

ANNUAL REPORT
of
SURVEYS and CONSTRUCTION of HIGHWAYS
in the Dominion Parks, 1915.

Ottawa, March 31st, 1916.

J. B. Harkin, Esq.,
Commissioner of Dominion Parks,
Ottawa, Ontario.

Dear Sir,

I beg to submit herewith the Annual Report of the highway work undertaken in the Dominion National Parks during the season of 1915 by myself and staff.

The work, as generally outlined in the early part of the season, was to consist of locating surveys in Rocky Mountains, Yoho, Glacier, Revelstoke and Waterton Lakes Parks. The decision, made at a later date, to place several hundred interned aliens at work on the construction of the most important highways, necessitated a change in plans

plans, and we found that time did not permit us to make the intended surveys in the last park mentioned.

All other work, however, was accomplished as planned, and in addition ten miles of new road were cross-sectioned and otherwise prepared for construction.

The early part of the season was spent in the Head Office, Ottawa, preparing plans and collecting information in connection with the summer's work.

Actual field work was begun in the latter part of May.

Revelstoke Park.

The first survey undertaken was in connection with the Mt. Revelstoke Motor Road in the Revelstoke National Park, and comprised both location and construction work.

This road is being constructed to the summit of Mount Revelstoke for scenic purposes, and to afford access to the mountain *country*, - stretching north and east from this summit, - which comprises the greater area of the recently established Park.

At present the Lindemark Trail connects the town of Revelstoke with the summit of the mountain, and extends beyond the summit a distance of five miles to Eva and Miller lakes, - two pretty bodies of water lying in the heart of an extremely rugged and mountainous country.

Some 3.4 miles of the motor road had been previously constructed by the Provincial Government of British Columbia, and in the summer of 1914 the Dominion Parks Branch opened up the road 2 miles further, besides doing the greater part of the easier grading on an additional 2 miles.

The end of the last grading operations in 1914 was Station 401 (by our survey), - Station 0 being the point of diversion of the motor road from the "Big Bend" wagon road up the Columbia river.

LOCATION.

As no actual survey of any part of the road had been previously made, the survey line was begun at the commencement of the road, and levels were carried up the mountain from a bench mark on the railway bridge over the Columbia river.

From Station 182 to the end of the season's work, a regular location line, with curves computed and staked out, was run.

By July 9th the line had been projected to Station 673 - elevation 5068 feet above mean sea level.

At this time it was found advisable to move the party to the Rocky Mountains Park to complete the final location of the Castle-Laggan road.

Work was resumed on the location of the Mt. Revelstoke Motor Road on August 25th, and the line was projected to Station 846, approx. elevation 6250 feet.

This station is within a few hundred feet of Balsam lake and the small log cabin situated near the summit of the mountain.

It was thought at one time that the road could be located to Eva and Miller lakes some five miles beyond this point, but after a reconnaissance trip to the lakes this idea was abandoned. The construction of the road would prove difficult and very costly, and it is highly improbable if it would ever be justified by the popularity of the lakes or their surrounding scenery.

A reconnaissance survey of a loop road, around the summit of the mountain and touching all the best points, was made, but owing to the press of other work the location survey was not completed.

The length of the motor road to the summit will be 16 miles, and that of the loop road, on the summit, will be approximately $3\frac{1}{2}$ miles.

In the distance of 16 miles, the road makes an ascent of 4780 feet - the average grade being 5.75%.

The limiting grades on the road are found on the section constructed by the Provincial Government.

Two or three stretches of 10 and 12 percent grades are found on this portion, together with 1000 feet of 8 percent. These all occur in the first mile, and if traffic at any time should happen to warrant it, could be avoided by a re-location of this part of the road.

That portion of the road constructed in 1914 has several pitches of 8 and 10 percent grades. These, however, are not lengthy.

Up to Station 401, little opportunity was afforded in reducing grades since portions of the road had been already graded up to this point, and all that could be done was to run in connecting links. The position of the switchbacks at Stations 331 and 370 had been definitely determined by the road being graded above and below the turn in 1914, and consequently it was impossible to make a much desired improvement in their location.

From Station 401 to the summit, very satisfactory grades and turns have been obtained. No grades on the road are prohibitive in any sense, but the long and continual ascent will always provide a severe test for the cooling system of motor car engines.

As would be expected on a mountain road of this nature, the alignment throughout has a high degree of curvature - there being a curve on an average of every 100 feet of length.

With the summit of the mountain as its objective, the road swings back and forth across the south slope in order to develop the distance necessary for a satisfactory gradient.

There are 26 distinct legs of the road between Station 0 + 00 and the summit.

Several switchbacks or hair-pin curves have been found necessary where a reverse in direction was desired.

These, while appearing dangerous and awkward to motor traffic, were unavoidable in most instances. However, the two worst turns might have been greatly improved had we had the opportunity of locating that portion of the road constructed in 1914.

The road throughout will be very interesting from a scenic point of view. The first 6 miles will probably be best in this respect, since along this portion very distinct bird's-eye views of the town of Revelstoke and the surrounding country are afforded.

Far reaching views of Eagle Pass and the Illecillewaet and Columbia river valleys, with their surrounding mountains, are obtainable throughout.

In the vicinity of Station 670, the country becomes less rugged - the larger timber

thins out and thick berry bushes and underscrub form the bulk of the growth.

At Station 846 the underbrush suddenly disappears, and the located line enters the little open basin surrounding Balsam lake.

While this point is not the highest point of the mountain, it is part of the rolling summit plateau and is generally referred to as "the Summit."

A very interesting bit of country stretches northerly from Balsam lake. With its open glades dotted with clumps of pine and spruce, it is a typical mountain park, and will be unique and interesting to travellers who view it for the first time.

From the higher points of the plateau striking views of the Clach-na-Coedin range and glacier are obtained, and to the north the Columbia river winds in silvery stretches far below the observer.

CONSTRUCTION.

As construction work on the motor road was commenced by day labour in June, under the

Park Superintendent, - cross-sectioning, with the staking of culverts, cribs and bridges, was carried on simultaneously with the regular location work. Weekly estimates were prepared and supplied the Superintendent for his reports.

The road was made passable by day labour from Station 306 to Station 429 - a distance of 23 miles. The portion constructed in 1914 was also considerably improved.

The progress made was very satisfactory, - the approximate quantities handled by day labour being as follows:

Clearing.....	8.8 acres
Grubbing.....	5.9 "
Earth.....	1318.0 cu.yds.
Loose rock.....	4775.5 "
Solid rock.....	1257.6 "
Round logs (in place in cribs, culverts & bridges)	13291.0 lin.ft.

In connection with this work I would state that the foreman's chief fault was a disinclination to thoroughly clear and grub a sufficient width of right of way for his embankment. The lower part of the embankment was often placed on brush and stumps with the result that a few months later settlement and sliding was noticed in several places.

This point was repeatedly called to the attention of the foreman, but no particular improvement was noticed until after our return to lay out work for alien labour in the latter part of August.

During the early part of September an Internment Camp was established at Station 405, and construction work by alien labour was begun at Station 429 on September 16th.

Good progress was made when the weather was favourable, but late in October wet and frequent snowfalls practically closed down the work.

The road was ^{partly} opened up to Station 500 - a distance of 7100 feet.

The quantities credited to alien labour are as follows:

Grubbing.....	2.52	acres
Earth excavation.....	624.8	cu.yds.
Loose rock excavation....	2756.0	"
Solid rock ".....	784.5	"
Round logs (in cribs, culverts & bridges)....	4844.0	lin.ft.

GENERAL.

GENERAL.

A combination of circumstances made the location of this road difficult and somewhat arduous.

In addition to the continual mountain-climbing and wet weather, the numerous curves necessary entailed an enormous amount of computing, and made it very difficult to maintain good progress.

During the latter half of June and the greater part of July, steady rains or frequent showers kept the thick underbrush continually wet and every movement in the bush was accompanied by a cold shower.

A wet snowfall of six inches occurred on June 25th and the 26th at the head of Dallas Pass, where Camp No. 2 was established.

However, by means of an efficient and willing party, work was pushed ahead and very satisfactory progress was made.

On the 12th and 13th of September, when location work was again under way in the Park, ten inches of snow fell at Balsam lake and in Dallas Pass, and winter appeared to have come to stay.

However, most of this fall disappeared during the three weeks fine weather that followed.

Supplies and equipment were transported to the camps at Dallas camp and Balsam lake by pack train.

After a few days several of the party became quite capable packers and outside help was not required.

Herewith are costs in connection with the surveys in this Park. (These costs do not include railway transportation expenses of self and party):

Class of Survey	Miles run	Cost per mile	Total Cost	Remarks
Reconnaissance	40.8	\$ 2.76	\$112.61	
Chained and Traverse lines	5.3	16.85	89.20	
Preliminary	3.6	30.00	108.00	
Location	14.3	45.82	655.34	
Grade Lines	5.8	6.00	34.78	
Cross Sections	6.0	28.30	169.82	
Totals -	75.8		\$1169.75	

REVELSTOKE PARK



Columbia River from Motor Road.



Location of road - near summit of Mt. Revelstoke.

(3)



Clack-na-Coodin Valley - from summit Mt. Revelstoke.

(4)



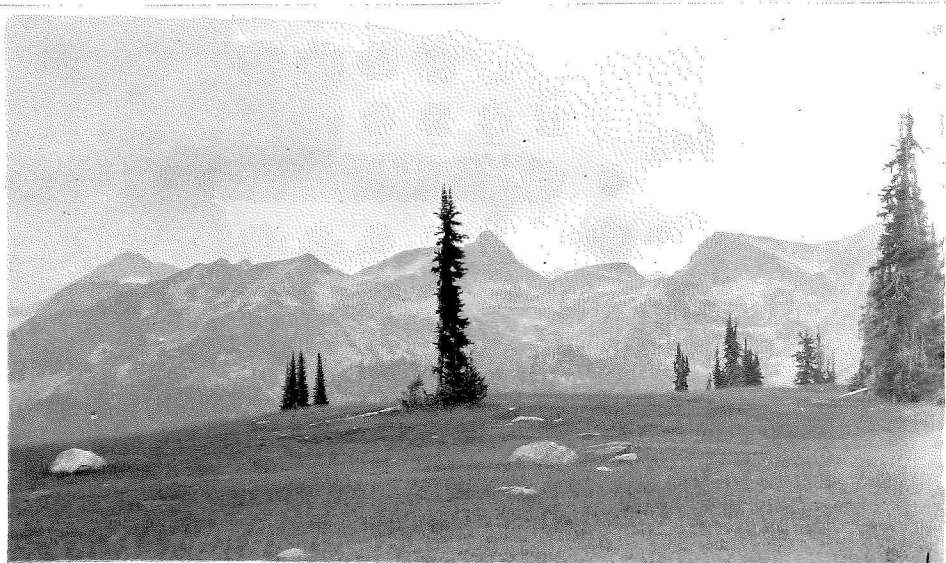
View from location of Motor Road -
summit of Mt. Revelstoke.

REVELSTOKE PARK



(5)

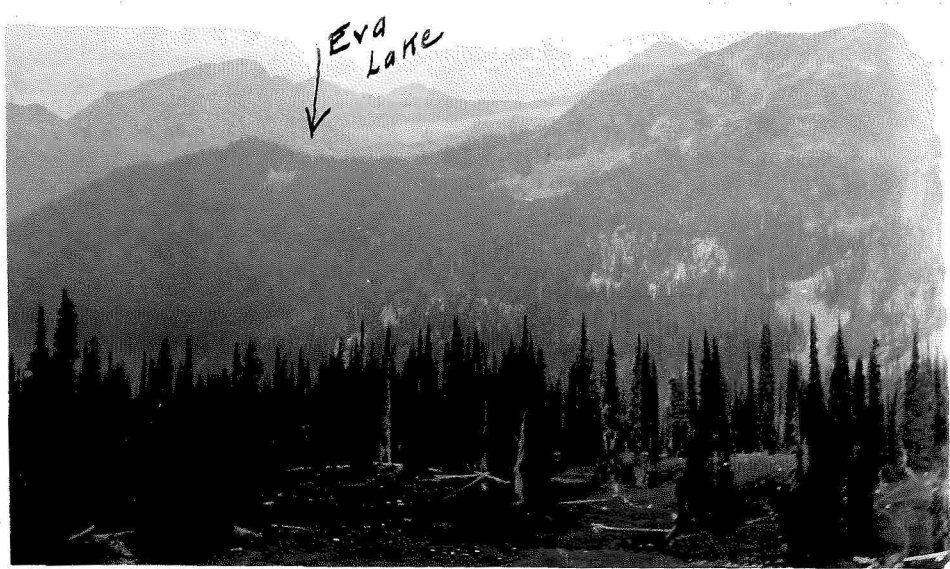
Clach-na-Coodin Range
from Location Line.



(6)

Summit Mt. Revelstoke
and Clach-na-Coodin Range.

(7)



On trail to Eva Lake.

(8)



Eva Lake.

REVELSTOKE PARK



(7a)

Cabin at Balsam Lake.



(8a)

Balsam Lake.

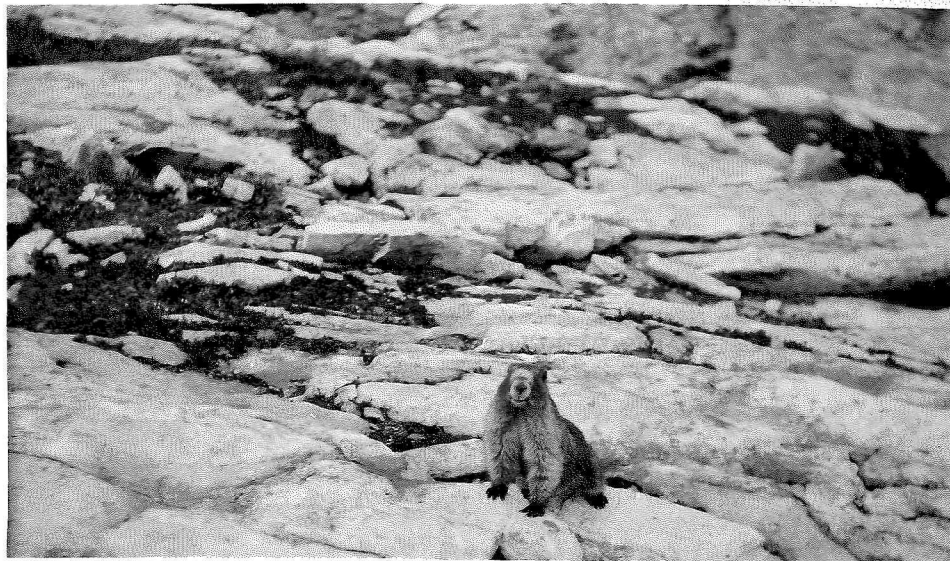
(9a)



Clach-na-Coodin Range & Glacier - 7990 ft

Clach-na-Coodin Range and Glacier.

(10a)



Mountain Marmot.

REVELSTOKE PARK



(9)

Eva Lake.



(10)

View from Motor Road.

(11)



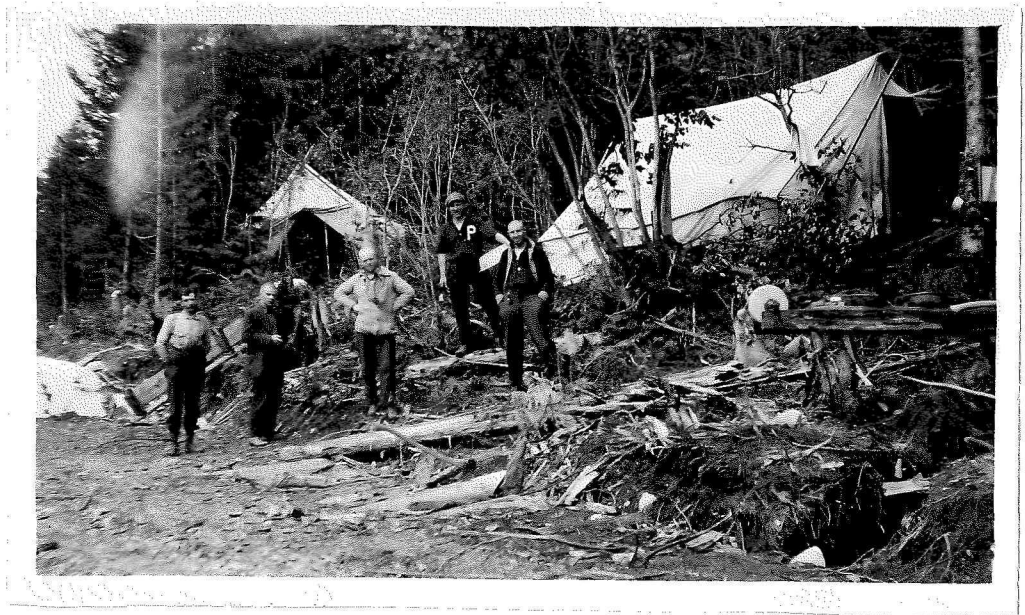
Switchback Sta. 285
1914



(12)

Station 314
1915

REVELSTOKE PARK



(13)

Engineers and Camp - Sta. 306.



(14)

Engineers' Camp - Sta. 414.

(15)



June 26th, 1915.

(16)



Engineers moving camp.

REVELSTOKE PARK



(17)

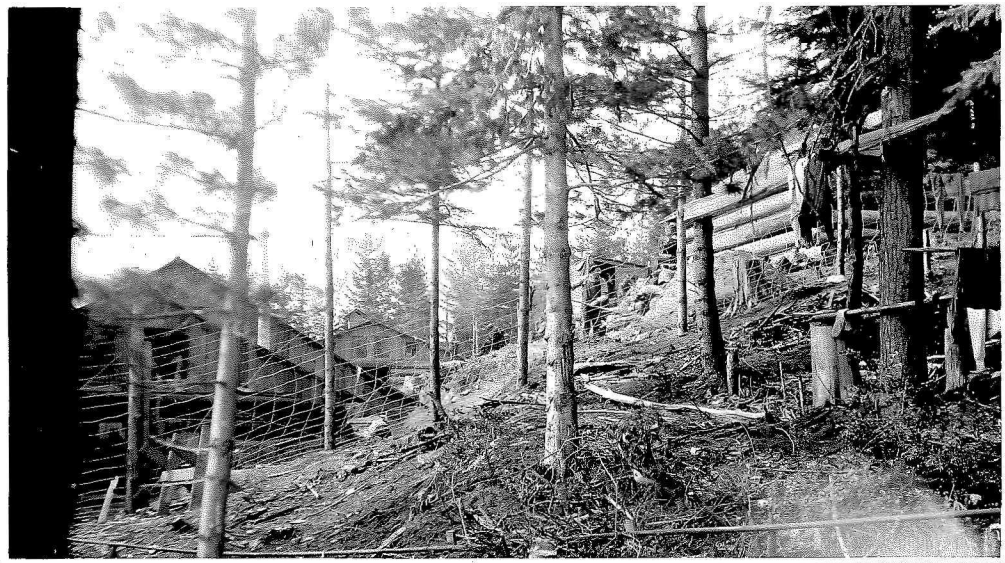
Moving Camp.



(18)

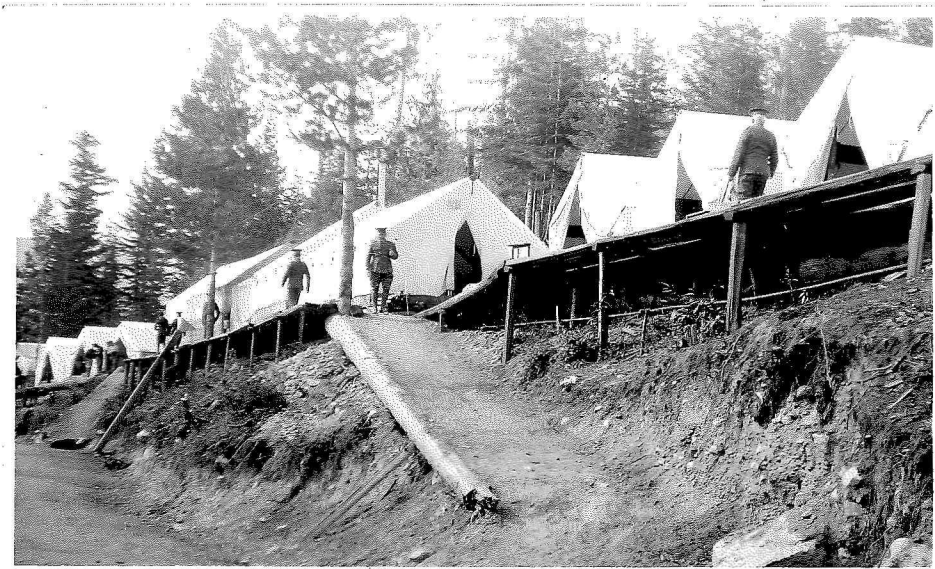
Internment Camp - 1915.

(19)



Internment Camp - 1915.

(20)



Military Camp - 1915.

ROCKY MOUNTAINS PARK.

The highway work in this park comprised both location and construction.

LOCATION.

On July 10th the party returned from Revelstoke Park and commenced the final location of the Castle-Laggan road from Eldon to Lake Louise.

This portion of the proposed road is about 12 miles in length, the greater part of which is over the level country of the Bow river valley lying north of the river. The Canadian Pacific Railway also traverses this part of the valley.

A preliminary survey had been made of this road in 1913 by C. M. Walker, D.L.S., and the general route of his survey was followed for the most part, - the chief changes being made to secure easier grades or better crossings of the larger streams.

Beginning at Station 335, to which point it had been located in 1914, the line runs on tangent, - and practically parallel to the Canadian Pacific railway right of way, - to Station 442, where

a deviation towards the sidehill on the right is made to avoid low ground that is flooded in the spring and late fall months.

This portion of the proposed road passes the western extremity of Castle Mountain, - the foothills of which have been traversed from Sta. O, near Castle Mountain station; from Station 451 the line follows a side hill slope to Station 468, where it drops gently to the flats adjoining Baker Creek.

At Station 500 a very satisfactory crossing of this creek is made, it being located about 600 feet above the railway bridge.

A 45-foot truss bridge will be required at this point.

Very fair material is encountered for a thousand feet on either side of this stream. Material encountered previously has rather too much clay for a good road surface.

On crossing Baker Creek, the line swings southerly by a long tangent, and then parallels the Canadian Pacific railway main line for three miles.

From Stations 550 to 700, particularly good

good views of Temple Mountain - the highest peak on the main line of the railway - are obtained, and in the neighborhood of Station 600 all but two of the famous Ten Peaks in the Moraine Lake valley can be seen at one time.

Between Stations 700 and 745, owing to the absence of any level ground on the north side of the Bow river, the line is forced to traverse some very steep sidehill above the railway track. The centre line was moved from ten to twenty feet further back from the railway right of way at this point so as to afford ample room for construction without interfering with the railway rights.

The material along this sidehill is a clay-gravel composition which becomes quite soft in wet weather.

Considerable crib-work will be required along this section.

Easy ground is encountered between Stations 745 and 805, the material appearing to be gravel-loam and a small percentage of clay.

On this portion of the line Corral creek is crossed at Station 785. Several ideal

camping

camping and pic-nicing spots can be found in this vicinity.

Near Station 800, owing to the presence of a large muskeg swamp enclosed in a rocky basin that extends northerly from the Bow river, the line cuts across the hilly country bordering the northern edge of the swamp.

The presence of swampy ground in the small valleys made sidehill location necessary for a great part of this section of the line, and considerable reconnaissance work was required before the best line was obtained. The line emerges from the hills on to level country at Station 830.

From this point fairly level ground is traversed until Laggan, - now called Lake Louise, - is reached at Station 960. The Pipestone river is crossed at Station 935. Two lines were run over this river to determine the best crossing. The line to the north affords the best bridge site, but is considerably longer than the south line, which will probably be adopted. A 50-foot truss bridge, or a 40-foot truss and a simple span, will be required over this stream.

A complete topographical survey was made near Lake Louise Station, as owing to the numerous tracks crossed by the 1913 survey it was desired to get a better railway crossing.

The location was completed and tied up with the Laggan to Field line on July 29th.

GENERAL.

Owing to the nature of the Bow Valley between Castle Mountain and Laggan, the country actually traversed by the proposed road is not highly interesting.

To traverse country interesting in itself, practically an air-line would be necessary, which at the present time is prohibitive in cost.

The surrounding mountains, however, are more than ample recompense, for some of the highest and grandest peaks of the Rockies lie on either side of the valley and are in full sight from the located line.

Nearing Lake Louise, splendid views are also obtained of the Lefroy and Victoria glaciers.

The costs of the survey of this road are as follows:

Class of Survey	Miles run	Cost per mile	Total cost
Reconnaissance	17.0	\$ 2.40	\$ 40.80
Location	13.0	33.10	430.30
Staking right-of-way	12.0	2.25	27.00
Totals -	42.0	\$	\$498.10

CONSTRUCTION.

In June 1915, it was decided by the Department to establish an Internment Camp near Castle Mountain for the purpose of having the clearing and grubbing of the Castle-Laggan road done by alien labour.

The first six miles of the road, which at that time were finally located, were staked out for clearing operations on June 18th and 19th by myself and one of the staff. A forty-foot width was considered most suitable for the right of way of this road, and it was staked accordingly.

This was all the clearing and grubbing called for by the engineering staff. At a later date it was thought advisable by Parks officials to clear out the dead timber and underbrush for an additional fifty feet on either side of the right of way. This, besides improving the appearance of the road, will lessen the danger of fires being started by travellers.

When it was decided to commence grading operations with alien labour, Mr. J. N. Stinson was sent to Castle Mountain to cross-section and lay out the work and perform the duties of resident engineer.

Before his arrival on the ground, two bridges were constructed on the road at Station 145. While culverts would have served equally well in this case, and were called for on the profile, the bridges in question were very well built.

The amount of grading done by alien labour was not up to expectations. It was hoped that the road would be opened up as far as Eldon, but although the work done showed the great possibilities of alien labour, this hope was not realized.

One of the main drawbacks appeared to be a failure by the military guard to secure a reasonable amount of work from the prisoners. This lax condition was soon taken advantage of by the latter, more particularly since in this class of labour civilian foremen have no means of enforcing the performance of work.

Lack of organization was also noticeable. Working parties were often jumped from one job to another at the discretion of the militia or sub-foreman, when better progress would have been obtained by having them complete the work in hand before moving.

Some of the foremen, while quite competent to superintend clearing and grubbing operations,—for which they were appointed,—were wholly inexperienced in grading work. Consequently the whole labour value of the aliens in grading operations was not realized.

The resident engineer, by laying out the work in far greater detail than is usual, and by supplying detailed plans of the work at various points, endeavored to assist the foremen

in

in every possible manner so that the work would not be greatly retarded.

Under existing conditions at the camp, the engineer had no actual authority as to the planning of the work or the methods employed in carrying it on, and could only offer suggestions whenever opportunity offered.

This condition is of course detrimental to the progress of the work. It is only reasonable to expect that the resident engineer, from his more thorough knowledge and understanding of the work in hand, could plan and carry on the work more efficiently and secure better results than a comparatively inexperienced foreman.

For this reason I would recommend that in all work undertaken by alien or day labour, the engineer on the ground be in charge, with the foreman subject to his orders. The engineer would assume none of the duties of the foreman, but merely give such orders or advice as would appear necessary. This condition is always found where engineer and foreman are employed by the same organization.

Clearing and grubbing operations were carried to Station 230, a distance of 4.4 miles, and cleared material was burnt as far as Station 193. Grading was practically all completed to Station 154, a distance of 2.9 miles.

The finished road showed a very high standard of construction, and is very pleasing to the eye. The road is nicely crowned, ditches neat and regular, and all out-slopes well trimmed. Owing to the soft nature of the soil along the greater part of the road, the subgrade should be surfaced with gravel before being open to traffic of any nature. One or two suitable gravel pits, conveniently near, have already been located by the engineer.

This work should be done as soon as weather conditions will permit this spring, otherwise the benefit of the careful crowning and ditching of the road will be lost.

While it might be thought that the road could have been opened up for a greater distance if less careful work had been allowed, I would say that under the circumstances but a small addition-

al length would have been built. The time lost was not lost on trimming work, but on the actual grading operations.

Also, trimming requires but a small portion of an average gang's time, and in the performance or neglect of this work lies all the difference between a neat or a ragged bit of road grading.

I have also noted that, with the majority of road-work, to delay finishing to some later date means to neglect it altogether.

With the camp-site at Castle Mountain ready for occupation as soon as weather permits, and with the advantage of a few months experience with a condition of labour hitherto untried in Canada, it is hoped that a very satisfactory showing will be made before the end of the season, or the cessation of hostilities closes down the work.

The following are the work quantities credited to alien labour on this road:

Clearing.....	12.8	acres
Grubbing.....	14.7	"
Earth excavation -	11243.3	cu.yds.
Loose rock " -	250.0	"
Solid rock " -	130.0	"
Hewn logs (in place)	6522.0	lin.ft.
Round " " "	4078.0	"

ROCKY MOUNTAINS PARK



(1)

Temple Mt. - from
Castle-Laggan road.



(2)

Location Line
Castle-Laggan Road.

(3)



Bridge Site - Sta. 500
Baker Creek

(4)



High water - Baker Creek.



(5)

View on Moraine Lake Road
Valley of Ten Peaks



(6)

Bridge on Moraine Lake Road.

(7)

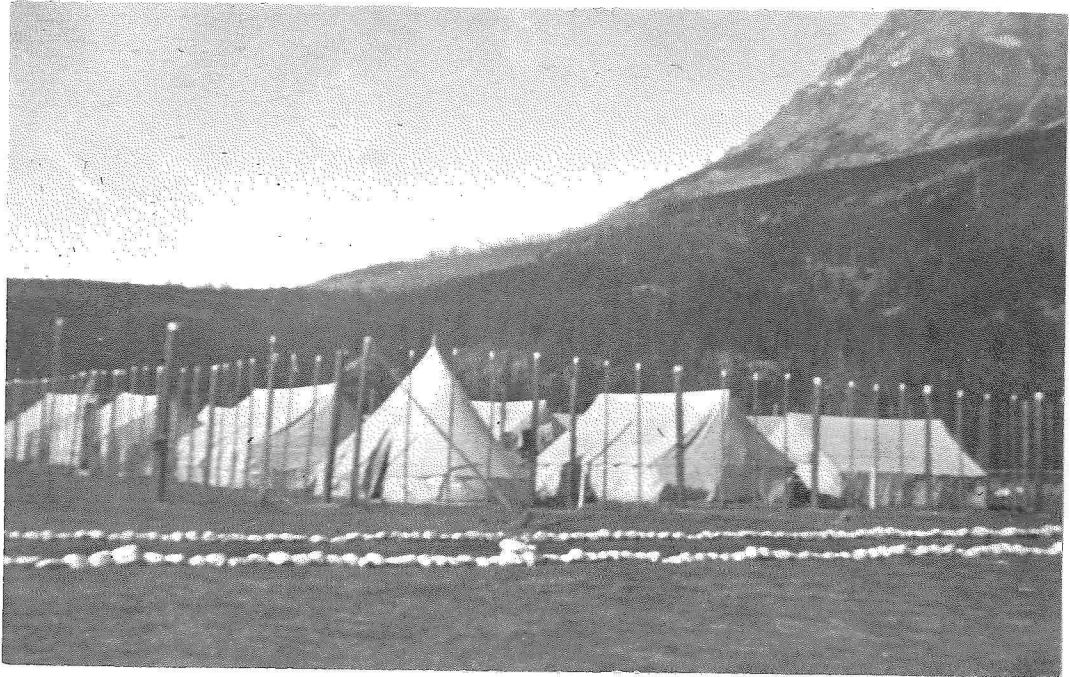


Consolation Valley and Tower of Babel.

(8)



Moraine Lake.



(9)

Interment Camp - Castle Mt.
1915



(10)

Interred Aliens on Castle-Laggan road.

(11)



Interned Aliens on Castle-Laggan road.

(12)



Finishing sub-grade -
Castle-Laggan road.



(13)

Aliens on Castle-Laggan road.



(14)

Finished grade - 1915
Castle-Laggan road

(15)



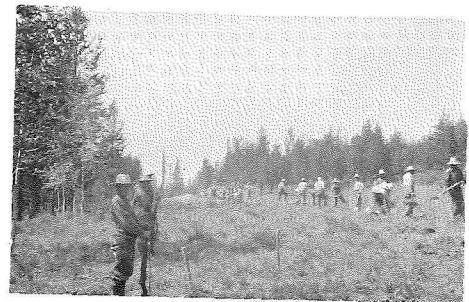
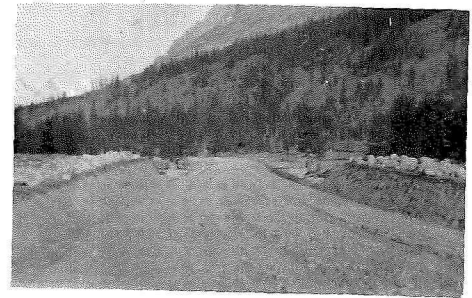
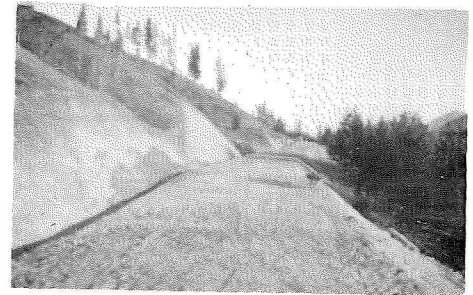
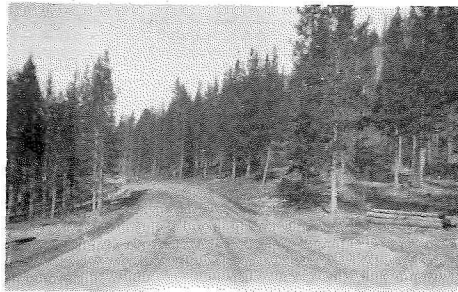
Finished grade - 1915

(16)



Finished grade - 1915

Snapshots of construction
Castle-Laggan road - 1915.



YOHO PARK

LOCATION.

The first work undertaken in Yoho Park was in connection with revisions on the Laggan to Field road.

This road had been located in 1914, but changes were necessary at several points, chiefly for grade reduction purposes. These revisions were projected in the Head Office during the early part of the season, and were run in during the month of August by myself and a small party.

The most important revision was made on that portion of the road connecting the Canadian Pacific railway old grade with the Yoho Valley road. The road used at present has one short 12% grade and several hundred feet of 8 and 9 per cent grades. The 1914 location gave an 8 per cent grade throughout. As revised, the road line has a maximum grade of 5.7 per cent, and an average of 5.3 per cent. This final location is the only practicable one that will afford a lighter grade than 8 per cent. It

has

has the disadvantage, however, of involving considerable grading under difficulties where parallel to the C. P. R. main line, and for this reason its construction could possibly be deferred until made necessary by the demands of traffic.

Revision work on the Laggan to Field road was completed on August 21st.

No further survey work was undertaken in this Park until the end of September, when the department decided to establish an Internment Camp on the north side of the Kicking Horse River Flats about $6\frac{1}{2}$ miles west of Field.

A temporary road to the proposed camp site, over which the first supplies were taken, was first located. Two traverse lines were then run between the Canadian Pacific Railway track and the camp for the purpose of locating a direct winter route.

On the completion of this preliminary work, the location of a new road from the Ottertail to the Natural Bridge was commenced.

This road, when completed, will afford a loop road that will run from Field to the Ottertail on the old railway grade, and then return to Field via the new section and the Natural Bridge road.

It was first intended to cross the Ottertail and Kicking Horse rivers in the vicinity of the Internment camp site, and then follow the northern side of the Kicking Horse River valley until a junction was made with the Natural Bridge road.

Owing to the very low and marshy ground in the vicinity of the camp, and the wide and undefined nature of the river channels, it was found that the above route would entail very lengthy bridges over the rivers and a great quantity of embankment.

For this reason a reconnaissance survey was made on the south side of the Kicking Horse River valley, and it was found that a route on this side would afford higher ground throughout, a much better crossing of the Ottertail River, and a very good crossing over the Kicking Horse about one-half mile below the canyon.

On the whole a better scenic route is also obtained.

The road line was consequently located on the south side of the Kicking Horse

River

River valley, and by the adoption of this route a saving of \$1300.00 was made in bridging material alone.

Leaving the old railway grade about one-quarter of a mile beyond the high trestle over the Ottertail River, the location line crosses the main line C. P. R. track at Station 18 and runs northerly for 3.7 miles until it strikes the Kicking Horse River at Station 195.

The line then skirts the river bank until opposite the mouth of Emerald creek - Station 218 - where the crossing is made to the north side of the river.

Following this side of the river the location skirts the edge of the canyon and finally joins the Natural Bridge road at Station 270.

When completed this road will form part of one of the most popular drives in the vicinity of Field.

While, with the exception of about two miles along the Kicking Horse River and Canyon, the

the road will not be as picturesque as the famous Yoho Drive, it will have the advantage of low grades with no dangerous switchbacks, and for this reason will doubtless receive a large share of motor traffic.

CONSTRUCTION.

Clearing stakes, denoting the limit of the right-of-way, were set immediately after the completion of the location work. Culverts and bridge piers were also staked out.

Plans of bridges, over the Ottertail and Kicking Horse rivers and Boulder Creek, were prepared and filed in the Head Office at Ottawa. Truss bridges are required over the two former streams, - a 45-foot span being designed for the Ottertail, and two 60-foot spans for the Kicking Horse.

All timber on these bridges, with the exception of flooring, will be round peeled logs cut from native timber. Hewing will of course be necessary at the joints and in floor beams and joists.

When the timber in the substructures has become seasoned, it can be coated with a water-proof stain of suitable color, which, besides preserving the timber, will add greatly to the appearance of the bridges.

Mr. Stinson, of the highway staff, was sent to Yoho Park in January to superintend the erection of these bridges. However, owing to severe weather and heavy snowfalls during January and February, very little progress was made with the work during these months.

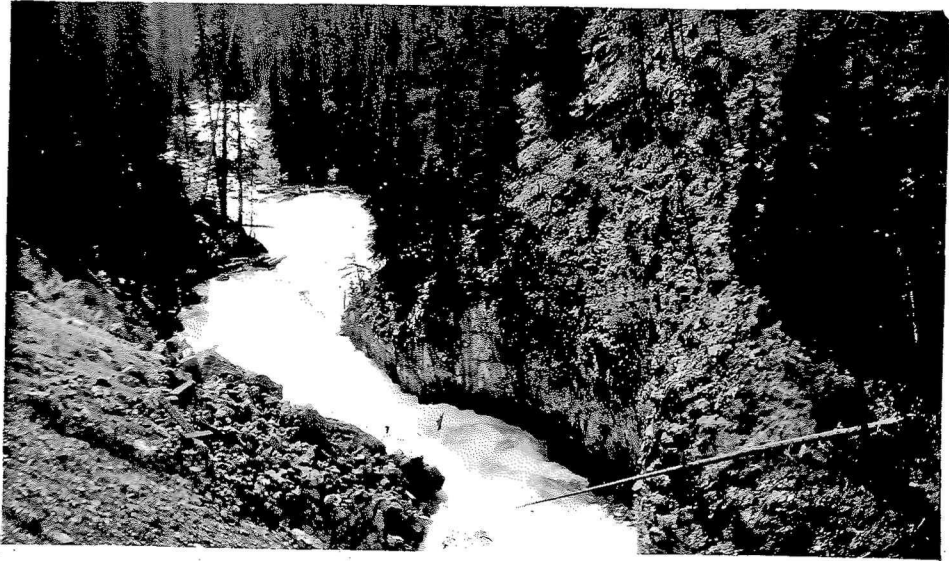
With favourable weather in March and April these bridges should be completed before the high water.

The road will be cross-sectioned at an early date in the coming season, following the completion of clearing and grubbing, and it is expected that the entire road will be graded and completed by alien labour during the summer months.

Costs of the surveys in connection with the location of this road are here given:

Class of Survey	Miles run	Cost per mile	Total cost
Reconnaissance	30.0	\$ 2.50	\$ 75.00
Location	5.1	54.69	278.92
Staking Culverts and Bridges	----	-----	48.44
Totals -	35.1	-----	\$402.36

YOHO PARK



(1)

Kicking Horse River -
from Laggan-Field road.



(2)

Kicking Horse River Canyon -
from Laggan-Field road.

(3)



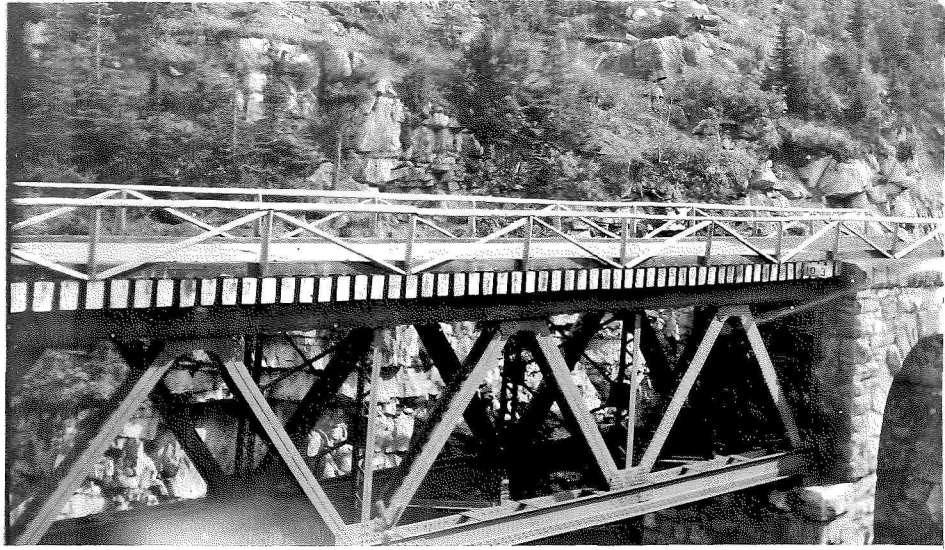
Kicking Horse River -
from Laggan-Field road.

(4)



Laggan to Field road -
(on old C. P. R. grade).

YOHO PARK



(5)

Bridge - C. P. R. old grade
Laggan-Field road.



(6)

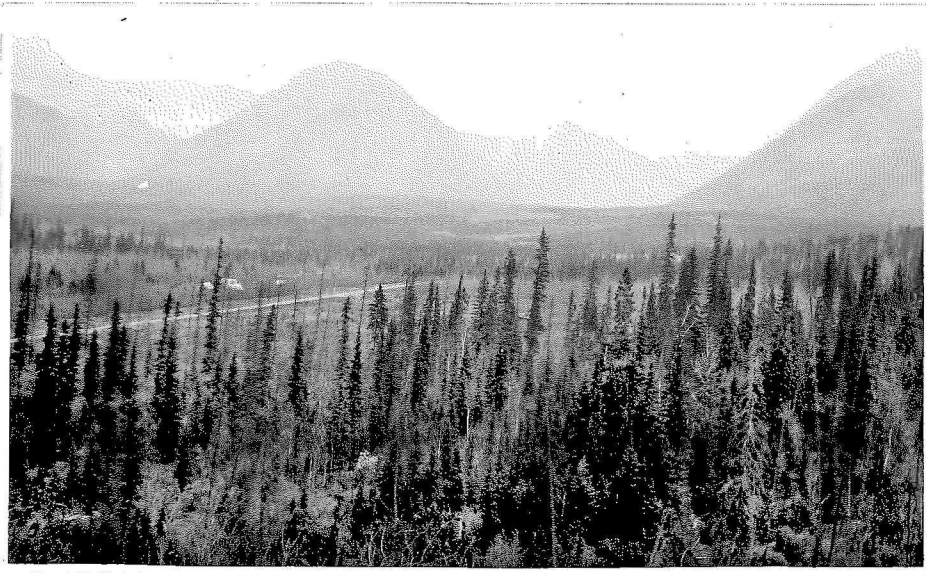
Bridge - C. P. R. old grade
Laggan-Field road.

(7)



Yoho Valley from Laggan-Field road.

(8)



Kicking Horse River Flats near the Ottertail.

YOHO PARK



(9)

Views of Ottertail Internment Camp
February 1916



(10)

(11)



Views of Ottertail Internment Camp.

(12)



YOHO PARK



(13)

Views of Internment Camp.



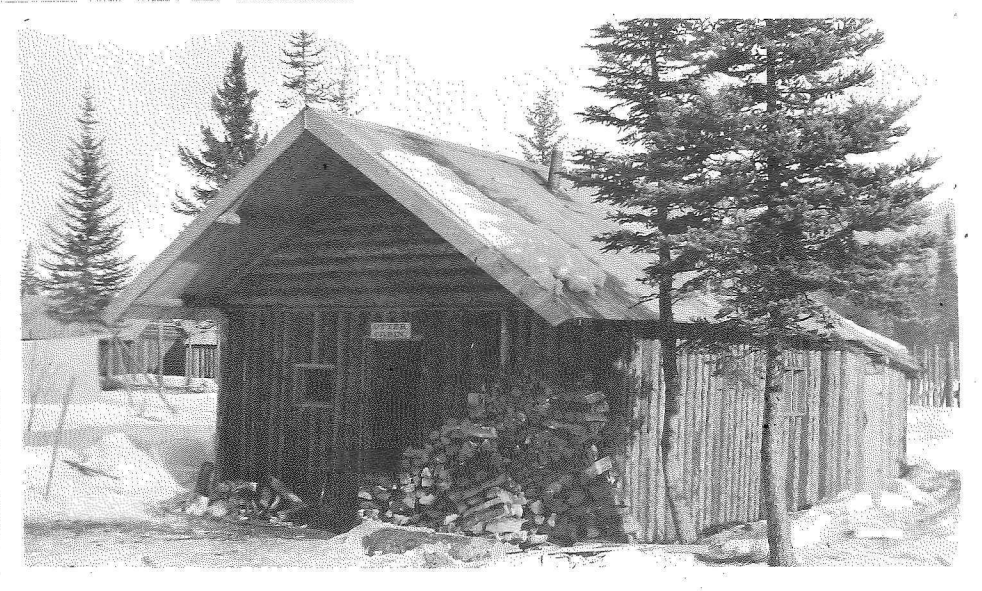
(14)

(15)



Views of Internment Camp.

(16)



GLACIER PARK

Owing to the construction work necessitated by the introduction of alien labour on the parks' roads, it was found impossible to perform all the location work in the Glacier Park originally intended.

The only road under consideration in this Park at the present time is that from Glacier Station to the Nakimu Caves.

On September 20th I made a trip to the Caves over the road, in order to determine what could be done as regards a re-location of the road for the purpose of obtaining better grades.

Owing to the narrowness of the road-bed and the steep turns, the road is only used by vehicles to within one mile of the end of the grading. This leaves a distance of nearly two miles to be travelled afoot or on horseback before the Caves are reached, which makes a visit to the Caves inconvenient unless made entirely on horseback.

The grades of the switchbacks on the newer portions of the road are very steep, and as they

they stand are a drawback to ordinary vehicles and practically prohibitive to motor traffic. The average grades on the new portions are also fairly heavy - 12 and 14 per cent.

By widening the narrow portions of the road and improving the turns, vehicles could be used without much trouble to the end of the grading.

While the location of the last one and one-half miles of graded road could be changed to give 6 or 7 per cent grades, none of the present grading along this section could be utilized, and I do not think it advisable to contemplate this change under existing conditions in the Park.

The best course at present appears to be improving the new portion of road, so that all sections graded can be used by vehicles, and possibly extending it for another one-half mile.

There does not appear to be any great advantage in projecting an expensive bit of road over the ridge at the head of Cougar Valley to the Caves themselves. The distance from the

foot

foot of this ridge to the Caves is very short,
and it is also probable that an entrance to the
largest Caves will be made somewhere in this
vicinity.

ROAD CONSTRUCTION AND MAINTENANCE -

To obtain the best results from the development of the highways in our National Parks, a definite policy as regards location, construction and maintenance should be laid down and followed.

In connection with the location of roads, the great part of our work at the present time consists in laying out the main chain of highways that will connect the various Parks.

These highways, being most important, will naturally receive the first consideration from a location and construction standpoint.

On their completion, or better, during the last stages of their construction, the development of the secondary highways will receive chief attention. These will be branches from the main highways to points of interest that are not touched by the main roads.

They will include loop roads and purely scenic routes. Some of these secondary highways are already constructed, and many of the routes are at present followed by trails.

With a few exceptions this plan of development is being generally followed in the parks at the present time.

CONSTRUCTION -

With regard to the construction of the roads, work of a more uniform character is highly desirable. At present every new road constructed - I refer particularly to those built by day labour, - reflects and embodies the peculiarities of construction possessed by the particular foreman in charge of the work.

Roads built by day labour, where foremen were head of the work with no definite instructions, show varying widths, ever-changing gradients, different ideas in drainage and timber construction, varying degrees of neatness or raggedness in grading, and consequently a wide range in cost.

To avoid these possibilities in the future, I would recommend that the Parks highway staff be requested and authorized to provide any

foreman

foreman about to commence road construction by day or alien labour, with definite instructions covering the work to be performed.

These instructions would give the width of clearing and grubbing, the width of finished road-bed and slope of cuts required, and should be accompanied by such standard plans necessary to cover the timber construction on the road.

They could either be given to the foreman directly or transmitted through the Superintendent of the Park in which the road is built. The latter course is advisable where there will be no engineer permanently on the work. In cases where there will be a resident engineer, the former course could be adopted and a copy of the instructions forwarded the Superintendent for his reference.

A copy would also be forwarded the Commissioner of Parke for filing in the Head Office.

Since sections of the new park roads will be built through material unsuitable for a road surface, the subgrades of these portions should

be

be gravelled before being subjected to traffic. On any road where a considerable quantity of surfacing material must be placed, the estimated cost of such work will be included in the total cost of the road, and the appropriation should be large enough to cover this extra expenditure.

Gravelling is better done a month or two after the completion of the road, when the built up sub-grade has had time to settle and compact itself.

The majority of our new roads are completed in the fall of the year, so that the necessary surfacing can be done either in the late fall or early the following spring.

MAINTENANCE -

A definite system of highway maintenance has not as yet been followed in the Dominion Parks.

At present repair work on roads is often left until it is an absolute necessity, and consequently entails greater expenditure than if taken at the proper time.

The old adage "a stitch in time saves nine" is never more true than when applied to road repairs and maintenance.

The examination of each road every spring and the performance of ordinary maintenance work in connection with it, will result in each type of road being in good condition during the summer. Also the expenditure required will be little in excess of the price of large repairs due to neglect.

Early last spring the Superintendent of Rocky Mountains Park was instructed to determine the maintenance work necessary for the coming season on the roads in that Park, so that the expenditure of an amount covering its cost could be authorized, and the work done.

He was also notified that this information should be obtained as early as possible each spring and supplied the Head Office, together with an estimate of cost, so that the work could be authorized and commenced well in advance of the rush season.

This course should be followed with respect to every one of our National Parks. In the absence of a resident engineer, the Park Superintendent could make the necessary examination of the roads, and where advisable his report could be checked up by one of the Head Office staff.

Repairs and maintenance work in each park could be done by a small gang of four or five men - a section gang - under a competent foreman.

The above general plans for road construction and maintenance are exceedingly simple and elementary, and consequently can easily be introduced into the various parks. They are not a great departure from the present methods employed, but constitute a more definite course of procedure than is being followed in our roads at the present time. I believe much improved results in construction and maintenance would undoubtedly follow their adoption.

CONCLUSION -

The great assets of our National Parks are of a scenic nature and every mountain area is rich in points of beauty and interest that annually attract thousands of visitors.

The rapid development of these parks by the construction of highways will, by making accessible each year additional scenic points, result in a steady annual increase in the number of Park visitors.

Since every visitor is an advertising medium, an increase in number will also increase correspondingly the effectiveness and scope of our National Parks advertising.

Further, it is generally true that the greater the number of interesting places open to the average tourist, the greater will be the lengths of the individual visits.

A combination of these circumstances will eventually afford a great increase in the annual revenue derived from tourist traffic.

European countries have by thorough development capitalized to a full extent whatever they possess of beauty and interest, and the government of the United States has taken steps towards more rapid development of their National Parks by formulating a comprehensive scheme of highway construction.

The Canadian National Parks with their splendid charm, deserve that every effort be made to afford to the public the opportunity of travelling extensively in them over well-built roads and trails.

Apart from an aesthetic view point, the increased revenue resulting from well developed National Parks will more than justify the additional expenditure entailed by highway construction on a larger scale.

Respectfully submitted
J. M. Wardle

Acting Highway Engineer.