

ANNUAL REPORT  
of  
SURVEYS AND CONSTRUCTION OF HIGHWAYS  
IN THE DOMINION PARKS - 1916

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

Dear Sir,

I beg to submit herewith the annual report of the highway work undertaken in the Dominion National Parks during the season of 1916 by myself and staff.

During the season surveys were made in all of the large western parks - different work being performed in Yoho, Jasper, Rocky Mountains, Revelstoke, Waterton Lakes and Buffalo Parks.

The work undertaken ranged from bridge design to drainage surveys, and included particularly highway location and construction.

YOHO PARK.

Construction. The first work of the season was in connection with the erecting of bridges by alien labour on the new Ottertail-Natural Bridge road in Yoho Park.

The sites of the various bridges on this road had been staked out when the road was located in October 1915, and the work of erection was begun the following February under the direction of Mr. Stinson of the highway staff.

Extremely cold weather and heavy snowfalls greatly delayed the work, and the truss of the Ottertail bridge was not finally placed until the middle of March. Work on the large Kicking-horse river bridge at Sta. 220, was commenced in this month, and the first 60-ft. truss was in place before the high water in June temporarily closed down the work. The second 60-ft. truss was erected in July, and work was then begun on the floorbeams, joists and bridge approaches. During this month a small bridge of 24-ft. span over Boulder creek, was also constructed.



The engineering work in connection with the construction of the bridges and the road itself, was taken over by Mr. J. C. Brady on May 13th, - Mr. Stinson, going to Castle Mountain to act as resident engineer on the Castle-Laggan road.

In addition to the bridge-work, clearing and grubbing to a width of forty feet was completed by alien labour between stations 0 + 00 and 218.

Grading was begun in the middle of July, and was continued by alien labour until the end of the month - the road being opened up from Sta. 0 + 00 to Sta. 8.

Unfortunately at this point the prisoners refused to do any further roadwork, and after some efforts on the part of the military to induce them to resume operations the camp had finally to be disbanded. On the closing down of the work by alien labour, construction was carried on by a small gang of day labourers.

Grading, without any side-ditching or finishing, was completed as far as station 66. Culverts and log drains were placed in the sub-grade where necessary.

The Ottertail River bridge was finished early in November, and in addition a strong crib was built above the bridge to protect the north approach. The Kickinghorse River bridge, while not completed, was made passable to saddle ponies and pack trains.

Road-work was finally closed down in the middle of November.

The following are the total quantities of work performed on this road in 1916:

Clearing.....	19.763	acres
Grubbing.....	19.775	"
Earth excavation.....	2445.1	cu. yds.
Loose rock " .....	489.0	"
Round logs in culverts....	937.8	lin. ft.
Hewn " " " .....	1480.4	" "
Round logs in cribs.....	3600.	" "
Iron in place.....	6333.8	lbs.
Timber in bridge piers....	3715.	lin. ft.
Timber in superstructure..	6583.9	" "
Flooring in place on bridge.....	10359.0	F.B.M.

Of these amounts the following can  
be credited to day labour:

Earth excavation.....	1958.2	cu. yds.
Loose rock.....	212.7	"
Round logs in culverts....	674.9	lin. ft.
Hewn logs in culverts....	1151.4	" "
Round logs in cribs.....	3360.0	" "
Iron in place.....	826.4	lbs.
Timber in superstructure of bridges.....	1397.4	lin. ft.
Flooring in place.....	10359.	F.B.M.

Location.-

During the latter part of August a survey was made of an alternate route to avoid the switchbacks on the Yoho Valley road. These switchbacks at present constitute a serious obstacle to motor traffic on the road, and it was desirable to obtain a diversion that would afford safer grades and alignment and could be constructed at reasonable cost.

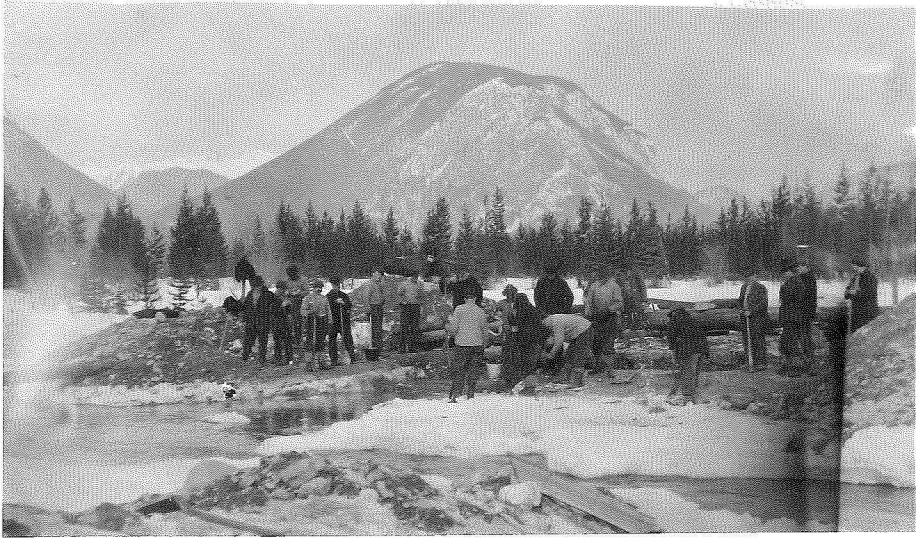
The line finally adopted and located on the ground has a total length of 5800 feet, and I consider a 15-ft. road could be constructed for \$9500.00.

In addition to having much better grades and alignment than the present switchbacks,

the proposed diversion leaves the present road at a point where a good view of the switchbacks can be obtained, and also offers much better scenic points along its entire route than the corresponding portion of the constructed road.

A full report of this survey with accompanying plans and profiles has already been submitted.

YOHO PARK



(1)

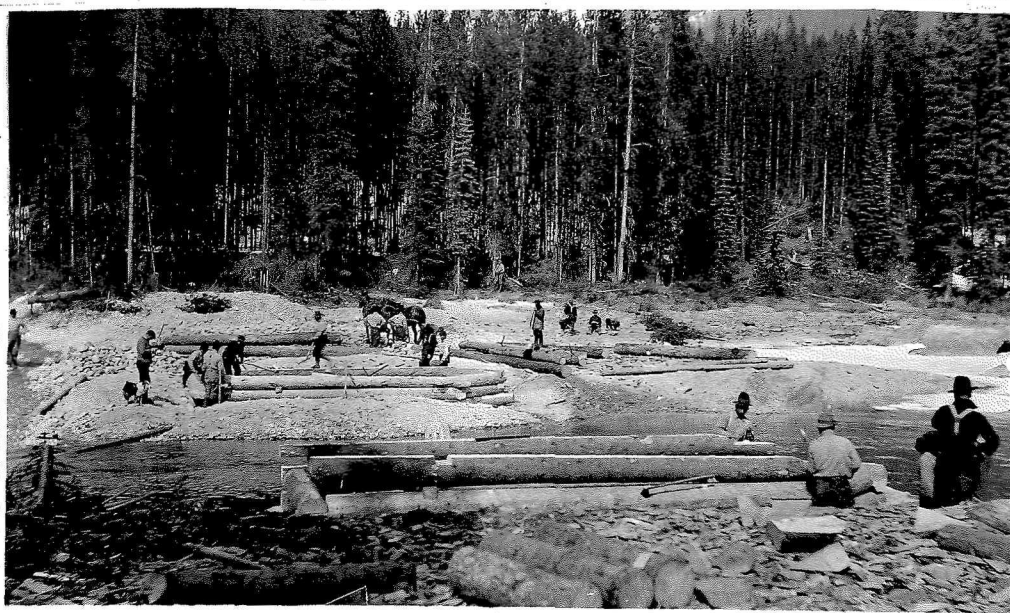
Excavating for Piers - Ottertail River Bridge.  
February 1916.



(2)

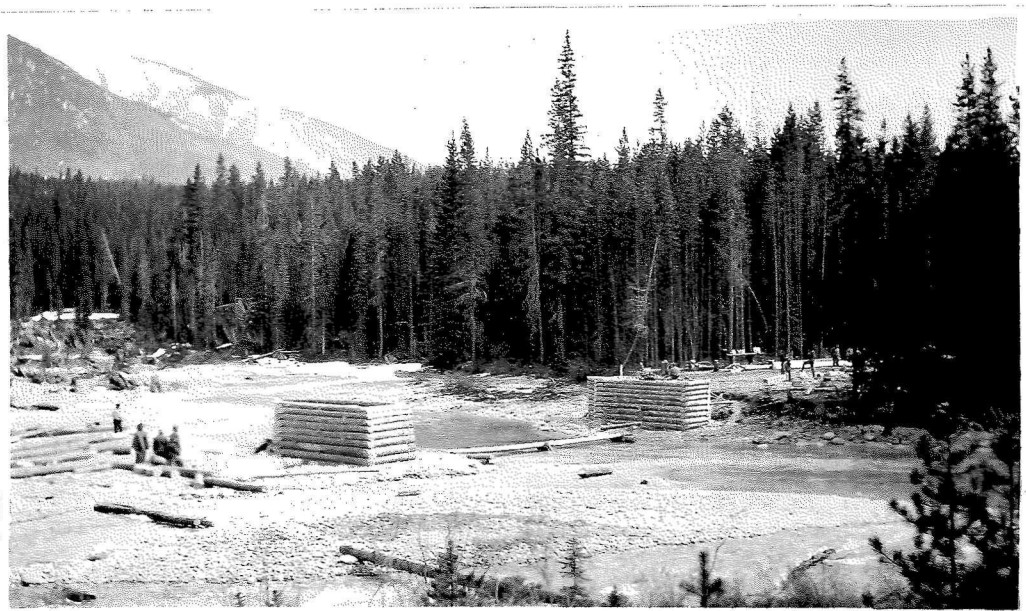
Ottertail River Bridge - March 1916.

(3)

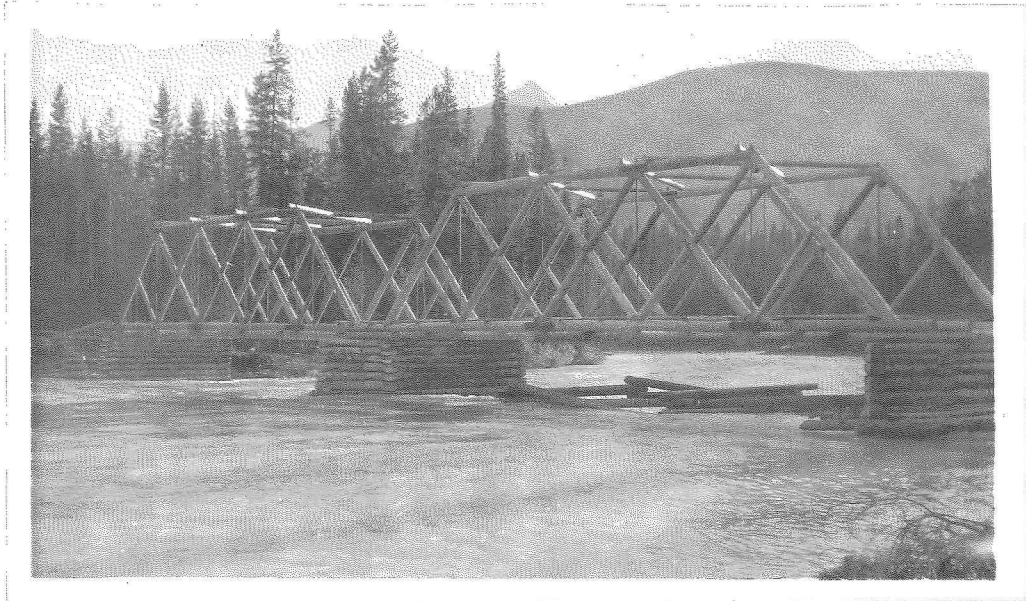


Building Piers - Kicking Horse River Bridge.  
April 20, 1916.

(4)



Piers Nos. 1 and 2 completed - Kicking Horse  
River Bridge. May 12, 1916.



(5)

Kicking Horse River Bridge - July 1916.



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Kicking Horse River Bridge - July 1916.



(7)



Section of new Ottertail-Natural Bridge Road.



YOHO PARK



(8)

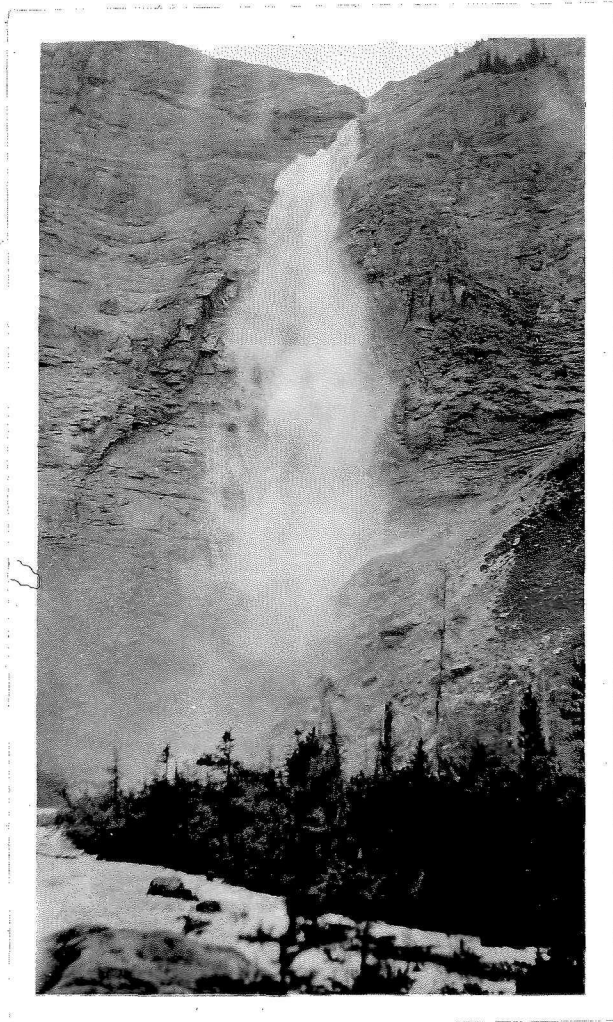
Yoho Valley Road - Cathedral Mt. in background.



(9)

Switchbacks - Yoho Valley Road.

(10)



Takakaw Falls - Yoho Valley Road.

JASPER PARK.

Location.

Early in May a small location party was organized in Jasper Park for the purpose of undertaking the final location of the Maligne-Medicine Lake road.

While a traverse of the proposed road between Maligne Canyon and Medicine Lake had been made the previous year by the local park's engineering staff, the line run was more in the nature of a preliminary survey, and when inspected on the ground was found to be unsuitable for a motor road.

Consequently the line as finally located

in 1916 did not utilize any of the old preliminary line - following as a general rule a somewhat higher route throughout.

Beginning at the intersection of the preliminary line and the 6th Meridian - Sta. 401 - which is a point some three hundred feet from the Maligne Canyon shelter, the location line crosses to the north side of the Maligne river immediately above the beginning of the Maligne gorge.

It then follows the river valley on a gradually ascending grade until Medicine lake is reached - Sta. 880. After skirting the lake shore for approximately half a mile, the line terminates at the Medicine Lake shelter - Sta. 905.

Owing to the press of construction and other work, the survey was discontinued at this point on July 29th.

Owing to an exceptionally high water on the Maligne river in July, the tote road to Medicine lake was flooded and washed out in many places, and considerable difficulty was experienced in getting in supplies. During the freshet the basin of Medicine lake became full to overflowing

and in addition to the subterranean drainage, a cataract - six to ten feet deep - flowed down the generally dry surface channel.

The water level of the lake reached an elevation of 4730.8 above sea level, which, I understand, is more than 80 feet above normal.

A total of 9.7 miles of new line were located and in addition two miles of line, between stations 300 and 401, were re-run in connection with construction work.

Herewith are the costs of the various lines run in connection with the location survey:

Reconnaissance	- 40.5 miles @ \$ 2.69	- \$108.94
Preliminary (Trial lines abandoned)	- 8.0 " @ \$23.77	- 190.16
Final location	- 9.7 " @ 50.86	- 493.34
		\$792.44

Construction:

While the last two miles of the road from Jasper to the Maligne canyon had been located in 1914, and the greater part of the

clearing and grubbing completed in 1915, very little grading had been done. Consequently the necessary grading on this section - sta. 305 to 401 - was the first construction work undertaken.

On the completion of this portion, grading on the new location was continued as far as station 413. Grubbing was completed to the same station and clearing to station 444.

In addition to this work the bridge over the Maligne river at sta. 407 was raised, strengthened and improved in appearance.

The construction of the road to Medicine lake was to have been accomplished by means of alien labour, but owing to difficulty with the prisoners only from 10% to 15% of the number interned at the Maligne camp were available for roadwork.

As it was of no advantage to the Parks department to continue the camp under these conditions, work was closed down on August 15th and the camp subsequently disbanded.

The following are the work quantities on this road for the season:

(June 8th to August 15th)

Clearing.....	4.315	acres
Grubbing.....	4.308	"
Earth excavation.....	2554.9	cu. yds.
Loose rock " .....	502.0	"
Solid rock " .....	97.0	"
Round logs in cribs and culverts.....	1072.0	lin. ft.
Timber in bridge.....	193.0	" "
Iron (in place).....	52.5	lbs.

Mt. Edith Cavell Road.

The location of this road was begun on September 7th by Mr. Wilkins of my staff. Two miles of the line immediately south of Jasper had already been located by the local park's engineering staff and our location line continued their location from sta. 110.

The road was finally located to sta. 598 - a distance of twelve miles from Jasper - and some three and one-half miles from the lake at the foot of Mt. Edith Cavell glacier.

Beginning at station 110, the line traverses the flat country on the west bank of the Athabaska river to station 245, at which point it commences the ascent to the crossing over Boulder creek - station 302.

The maximum grade on this section of the line is 6.5%, with an average of 6%, and is the heaviest gradient on the road as so far located. This portion of the line will also be one of the most expensive sections from a construction standpoint, as some very steep side-hill is encountered.

Two lines were run in order to determine the best crossing over Boulder creek. The lower crossing was eventually chosen as it afforded a straighter alignment with a shorter gradient - the bridge required being also easier to erect than that on the upper line. A 360-ft. trestle bridge will be required for the crossing chosen.

Leaving Boulder creek the line climbs gradually to the crossing of Cavell creek at station 412. A 200-ft. truss and trestle bridge will be required at this point.

At station 418 the line begins ascent of a very abrupt shoulder, some 450 feet in height, which is climbed by a series of four long switch-backs with average grades below 6%.



At station 540, elevation 4621 feet, the survey passes within a few feet of a cluster of "Hoodoos", situated on the face of a steep, clay-gravel bank. At the foot of this bank, 500 feet below, Cavell creek is seen flowing towards the Athabaska river.

From station 540 to station 598 fairly good country is traversed and the grades are very light, there being a total ascent on this portion of only 60 feet.

Owing to the extreme cold weather and heavy snowfall experienced in the Cavell valley, work was stopped for the season at station 598, the party being disbanded on November 24th.

From a scenic point of view the Mt. Edith Cavell road will be the superior of any in Jasper park, and I believe will prove as interesting as the best drives in either Rocky Mountains or Yoho parks.

From station 180 onwards, practically every turn in the road discloses new and interesting sights, and in addition there is a splendid view of the mountain peaks lying up the Athabaska that widens in extent as the line gradually ascends.

At the crossing of Cavell creek, the proposed bridge will span a canyon 100 feet wide and 60 feet deep,- at the bottom of which the water foams and rushes in splendid cataracts.

On the switchbacks, far reaching views of the Athabaska river - north and south - are afforded, and the town of Jasper can be discerned against the background of Pyramid mountain, which towers above the neighboring hills. From the summit of the switchbacks, lakes Patricia and Pyramid can be seen lying in pretty basins among the mountain foothills, and directly ahead, Mt. Cavell, and the neighboring peaks, with their snowy mantles, are in full view.

Construction work on this road was begun on September 4th, under the direction of the Acting Superintendent, and by December 30th some five miles of grading had been done.

Work on the various bridges required on the first six miles of the road, is being continued as far as weather conditions permit throughout the winter months.

JASPER PARK



(11)

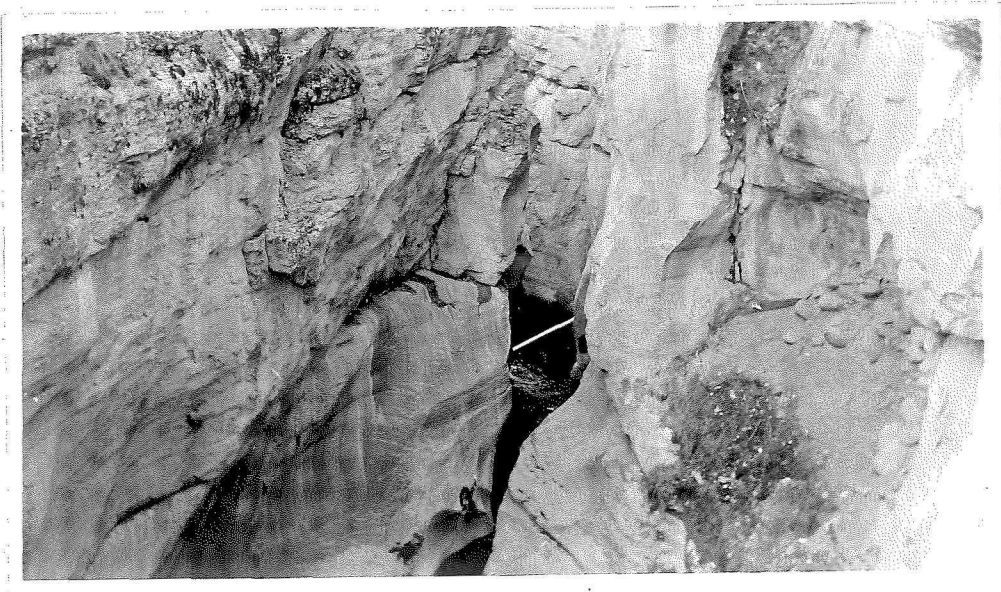
Pyramid Mountain from Maligne Road.



(12)

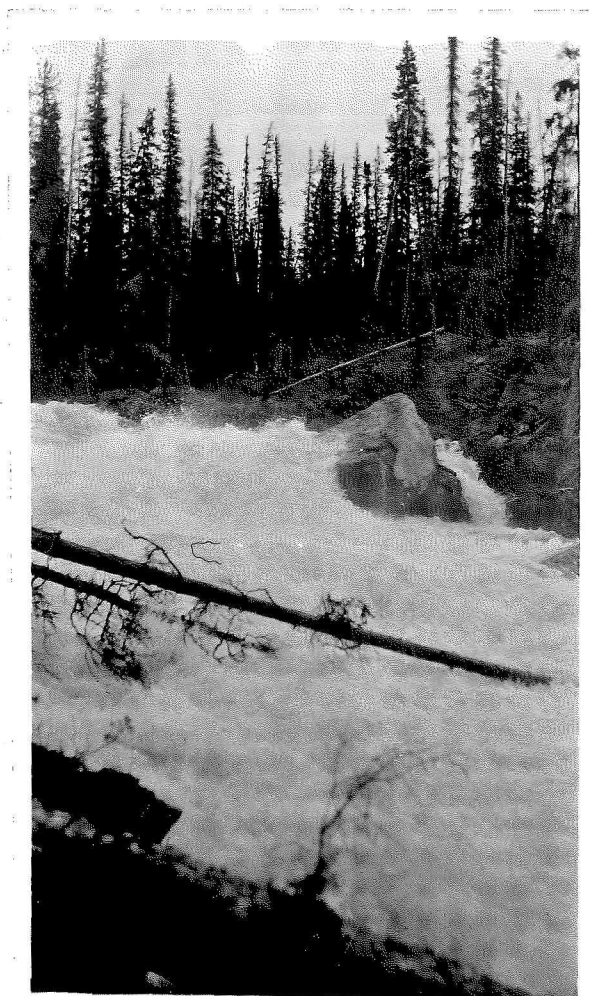
Interment Camp at Maligne Canyon - 1916.

(13)

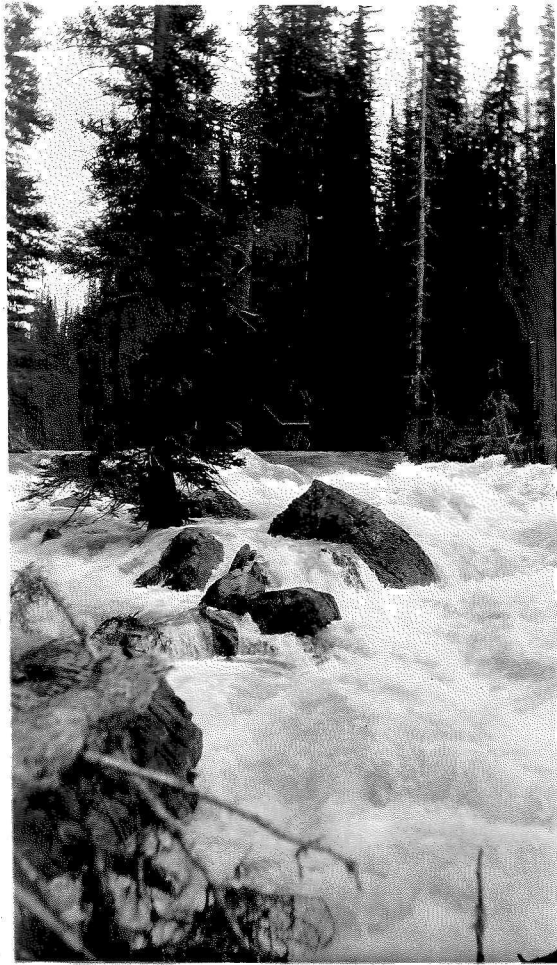


Upper Maligne Canyon - near Sta. 510.

(14)



Overflow from Medicine Lake - July 1916.



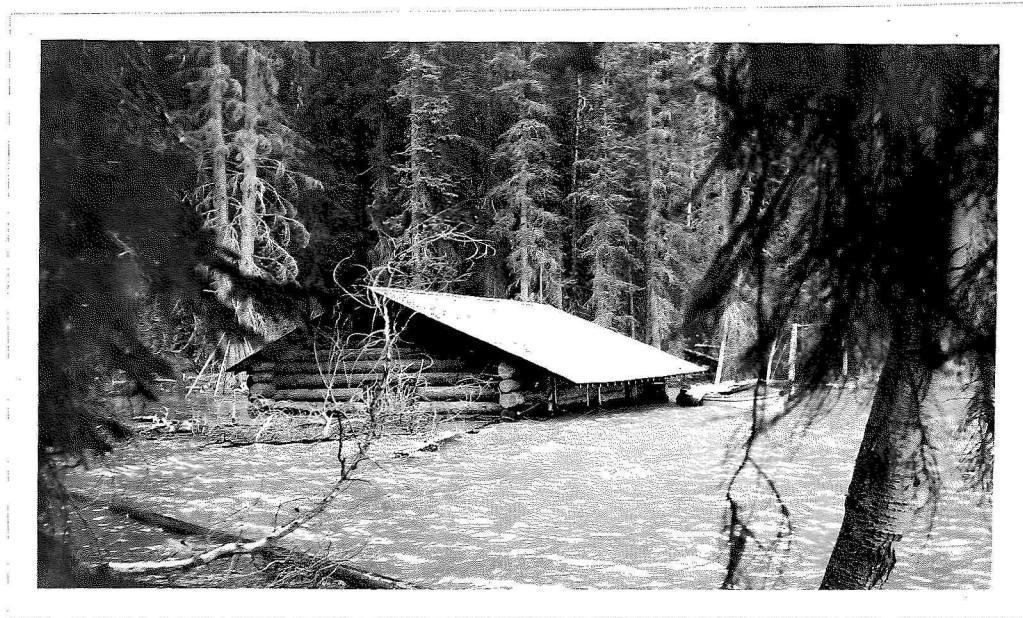
Overflow from Medicine Lake  
showing flood conditions.

(16)



Fording Maligne River during highwater.

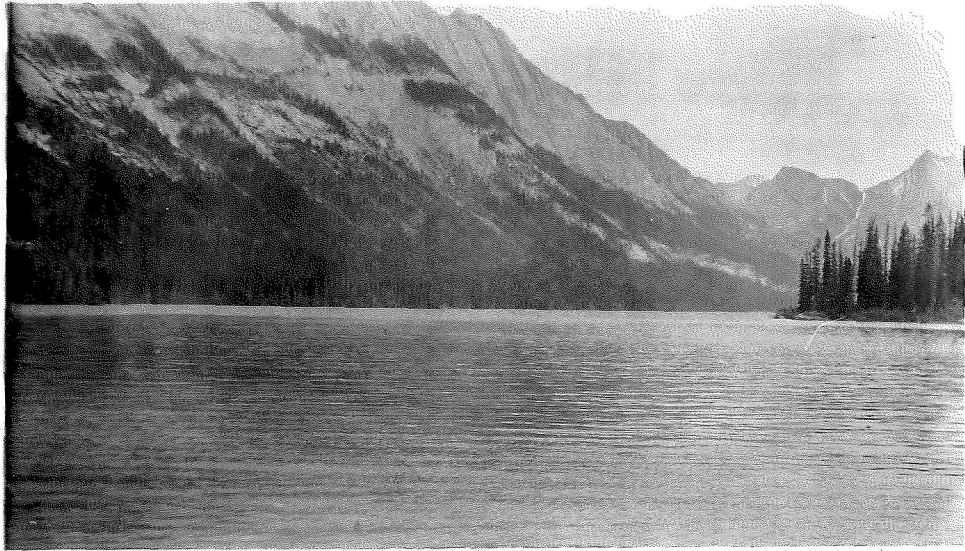
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Medicine Lake Shelter during flood of Medicine  
Lake - July 1916.



JASPER PARK



(18)

Medicine Lake - July 1916



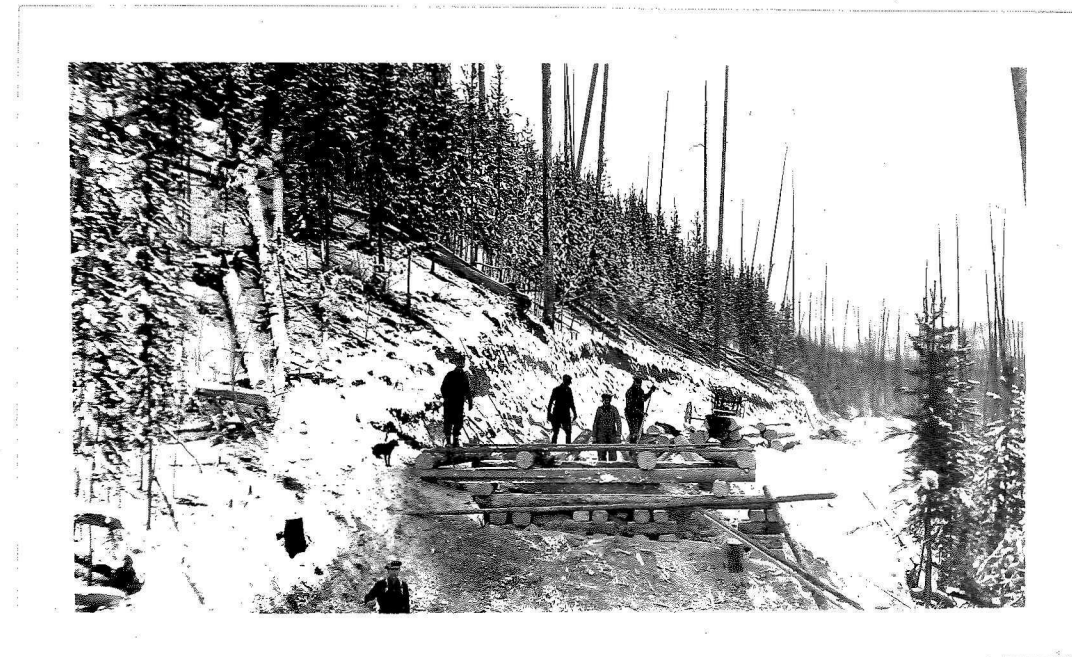
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Mt. Edith Cavell Road - Sta. 249.

(21)



Mt. Edith Cavell Road, -Building trestle  
Sta. 252.



JASPER PARK



(22)

Location Line - Sta. 505.

(23)



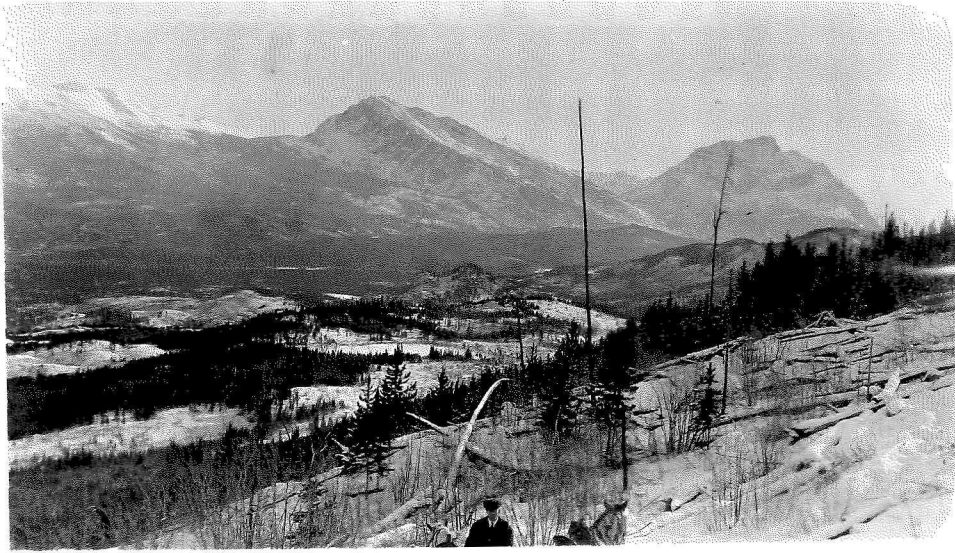
Looking North from Sta. 502 - Mt. Edith Cavell  
Location Line.

(24)



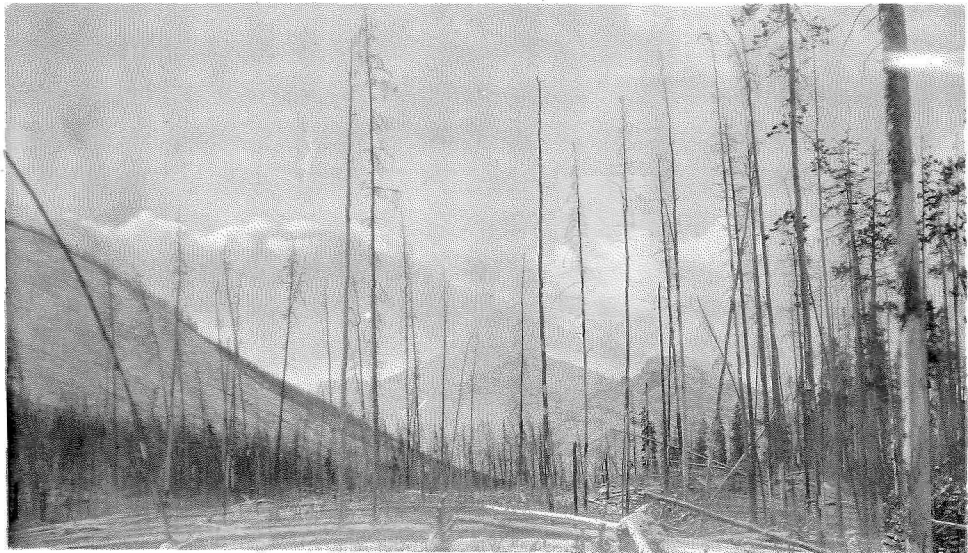
Athabasca River and Valley from Sta. 487.

JASPER PARK



(25)

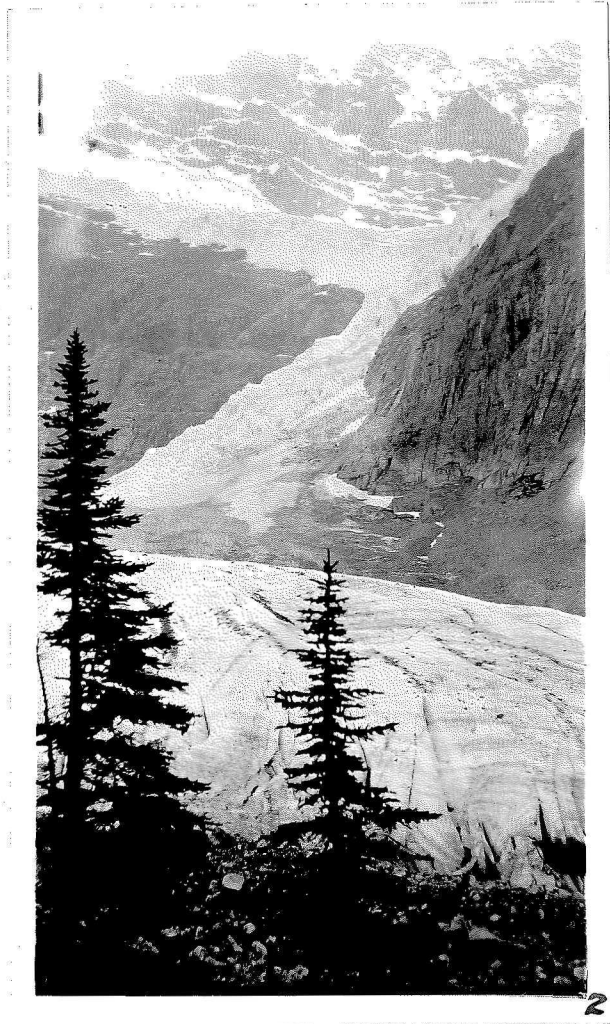
Mount Hardisty from Sta. 487 - Location Line.



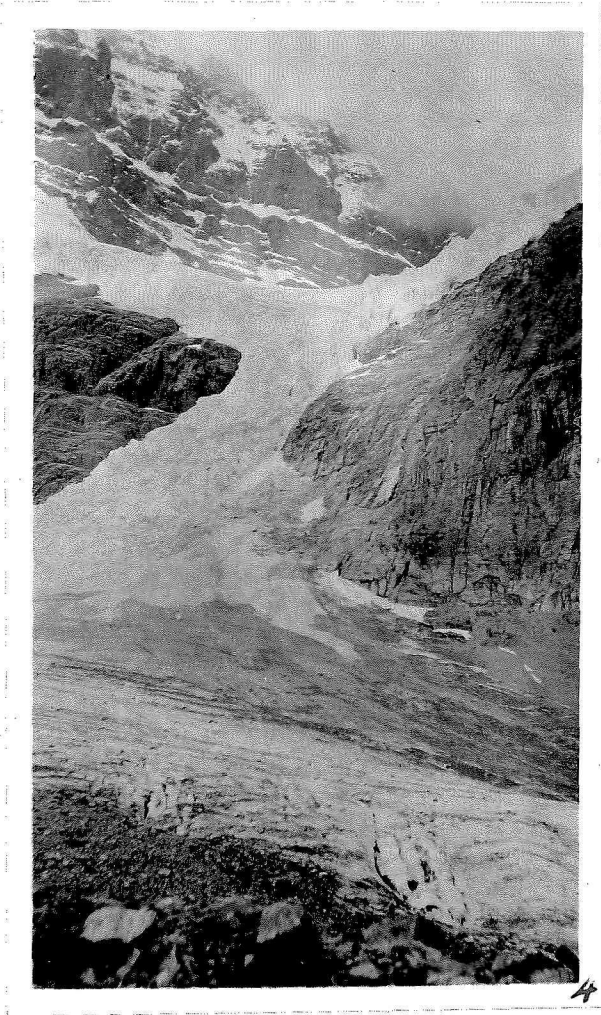
(26)

Mt. Edith Cavell from Sta. 540.

(27)



Mt. Edith Cavell Glacier - from a point near  
proposed terminus of motor road.



Mt. Edith Cavell Glacier.

(29)



Pass south east of Cavell Glacier. - Alt. 7200.



ROCKY MOUNTAINS PARK.

The chief highway engineering work undertaken in this park during the season was in connection with the construction of the motor road from Castle to Laggan, by day and alien labour.

During the season of 1915, this road, with the exception of some trimming at various points, and some grading and cribwork in the vicinity of station 93, had been built by alien labour from sta. 0 to sta. 150.

In the past season a new road, 18 feet wide, was opened up from sta. 150 to sta. 356, a distance of four miles. The road between these two points is nearly completed, there remaining only a 1000-ft. section in the Eldon Hills to be graded.

Besides the construction of this new road, the portions left unfinished in 1915, between stations 0 and 149, were completed, and the greater part of the road from sta. 0 to sta. 132 was surfaced with gravel.

A second-hand steam shovel purchased by

the department did good work in connection with the heavy grading in the Eldon Hills.

During the period of its operation, a total of 4570 cubic yards of earth, loose rock, and solid rock, were excavated, and a considerable saving was effected over grading by ordinary methods.

Considerable time was lost in the operation of the shovel on account of the delay in securing small parts for minor breakages, which under ordinary circumstances are usually kept in stock with the shovel, or else made by a blacksmith employed in connection with the work. Orders for such common supplies as bolts, nuts, washers and lubricating oil, were several days in being filled at the government stores at Banff.

The work was also delayed by the incompetency of a fireman, who on several occasions failed to keep up the required head of steam.

In spite of the adverse conditions encountered the showing made justified the purchase of the shovel, and I consider that, handled to the best advantage, the machine will make much better progress.



Besides the timber work incidental to the construction of culverts and log drains on the road, a bridge over Baker creek, sta. 500, was practically completed.

This bridge is of 43-ft. clear span, and consists primarily of two 45-ft. I-Beams, supported on concrete abutments. Besides being of a permanent nature and low in cost, this bridge will be of good appearance.

The completion of this bridge affords a passable route for vehicles as far west as Temple - a fairly good tote road being available at sections where the motor road is not constructed.

Eleven miles of the road still remain to be built before Lake Louise (Laggan) is reached, but as some seven miles of this portion will be easily constructed, it is hoped that the road will be opened up as far as Lake Louise this coming season.

The following are the total work quantities credited to day and alien labour and the steam shovel on this road in 1916:

Clearing.....	12.028	acres
Grubbing.....	9.434	"
Earth excavation.....	16,663.5	cu. yds.
Loose rock " .....	4,308.9	" "
Solid rock " .....	90.8	" "
Surfacing gravel.....	1,250.	" "
Logs in culverts, cribs and guardrail.....	10,944.	lin. ft.
Bridge timber in place....	154.	" "
	4,545.	F.B.M. )
Concrete in place.....	30.	cu. yds.
Iron in place.....	1,317	lbs.
2-45 ft. I-Beams in place..	10,350.	"
Other bridge iron.....	140.	"

The total yardage moved by alien labour on the road in 1916 was approximately 15,700 cubic yards, as compared with 11,623.3 cubic yards moved in the season of 1915.

#### ROCKY MOUNTAINS PARK.

##### Location.

On the conclusion of the construction work on the Castle-Laggan road for the season, two surveys were undertaken in the vicinity of Banff during the month of November.

One of these was in connection with the proposed new Spray river and Hot Springs roads, and the other in connection with a diversion to avoid the "Corkscrew" on the Tunnel Mountain road.

The first survey consisted chiefly in taking topography and levels on the original survey lines of the Spray river and Hot Springs roads, as located by Mr. Child, resident engineer at Banff, and in staking out the position of the culverts necessary for drainage purposes.

The field work in connection with this survey was completed in three weeks.

The survey of the proposed diversion on the Tunnel Mountain road was made without difficulty, a very satisfactory route avoiding the "Corkscrew" being obtained.

The diversion, as located, is 1200 feet long, with an average grade of less than six per cent, and a maximum grade of seven per cent for 400 feet.

As the adoption of this diversion would afford a safe and easy route for motor cars, I would recommend its construction at an early date.

Detailed reports of this survey and of the Spray river and Hot Springs road surveys have already been submitted.

ROCKY MOUNTAINS PARK

(30)



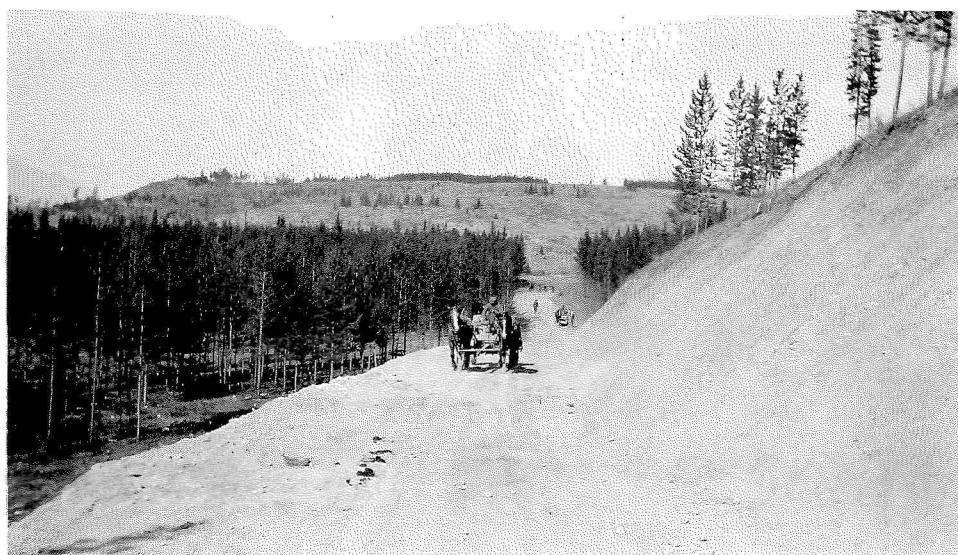
Castle-Laggan Road - Sta. 93.

(31)



Castle-Laggan Road, -from Sta. 170 - 1916.

(32)



View of Castle-Laggan Road - 1916

ROCKY MOUNTAINS PARK



(33)

Views of Castle-Laggan Road - 1916



(34)

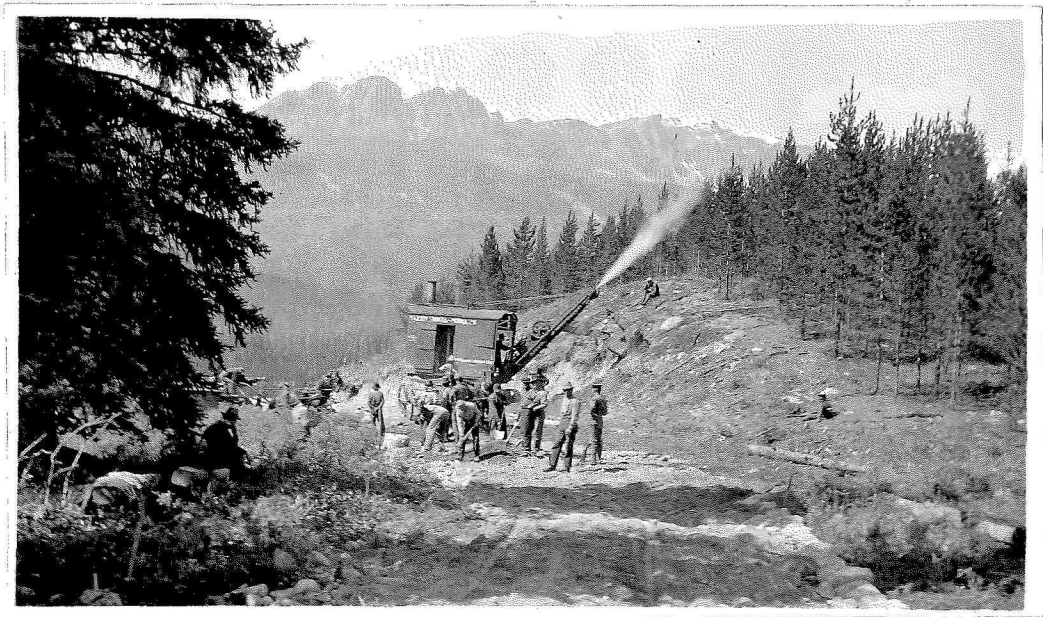


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Steam-shovel on Castle-Laggan Road - Sta. 315.

(36)



Steam-shovel on Castle-Laggan Road - Sta. 342.

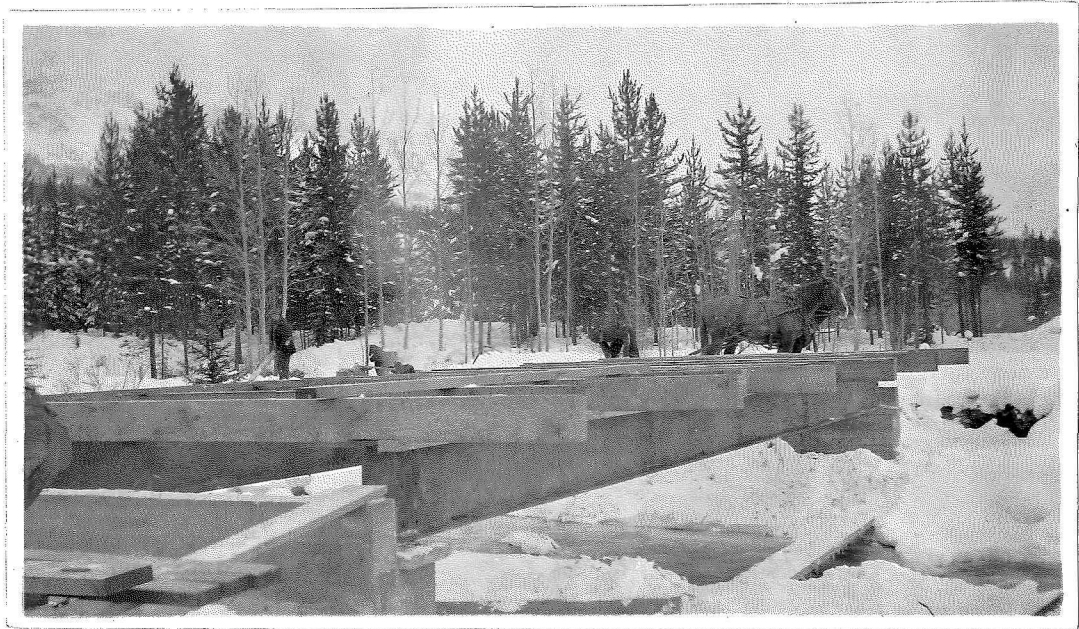


ROCKY MOUNTAINS PARK



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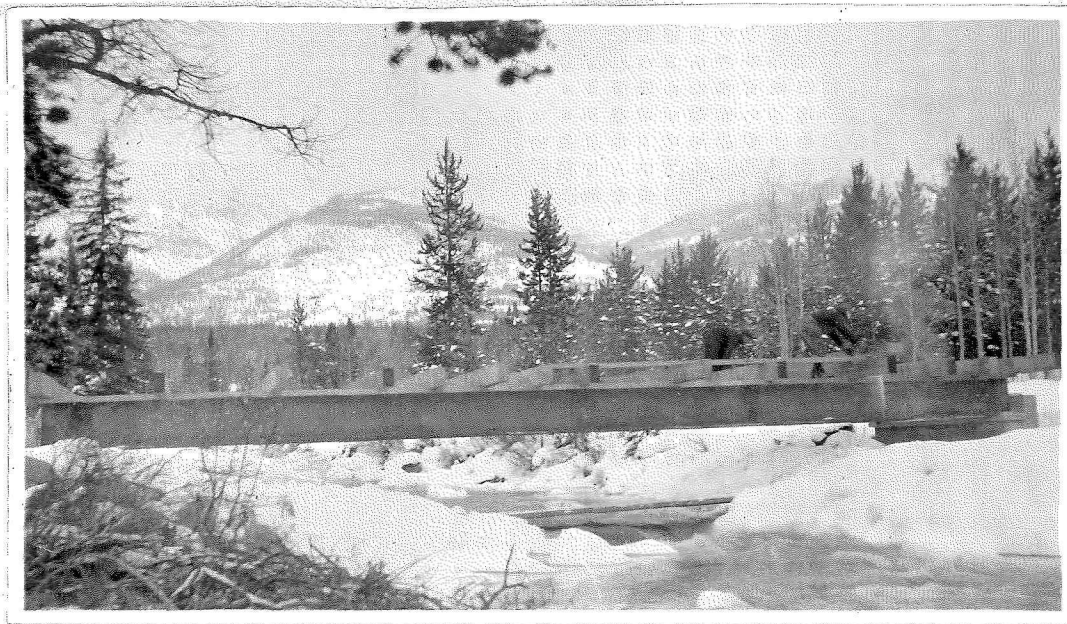
Concrete in forms - Baker Creek Bridge piers -  
Sta. 500



(38)

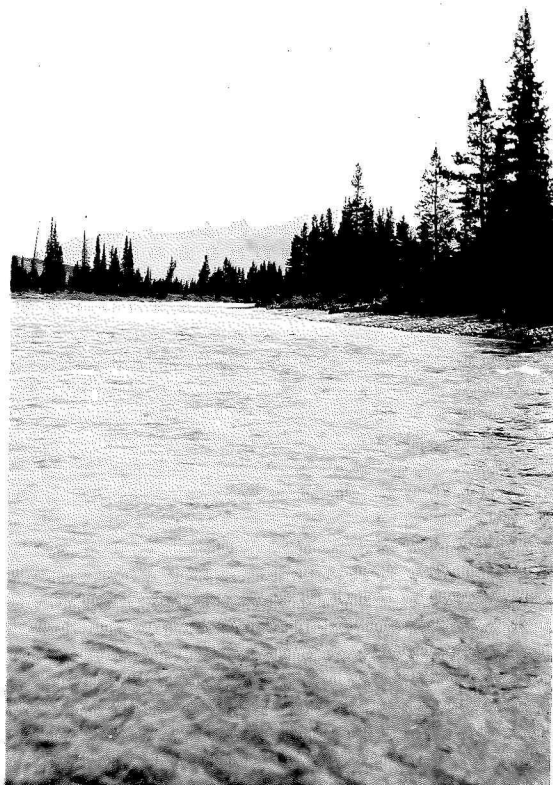
View of Baker Creek Bridge during Construction -  
1916

(39)



View of Baker Creek Bridge during Construction -  
1916.

(38A)



Bow River from Motor Road.

REVELSTOKE PARK.

Engineering work in this park consisted in laying out and measuring the work performed by day labour on the Mt. Revelstoke Motor road during the season.

In 1915, grade lines had been set to station 577, and these were followed during the construction of the road.

Early in September a resident engineer was placed on the work, and weekly measurements of the work quantities were made. In addition, the work done prior to September was measured up as accurately as possible by the engineer.

Construction work began in June and was closed down at the end of October. During the season, the road was opened up and made passable to motor traffic from station 475 to 576, a distance of two miles. The road between stations 430 and 475 was also completed by the removal of the solid rock that had been left from the previous season.

In addition to the grading done, wheelguards, cribwork and culverts, were placed where necessary.

Construction work stopped for the season at station 576,- this point being the site of the trestle bridge required over Bridge Creek canyon.

This bridge will be 100 feet long and approximately 20 feet high, with one approach on a curve, and taken in conjunction with the canyon it crosses will be one of the scenic points of the road.

Five miles of road still remain to be built before the chalet near the summit is reached, but I consider the most difficult portion of the road will be constructed with the completion of the road in the vicinity of Bridge creek.

Progress profile and estimates covering the work done between stations 430 and 576 have already been submitted.

WATERTON LAKES PARK.

Survey work in this park under my supervision, during the past season, was confined to the location of a trail from the chief warden's cabin, over "Summit" ridge, to the warden's cabin on the south fork of Yarrow creek.

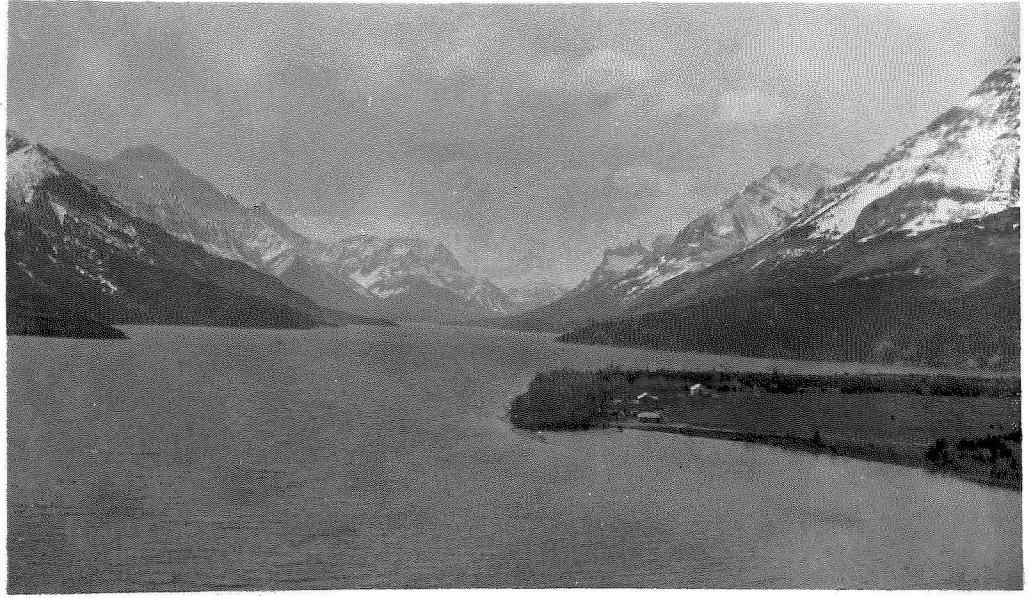
This work was undertaken by Mr. Stinson in the early part of June. The trail as located will be about thirteen miles long, with a maximum grade where it crosses Summit ridge, of 8 per cent.

Of this distance, nine miles were either constructed, or else located in open country where little or no work was required, and the remaining four miles were built during the season.

While in Waterton Lakes Park Mr. Stinson also made note of the existing road and trail conditions, and outlined the various work he thought should be undertaken in this connection.

A detailed report covering the survey work undertaken in this park has already been filed in Head Office.

WATERTON LAKES PARK



(40)

Upper Waterton Lake at International Boundary.

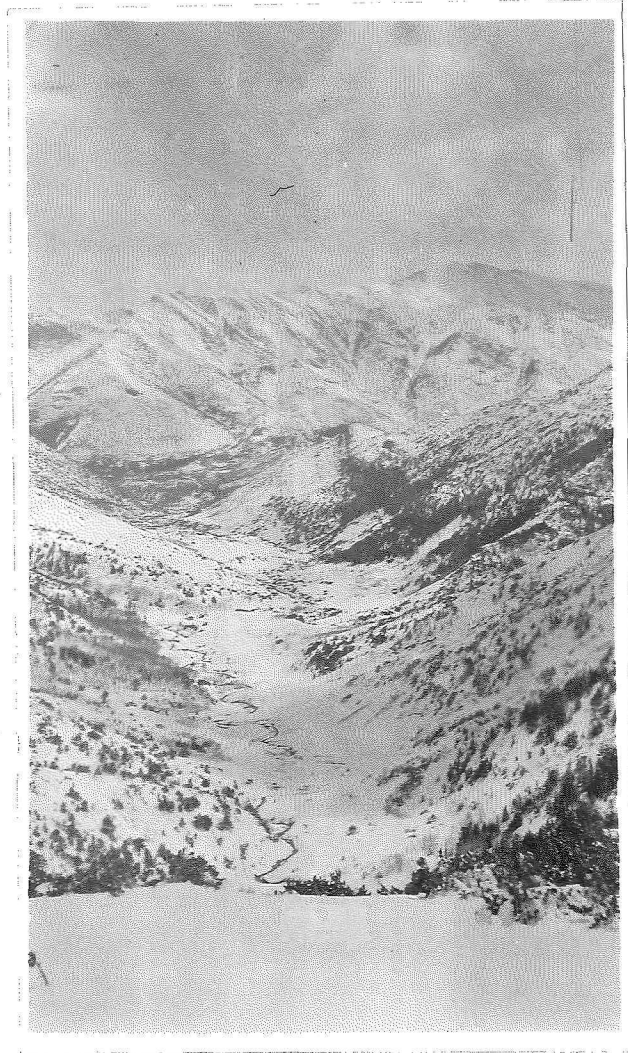


(41)

Cameron Falls.



(42)



Horseshoe Valley from Summit Ridge.

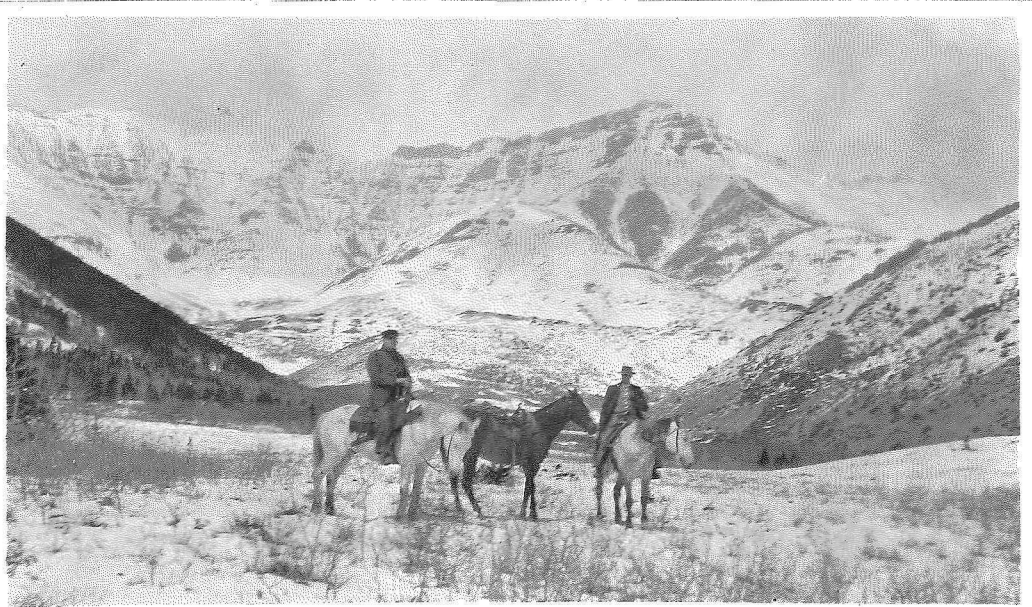


WATERTON LAKES PARK



(43)

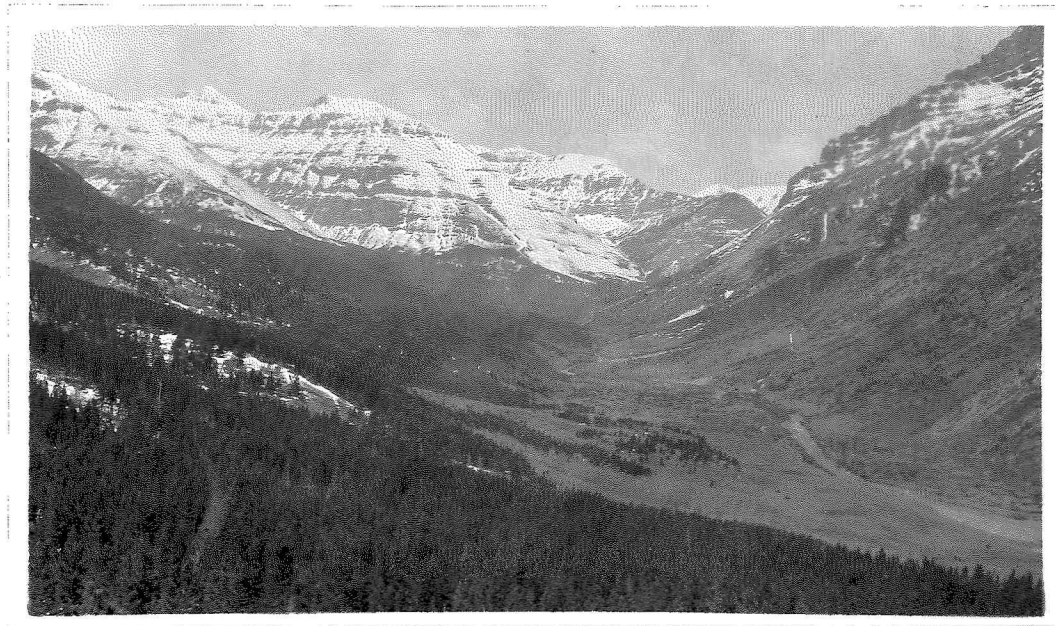
Horseshoe Valley with Summit Ridge in background.



(44)

Entrance to Horseshoe Valley.

(45)



Yarrow Creek Valley.

### BUFFALO PARK.

Early in December a survey was made of that portion of the Buffalo Park farm known as the "Hay Meadow", for the purpose of obtaining data in connection with the proposed drainage of this area.

The meadow under consideration is part of the shallow basin of the Ribstone river, and in extent is one and one-half miles long with an average width of 2400 feet.

Owing to the flatness of the country and the small channels available to carry off the Ribstone river and surface drainage waters, the meadow, except during a dry season, has been too wet to permit the cutting or gathering of the hay crop. A survey of the effected area was therefore made to determine what could be done towards providing a satisfactory drainage system.

Field work was undertaken during the first week of December, seven miles of transit and level lines being run in.

From the information obtained it was found that an enlargement of the present ditches

and the construction of two new ditches, would provide a system capable of effecting the degree of drainage required.

While the drainage of the meadow area will possibly result in an occasional flooding of the low lands bordering Willow lake, this, if at all harmful, can be remedied by cleaning out and straightening the outlet channel from the lake.

A full report with plans and estimates covering the proposed work, was submitted in January.

## GENERAL

A large amount of survey work in connection with both road location and construction was undertaken during the season.

In addition to the regular work outlined, several surveys, decided upon at a later date, were made in November and December.

Owing to the long season of seven and a half months in the field, work was necessarily carried on during the late spring and early winter months, and was greatly hindered in these periods by bad weather conditions.

Some eighteen inches of snow was still lying in the foothills near Laggan in May when general surveys were commenced, and during location work on the Maligne Road during May and early June wet snowfalls were frequent.

Exceptionally cold weather was encountered in the middle of November in the different Parks,  
the

the Mt. Cavell Road location party being disbanded with two feet of snow on the ground and a temperature of 25<sup>o</sup> below zero.

Owing to the increased cost of survey work and the discomforts of a canvas camp in such severe weather, I have not found it of advantage to continue field work beyond the first week of November.

One of the greatest drawbacks to both construction and location work was the difficulty in obtaining men.

Those employed steadily from the first of the season will generally remain until the closing down of the work, but it becomes increasingly difficult to obtain men as the season advances.

Owing to these conditions location parties were generally short-handed throughout the season, and it was difficult to keep the cost of the different surveys within the usual limits. This was particularly the case in connection with the location of the Mt. Cavell Road in Jasper Park. Survey work was practically held up on this road early in

September

September when labour was in great demand for harvesting in the vicinity of Edmonton and Calgary.

During the season in the field twenty four miles of new road were finally located, and thirty miles of preliminary, re-location and other lines run.

In addition thirteen miles of road were constructed and four large bridges built. Plans for these and other bridges were prepared either in the field or while in Ottawa during the winter months.



ROAD CONSTRUCTION AND MAINTENANCE -

In my report for the year of 1915, I made certain recommendations with regard to a very desirable uniformity in the construction of our park highways.

In previous years many important points incidental to the construction of a road, such as the width of road-bed, crown, drainage and the character of timber construction, were frequently left to the judgment of the foreman in charge of the work. This practice naturally resulted in varying types of construction, some of which were faulty or unsuitable.

This defect was pointed out in my previous report, and, as a remedy, it was recommended that definite instructions and standard plans, - modified if necessary to suit local requirements- should be supplied to the foreman or resident engineer in charge of the work.

I am now glad to report that practically all roads under construction in the Dominion Parks during the past season were built according to standard sections and plans prepared by the highways staff.

Resident engineers on the Castle-Laggan, Ottertail-Natural Bridge and Maligne Motor Roads were provided with complete instructions covering the roads in question, while a set of standard plans was also supplied the Acting Superintendent of Jasper Park for his guidance in the construction of the Mt. Edith Cavell Road.

While still in its initial stages, I consider this adoption of a uniform standard of construction an important step towards better roads in our National Parks.

MAINTENANCE:-

Our present lack of a satisfactory and definite system of road maintenance is I believe one of the greatest obstacles to our good roads movement.

The time is fast approaching when our park roads will be submitted to heavy motor traffic.

Tourists fresh from the scenic routes of the Yellowstone, Yosemite, Glacier and other celebrated parks of the United States will motor through our Western Canadian Parks. We would not wish other

than

than a favourable comparison to be made between the motor routes recently traversed and our own national park highways.

Within our park boundaries are some of the grandest portions of the Rocky Mountains range and we need fear no comparison from a purely scenic standpoint. Further, the main highways we have located and constructed in recent years have remarkably low gradients, and are equal if not superior in this respect to any constructed under similar conditions on the continent.

But this alone is not sufficient. In addition we must, by constant and careful work, so maintain our road surfaces that the motoring visitor can enjoy the scenic beauties around him without suffering the distractions of a bad road-bed.

During the past season I paid particular attention to this aspect of our road question and found a large percentage of our roads in a comparatively poor state of maintenance. Several of the roads affected needed but a little repair work in the nature of raking, and the filling of ruts and holes, to put them in a satisfactory condition.

Other

Other roads, due to continued neglect, needed practically a re-building of the subgrade before they could possess a technically good traffic surface. Failure to exercise proper care or supervision as regards culverts and drainage ditches had resulted in washouts and the destruction of the crown of the road by flood waters.

Such defects as these can be prevented or greatly minimized by the establishment and carrying out of a definite plan of maintenance.

A satisfactory system should provide for essentially:-

(a) A systematic annual inspection of all roads as soon as weather conditions permit in the spring.

(b) The economical performance of such repair and maintenance work on each road as is required to keep it in good condition for traffic.

There are practically but two distinct methods of earth road maintenance in use at the present time. The first involves the thorough repairing of a road by a fairly large force of men in a short time in the early spring. No further attention is then

paid

paid the road until the following year. While having its good points this method is not generally conceded to give the best results for the expenditure involved.

The second method requires the employment of two or three "sectionmen", on a portion of road six to ten miles in length, from early in the season until well in the summer months. This method gives the road attention when it needs it most and generally "nurses" it through the heavy rains of the early summer. As water is the natural enemy of earth roads this is a strong point in its favour.

On the whole the latter plan is, I believe, the most suitable for the conditions found in our Parks. Its financial requirements can also be estimated and provided for by reserving a suitable amount for each mile of road to be applied on maintenance work.

One of the pleasantest roads to drive over during the past season was the Yoho Valley Road from Field to the Takakaw Falls.

The smooth surface on this road, -one naturally difficult to keep in good condition, -was in my opinion largely due to the continual employment  
of

of section-men upon it throughout the early summer months.

While the work performed by these two or three men from day to day might be hardly noticeable, - the results were very satisfactory and a good road surface was maintained throughout the season.

There is no doubt but that this plan can be substantially adopted to good advantage in all our Parks.

The main roads in Rocky Mountains and Jasper Parks are particularly in need of some such scheme of maintenance and I would therefore recommend that it be introduced in at least these two important parks this spring.

To be effective this system must be continuous from year to year, and the maintenance work it provides for must be recognized as an essential and routine performance of every season.

After its application through two or three years we will have not only universally better roads, - but we will be preserving and utilizing to the best advantage the trimming and crowning, performed at considerable trouble and cost, on our roads when newly constructed.

Respectfully submitted,

*J. M. Wardle* B. S. E.

VIEWS OF BANFF-WINDEREMERE ROAD  
SINCLAIR DIVISION

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(46)

Road house at crossing of Sinclair Creek by  
Columbia Valley Road.



(47)



Sidehill cut on Sinclair Road.

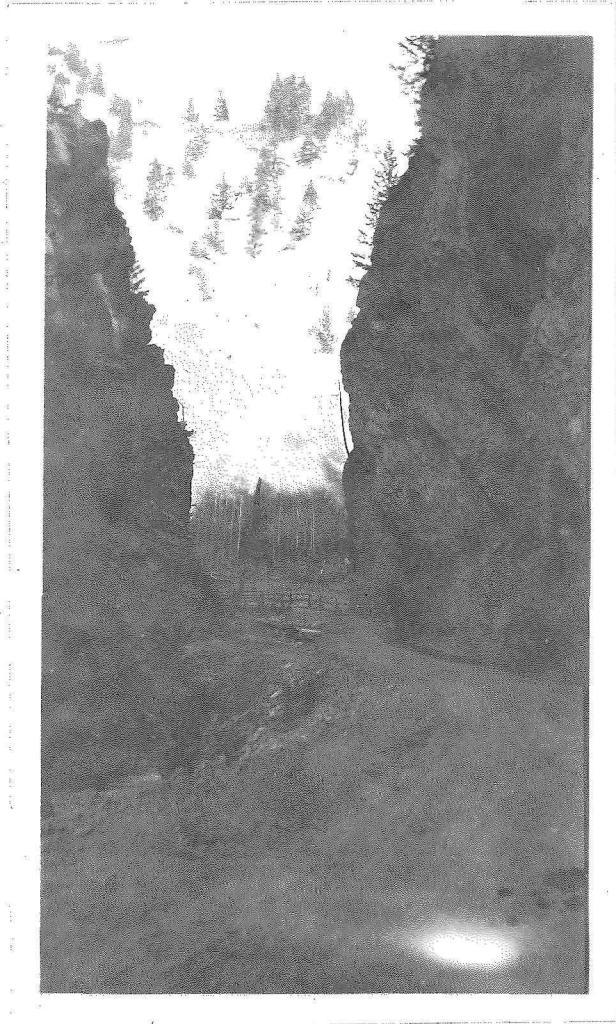
SINCLAIR DIVISION



(48)

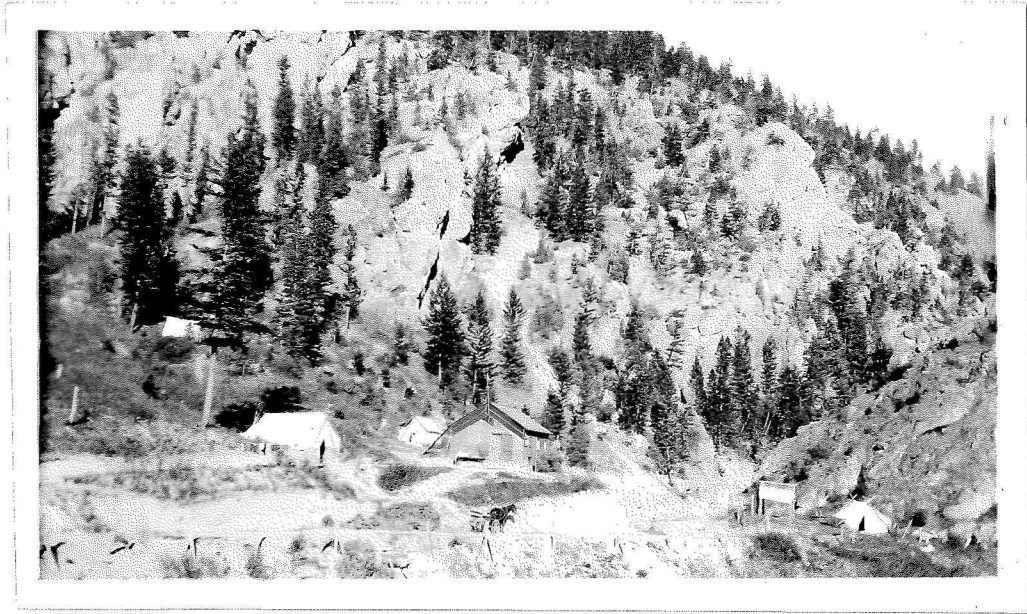
Sinclair Creek Canyon.

(49)



Sinclair Creek Canyon.

SINCLAIR DIVISION



(50)

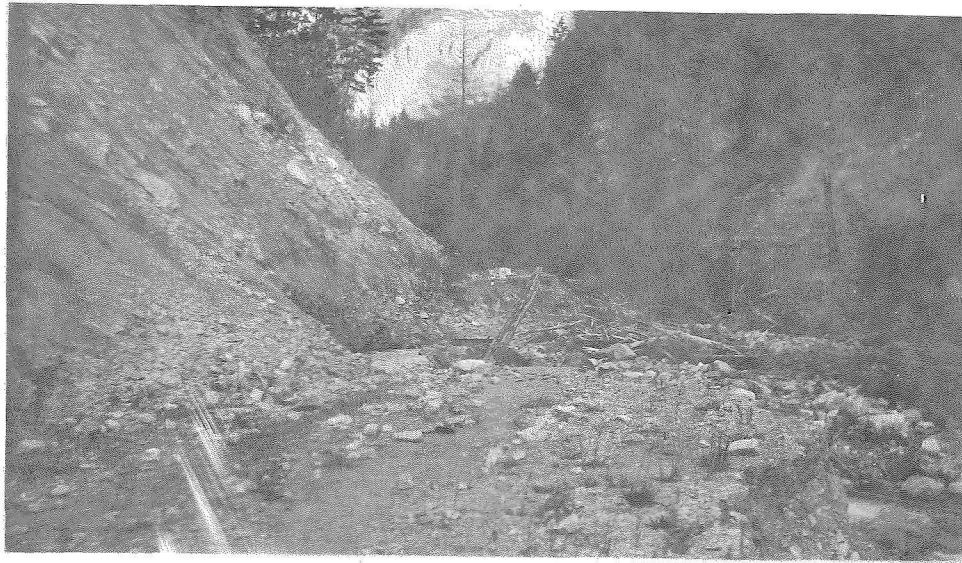
Sinclair Hot Springs.



(51)

Sinclair Hot Springs - Bathhouse and pool.

(52)



Views of washout by flood in June 1916.

(53)



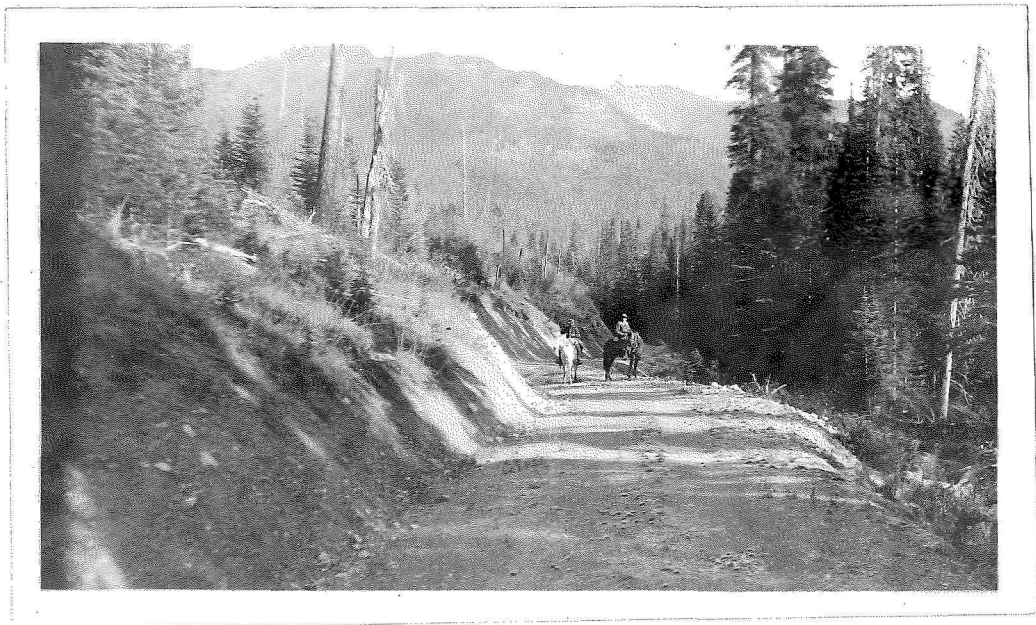


SINCLAIR DIVISION



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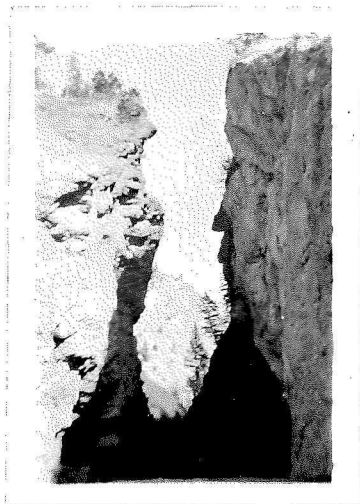
View of washout by flood in June 1916.



(55)

Section of Road near Sinclair Summit.

(56)



(57)



(58)



Snapshots taken on Sinclair Road.