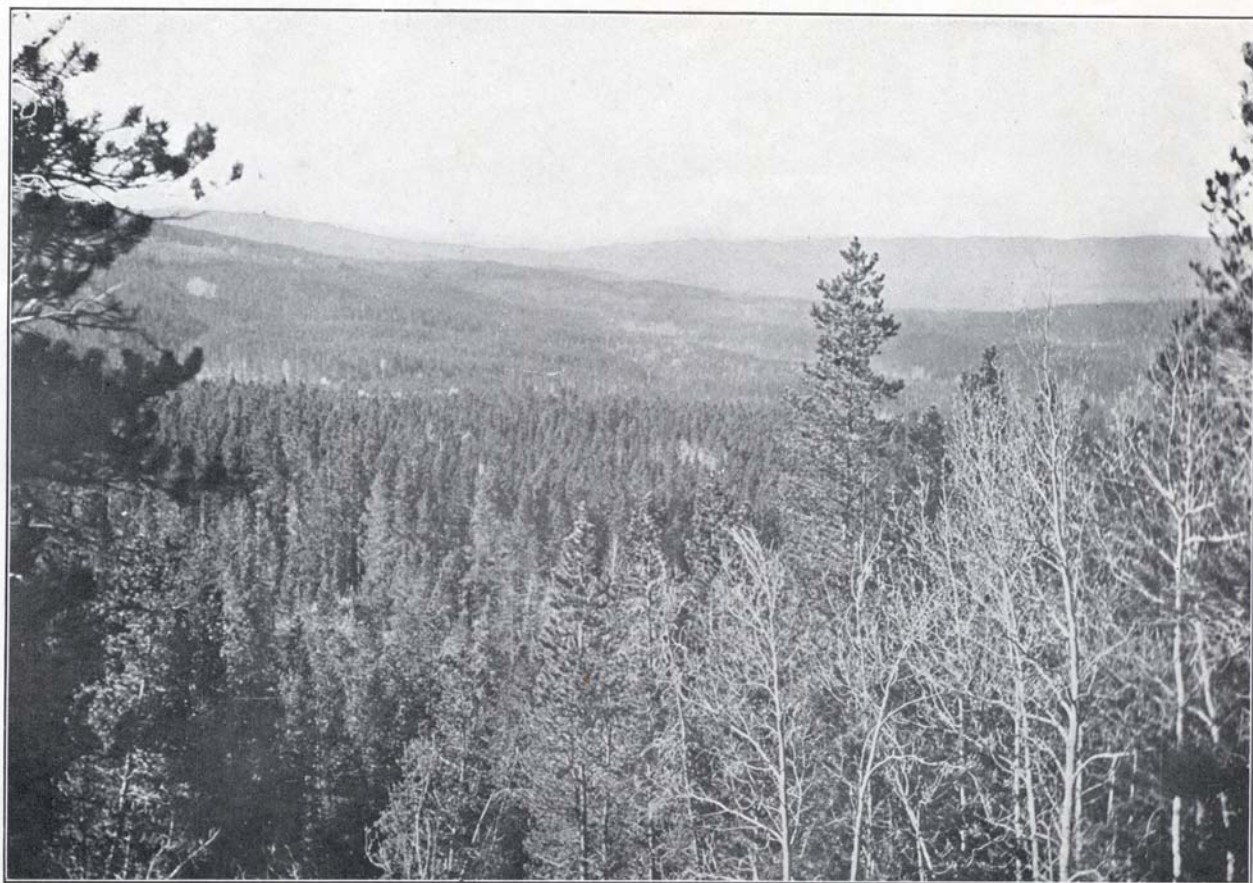


PLATE 1.—Lodgepole Pine : Slopes Type. (Head-waters of Swan River.)

Photo D. Roy Cameron, 1911.