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FINAL  
GEOLOGICAL REPORT  
ON  
"THE REDSTONE RIVER"  
N.W.T. (Canada)  
IMPERIAL OIL LTD., CANOL PROJECT.

Assignment No. 12.

By:- W.P. Hancock Party Chief  
D.C. Wetterberg Assistant  
W.T. Worthington Helper

Date Submitted:- February 18, 1944

Read and accepted by:- *Herb Link*

Date:- *2/18/44*

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TABLE OF CONTENTS

	Abstract	Page
CHAPTER I	INTRODUCTION	1 - 3
CHAPTER II	TOPOGRAPHY	4
CHAPTER III	STRATIGRAPHY	5 - 10
	General	5
	Table of Formations	5
	Middle Devonian	6
	Upper Devonian	7
	Fort Creek Formation	7
	Bosworth Formation	7
	Cretaceous	9
CHAPTER IV	STRUCTURE	11 - 14
	General	11
	Foothills Structures	12
	"Big Bend" Anticline	13
CHAPTER V	OIL POSSIBILITIES	14
CHAPTER VI	CONCLUSIONS & RECOMMENDATIONS	15

Bibliography

LIST OF SPECIMENS

Appendix

LIST OF ILLUSTRATIONS

PLATE 1 INDEX MAP

PLATE 2 "RECONNAISSANCE GEOLOGICAL MAP  
OF THE REDSTONE RIVER"  
Scale: 1 inch = 1 mile

PLATE 3 "COLUMNAR SECTION, REDSTONE RIVER"  
Scale: 1 inch = 200 feet

PLATE 4 "CROSS SECTION, UPPER REDSTONE  
RIVER" Vertical and Horizontal  
Scales: 1 inch = 1 mile

PLATE 5 "STRUCTURE CONTOUR MAP OF THE  
"BIG BEND" ANTICLINE, REDSTONE  
RIVER, Scale: 1 inch = 4 miles

FINAL GEOLOGICAL REPORT

ON

"THE REDSTONE RIVER"

A B S T R A C T

The Redstone River crosses the structural and topographic basin lying between the Mackenzie and Franklin Mountains. Fort Creek shales, Bosworth sandstones and shales, and Cretaceous sandstones and shales are exposed in the river valley of the map area. Beavertail-Ramparts limestones and Bear Rock brecciated dolomite outcrop in the Mackenzie Mountain front beyond the area. Source, reservoir, and cap rocks are present in the area. The upper part of the map area covers a wide belt of foothills structures. Four structures considered to be possible oil traps were mapped in this portion of the area. Downstream from the foothills belt and seven miles from the Mackenzie River lies the "Big Bend" Anticline. This structure is easily accessible from the Mackenzie River and it is recommended that a test well be drilled here. Part of the Cretaceous and all of the Devonian rocks could be tested in this well to give positive evidence regarding oil possibilities, not only of this structure, but of the entire area.

## INTRODUCTION

The Redstone River rises in the Mackenzie Mountains and drains the area between the Gravel and Dahdininni river systems. It enters the Mackenzie River opposite the Saline River, 120 miles above Norman Wells, (Plate I). A preliminary plot of the lower 60 miles of the Redstone was made by Mr. A. Frame from aerial photographs N 64 W 124, verticals Nos. 82 to 112. A reconnaissance geological survey of this portion of the river was made to determine the presence of structural conditions favorable to the accumulation of oil.

Considerable difficulty was involved in reaching the map area. The Redstone River is too swift to ascend by canoe or motor boat. No lakes occur near the river in the map area large enough to land a pontoon plane, from which a survey party could readily reach the Redstone River.

On July 9, Party "G", consisting of D.C. Wetterberg and the writer, were landed by seaplane on a lake in the front Ranges of the Mackenzie Mountains. This lake drains into a tributary of the upper Redstone and it was planned to reach the map area, about 50 miles distant downstream, by this somewhat circuitous route. The tributary proved too rough for canoe travel at the then prevalent water stage, and after losing all the equipment, maps, and most of the food supply, the canoe was abandoned. The party then headed overland for the Mackenzie River. Seven days were required to walk to the mouth of the Redstone River, a distance of about 70 miles. After three days wait at the mouth of the river the party was picked up by the tug boat Chipewyan of the United States Marine Operators, and taken to Fort McRiley. A plane returned the party to Norman Wells on July 28. An account of this first attempt to reach the map area was submitted as a special Memorandum by the writer last July.

After a reconnaissance flight over the Redstone River, Mr. Dalsail, an experienced bush pilot of the Air Transport Command, landed Party 'G' on the Redstone River on August 4 about fifteen miles above the report area. D.C. Wetterberg, W.T. Worthington and the writer constituted the survey party. The canoe abandoned on the first trip was retrieved, and the map area was reached on August 13. The survey was completed August 22.

Outcrops were located with the aid of the vertical aerial photographs covering the Redstone River, and were plotted on the map constructed by Mr. Ales Frans. Plane table surveys, including a survey of the "Big Bend" Anticline, were made at intervals along the river for scale control. The vertical aerial photographs do not have sufficient lateral coverage to indicate areas adjacent to the river which offer the greatest stratigraphic and structural control. Since the completion of the field work, trimetrogon aerial photographs have been made available, and a study of these has yielded further stratigraphic and structural information which has been incorporated in this report.

Due to its inaccessibility the Redstone River had not been previously studied. In 1923 W.A. Kelley headed a sub-party under G.S. Hume (4) investigating certain exposures along the Dahadinni River. Kelley made one traverse over to the Redstone River "where Cretaceous rocks are exposed on the cut banks of the river valley".

The writer wishes to acknowledge the co-operation given by his assistants, especially that of D.C. Wetterberg who accompanied the writer on both of the Redstone trips. The kindness and attention displayed by Captain and Mrs. Danner, and the crew of the boat Chipweyan, in rescuing the party after the accident of the first trip, was greatly appreciated. Discussions with Lt. G.D. Bath (1 & 2) and Lt. R.M. Hart (3), who did geological work in nearby areas, has facilitated compilation of this work.

Fossil identifications were made by C.R. Stelck assisted by K.F. Huff.

A preliminary report of this survey was written in September, 1943. (Assignment No. 12, Report No. 25).

#### Accessibility

Survey parties may be landed by pontoon plane almost any place along the Redstone provided the pilot has experience in, and courage for such landings. Transportation across country involves all the difficulties encountered in other areas of the north. The most promising structure of the area, "Big Bend" Anticline, could be reached from the Mackenzie River by constructing about seven miles of road along the north bank of the Redstone River.

## Chapter II

## TOPOGRAPHY

The Redstone River crosses the topographic and structural basin between the Mackenzie Mountains on the west and the Franklin Mountains on the east. The western part of the map area is adjacent to the Mackenzie Mountain front, and it displays a foothills type of topography. The relief in this part of the area is about 700 feet and 1500 to 1800 feet above the Mackenzie River. The upper 23 miles of the Redstone River, in the foothills belt, flows in one channel between steep cut banks of Devonian shale. Over this interval the river bed widens from 500 to 5000 feet. Sand and gravel bars occur along the sides of the river bed, and in the lower portion these begin to appear as islands in the river. In the lower 16 miles of the foothills belt the topography is subdued. The river maintains a relatively straight course in a valley up to 10,000 feet wide. The river bed varies from 2000 to 5200 feet in width and is divided into many channels by islands and gravel bars. The river gradient in the foothills belt varies from twenty to thirty feet per mile. Tributary streams are common in this part of the area. They are all too small for canoeing, and lie in deep V-shaped valleys, their pattern is controlled by geological structure.

The foothills topography gradually dies out to the east and the lower 20 miles of the river flows through a relatively flat plain sloping towards the northeast. Many small lakes are present in the five miles of plains adjacent to the Mackenzie River but are rare over the rest of the plain.

Except in the upper part of this plain area and near the river mouth, the Redstone River is again restricted to one channel. The river valley varies considerably in width and the valley walls are 100 to 175 feet high. The only radical change in direction occurring over the entire length of the lower Redstone River has developed as a result of the "Big Bend" Anticline in this portion of the river. The river gradient in the plains varies from twelve to eighteen feet per mile.

## STRATIGRAPHY

GeneralTable of Formations

Quaternary & Recent	Clay, silt, sand, gravel and boulders	0 - 200 feet
	Unconformity	
Cretaceous	Sandstone, shale, thin coal seams, and local conglomeratic beds.	600- <u>+</u> feet
	Unconformity	
Upper Devonian Bosworth formation	Sandstone, shaly sandstone, shale, and thin, dense, dark grey limestone.	1000- <u>+</u> feet
Fort Creek formation	Shale, dark grey to black, bituminous, grading upwards into the Bosworth formation.	1500- <u>+</u> feet
Middle Devonian Beavertail-Rasparts	Limestones, massive, grey-brown, (Exposed in mountain area, southwest of report area).	200- <u>+</u> feet
Silurian or Devonian Bear Rock formation	Brcecciated, dolomitic limestone (Exposed in mountain area, southwest of report area).	100- <u>+</u> feet

Devonian and Cretaceous rocks were recognized in the map area, (Plates 2 and 3). The Bear Rock, (Devonian or Silurian) formation was observed in the front ranges of the Mackenzie Mountains above the map area. The formation consists of brown, brecciated, dolomitic limestone, which weathers buff into typical rugged masses as in the Norman Wells area. With one possible exception the Beavertail - Rasparts (Middle Devonian) formation is likewise exposed only in the mountain front beyond the area surveyed. It was observed in a canyon through which the party descended en-route to the map area. In this canyon 150 to 200 feet of massive limestones are exposed. This is somewhat thicker than the Beavertail - Rasparts limestones in the Fort Norman area. The base of these limestones is not exposed nor

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Crush (Upper Devonian) shales are not entirely exposed in the map area. Sections observed are typical of this formation as described by workers in the Fort Norman field. Sandy beds overlie the Fort Creek shales and grade down into that formation. Fossil evidence proves that these are the stratigraphic equivalent of the Bosworth, (Upper Devonian) sandstones and shales. The Bosworth beds are known elsewhere to be unconformably overlain by Cretaceous sediments, although no angular unconformity was observed. The Cretaceous along the Redstone River is very poorly exposed. Sandstones and shales constitute the sections observed and no divisions into formations could be made. The valley bottom is strewn with glacial boulders throughout its length. The only boulder bed found in place, occurs just above the sharp bend in the river between photo centers 109 and 110. Glacial clays, silts and sands comprise most of the river banks of the lower half of the river. Recent river silts, sands and gravels have been deposited near the river mouth.

#### Middle Devonian

At station No. 24 a small outcrop of limestones occurs on the crest of the north plunging anticline. The limestone is bedded, dark grey to brownish, finely crystalline and dense. It emits a sulphur odour when freshly broken. Fossils were collected from this outcrop but were lost before identification, and the age of this limestone is therefore in doubt. This limestone may be the top of the Beavertail formation, but it is thought more likely to be a limestone bed in the Upper Devonian. Further reference is made to this in the description of this structure under Chapter IV.

Beavertail - Ramparts limestones and the Bear Rock dolomite are exposed in the mountains of the report area, and without doubt occur at depth in the area. Both formations offer potentialities as reservoir rocks.

Upper Devonian

Fort Creek Formation. The complete section of this formation is not exposed in the area. Hard, black, platy, bituminous shale which weathers rusty to yellowish occurs on the east bank of the Redstone between photo centers 111 and 112. This shale is typical of the Fort Creek shale in the Norman Wells and adjacent areas. Directly opposite, on the west bank of the river, is a prominent, sandy or calcareous bed which extends out into the river causing a slight waterfall. This outcrop was inaccessible, but presumably is part of the upper Fort Creek gradational zone which is quite thick in this area. The black platy shales outcrop on both sides of the river downstream to within one half mile of photo center 110. Sandy beds then appear in the section marking the transition zone into the Bosworth formation. Unfortunately inaccessibility of these exposures prevented an examination of these gradational beds.

The Fort Creek formation is estimated to be 1500+ feet thick in this area. It is an important, potential source rock for oil.

Bosworth

At Station No. 3, about 300 feet of brownish-grey partly micaceous shale with sandy beds is exposed in an almost vertical cliff. These beds are presumably Bosworth in age. They are lithologically similar to the shale and sandy beds outcropping on the west bank just up-river from photo 312. Fucoids and squashed Brachiopods of Bosworth age were found in the latter outcrop. Downstream from the high cliff of Bosworth shales and sandy beds, at Station No. 6, these sandy beds are overlain by soft, friable, dark grey to black shales with small ironstone nodules. The contact between the soft shales and the harder, lighter coloured, sandy beds is very distinct. The strata strike almost parallel to the river here and the soft shales are exposed downstream as far as the fault on the west flank of the

anticline crossing the river near photo center 105. Between 150 and 200 feet of this shale was observed. Sandstone beds, up to fifteen feet thick, were found in the upper part of this member and a fossil suite 85103 containing Atryna, Cyrtospirifer (flat sulcus), Crinoid stem, and a Pelecypod were collected from a thin sandy member in the upper beds. In the stream valley south of photo center 107, the highest Bosworth section studied in the area is exposed in steep cut banks. It consists of 50 feet of brownish-grey, silty to arenaceous shale with thin sandstone beds, which are capped by a two and a half foot concretionary bed containing Pelecypods (Suite 85101). Below this is 35 feet of shale with thick sandstones containing Corals and Atryna (Suite 85102).

At Station No. 17, are steeply dipping interbedded shales, sandstones and thin dense limestones. A fossil suite (85104) was collected from the upper limestone band of this section. The suite contains Atryna, Bellerophon, Cyrtospirifer (flat sulcus), Chonetes and a Goniatite. The Cyrtospirifer with the flat sulcus is a widespread form which makes its first appearance in the lower part of the Bosworth formation. Although the entire outcrop was not accessible it is believed that these beds are probably lower Bosworth in age. The soft friable dark grey shale is again exposed in contact with the underlying sandy beds on the east side of this structure one mile downstream. Further downstream, at Station No. 20, the upper sandy portion of these shales is exposed. A fossil suite (85106) containing Streptelasma, Paracyclas and a Crinoid stem, were collected from a calcareous sandstone in this outcrop. Hard, calcareous sandstones containing Corals and an Ammonite, were observed on the creek directly south of the above exposure.

At Station No. 23 Bosworth sandstones, shales and calcareous beds are again exposed on the steeply dipping west flank of an anticline. A

collection from near the top of the section contained Almond, Shastrabandhu and Pugnoides. Soft, flaky, and sandy shale with thin sandstone bands outcrop on the opposite bank of the river about one mile downstream. These are exposed over the crest of the anticline. No more outcrops of Bosworth sediments were observed in the area.

#### Cretaceous

Although over half the map area is underlain by Cretaceous rocks, the Cretaceous section is poorly exposed. The Cretaceous - Bosworth contact was not observed but it is known to be unconformable.

On the north side of the river, opposite photo center 105, there is a steep wooded cliff lying 600 to 700 feet above the river level. This cliff trends back from the river at approximately north 60 degrees east. The rocks upholding the cliff are fine-grained, greenish-grey, rusty weathering, sandstones with shaly beds, resembling Cretaceous rocks further downstream, and they are believed to represent the lowest Cretaceous deposits of the area. This section of sandstones is 150 to 200 feet thick.

A 90 foot cut bank of Cretaceous sediments occurs at Station No. 22. The section is composed predominantly of soft dark grey shale and sandy shale with sandstone beds up to twelve feet thick. The sandstone is medium-grained, pepper and salt type, showing well developed cross-bedding. A four inch coaly seam occurs in a shale bed 55 feet from the base of the outcrop. Small rusty weathering ironstone nodules are present in both the shales and sandstones.

The next Cretaceous exposure occurs on the right bank ten miles downstream, at Station No. 27. Part of the intervening area is occupied by Devonian rocks exposed on the crest and limbs of an anticline. The remainder, however, is overlain by badly slumped Pleistocene silts and clays.

The outcrop consists of 60 feet (mostly covered) of dark grey shale containing plant remains, overlain by 30 feet of fine grained, dark grey sandstone. The sandstone is finely bedded, strongly cross-bedded, and contains scattered semi-angular, hard, black shale pebbles. A coal seam occurs in three feet of shale overlying the sandstone.

Except for a small outcrop of flat-lying dark grey sandy shales one mile downstream from photo center 90, the river banks for twelve miles below the outcrop described above, are composed of soft, slumped silt and clay. A group of sandstones and shales are exposed on both sides of the river at photo center 88. Sandstones predominate and they are a medium-grained pepper and salt type, finely bedded, with thin to thick jointing along the bedding planes. A two to three foot conglomerate band occurs in a thickly jointed sandstone near the base of the outcrop. The conglomerate consists of finely crystalline, dense, light gray, well rounded limestone cobbles up to six inches in diameter, and smaller hard, black shale pebbles, in a matrix of medium grained pepper and salt sandstone. The shales of this section are hackly, dark grey, silty to sandy and weather to a dull rusty red color.

The conglomerate bed is exposed again downstream on both flanks of the "Big Bend" Anticline and in the outcrops on the east flank of the syncline beyond "Big Bend" Anticline. Over the crest of "Big Bend" Anticline the conglomerate bed has been eroded off and the sediments exposed consist predominantly of dark grey sandy shale with sandstone beds up to five feet thick. Ironstone bands and nodules occur in both the shales and sandstone. This section is 150 to 175 feet thick. The position of this section and the overlying conglomerate and associated beds, in the Cretaceous section is not known.

## STRUCTURE

General

The Redstone River area lies in a structural basin between the Mackenzie and Franklin Mountains. The upper part of the report area lies in the foothills of the Mackenzie Mountains. On the Dahadinni River to the south (1), the Mackenzie Mountain front extends further to the east than it does along the Redstone River. The Dahadinni Anticlinorium is the outermost range of the Mackenzie Mountains. It plunges in the direction of the Redstone River resulting in a wide belt of foothill topography and structure along that river.

The front ranges of the Mackenzie Mountains, beyond the report area, consist of a series of anticlinal folds exposing Devonian limestones. These ranges trend north-south to northwest-southeast. In the foothills belt of the upper part of the Redstone River the formations have been folded into a series of anticlines of smaller magnitude trending roughly parallel to the mountain front. Three such structures were mapped in the field and a fourth one is indicated by aerial photographs (Plate 2).

At Station No. 27 Cretaceous sediments dip 25 degrees to the south and Cretaceous rocks presumably underlie the remainder of the river, an area about 28 miles wide. It is obvious that there must be a flattening of dip, or reversals, or both, to account for this width of Cretaceous sediments below the highly dipping beds at station 27. Flat beds are exposed at Station 28 and an interesting structure, "Big Bend" Anticline, with a smaller subsidiary fold was mapped seven miles from the mouth of the river. There may well be other structures in this interval, hidden by the clay and silt deposits.

Foothills Structures

Plate 4 is a cross-section of the structures mapped in the foothills belt with the front range of the Mackenzie Mountains projected from south of the map area. Following is a brief description of these structures from west to east:

The first structure lies just east of and parallel to a larger anticlinal flexure of the Mackenzie Mountain front, on which the Devonian limestones are exposed. Fort Creek shales and Bosworth sandstones and shales are exposed on the structure under consideration. Dips as high as 75 degrees were observed on the west flank of the fold, the east flank is much gentler with dips up to twelve degrees. Closure of the structure to the north and south is not known. There is an east-west structural relief of at least 500 feet.

Downstream from the above described structure the strata swing from a northwesterly strike to an east-west one, dipping to the south, and maintain this attitude up to Station 16. At Station 17, which is separated from Station 16 by a gully 150 feet wide, the beds strike northwesterly and dip 65 degrees to the west. A fault apparently exists between these stations, although the exposures at Station 16 are soft shales and show no effect of such faulting. Between Stations 17 and 18 there is a reversal in dip with lower dips on the east flank of the structure. Bosworth sandstones and shales are exposed in the valley walls across this structure. A steep cliff extending back from the north river bank, on the east limb of the anticline is composed of Cretaceous sandstones. It is not known whether or not the structure is closed to the north and south. There is an east-west structural relief of 300 to 400 feet.

Beyond the above structure there is a wide syncline which plunges to the north. On the east flank of this syncline, at Station 23, Bosworth

60 degrees. At Station 25 these beds show a sharp reversal of dip with some local folding on the east flank of the structure. On the south bank of the river, Station 24, a small outcrop of dense, dark grey, bedded, limestone occurs on the crest of the anticline. The structural axis strikes north-south and plunges to the north. Closure to the south is not known, but from oblique aerial photographs in this area, the structure appears to be a continuation of the Dahadinni Anticlinorium (1). There is an estimated east-west structural relief of 600+ feet.

Between the above structure and Station 27 oblique aerial photographs suggest the presence of another anticline trending approximately parallel to the one above. Cretaceous sediments are exposed at Station 27, on the east flank of this structure, and presumably overlie it. Nothing more is known regarding this anticline as it was not observed in the field.

All of the above structures presumably involve the Devonian limestones and dolomites and may be considered as possible oil traps. They are, however, not easily accessible and unless developments of the more favourable "Big Bend" Anticline justifies it, no further study of these structures is warranted.

#### "Big Bend" Anticline

This is the most important structure located in the survey of the Redstone River. It lies about seven miles from the Mackenzie River and because of this it is easily accessible. It also provides an excellent opportunity to test part of the Cretaceous rocks and all of the Devonian sediments for oil possibilities.

A plane table survey was made of this structure, using a conglomerate bed as datum (Plate 5). The structure is at least three miles

valley closes in that direction. There is a natural structural conglomates, marlstones and shales, but their position in the Cretaceous section is unknown. There is no faulting in the surface beds, and the structure undoubtedly continues at depth. A small subsidiary fold line to the west of this structure (Plates 2 and 5).

The "Big Bend" Anticline certainly warrants further investigation, and a proposed test well location has been made on the west bank of the river along the anticlinal axis.

#### Chapter V.

#### O I L P O S S I B I L I T I E S.

No seepages of oil or gas were observed in the area. Black bituminous Fort Creek shales are exposed in the upper part of the area and presumably underlie the remainder of it. Bosworth and Cretaceous sandstones capable of acting as reservoir rocks, and the overlying shales of these formations would provide adequate cap rocks. Beavertail-Ramparts limestones and the Bear Rock brecciated dolomite, though not exposed in the map area, presumably underlie it and are two horizons of probable reservoir rock, with the Fort Creek shale above forming the cap rock. No reef limestone, similar to and in the same stratigraphic position as the reservoir rock at Norman Wells was observed in this area.

Structurally the area is encouraging regarding oil possibilities. Four anticlines were mapped in the area, another one is suggested by oblique aerial photographs, and other structures, covered by Pleistocene clays and silts, probably exist.

## Chapter VI

## CONCLUSIONS AND RECOMMENDATIONS.

Source, reservoir and cap rocks occur in the area traversed by the Redstone River. Five structures, which may provide suitable oil traps, are known to cross this river. The lower one of these, the "Big Bend" Anticline is the most favourable.

It is recommended that a test well be drilled on the "Big Bend" Anticline. A proposed well location has been made on the axis of this structure north of the Redstone River. This location can be made easily accessible by constructing seven miles of road from the Mackenzie River. This test will give concrete evidence regarding the possibilities of part of the Cretaceous, Bosworth, Beavertail-Ramparts and Bear Rock formations for the entire area. Reflection seismograph work should be carried out in conjunction with, or previous to drilling this test, and if the test yields encouraging results the survey should be continued further inland to locate structures buried under the Pleistocene deposits.

The advisability of further investigations of those structures mapped in the foothills belt of the area will depend upon the results obtained in the "Big Bend" test.

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## B I B L I O G R A P H Y

(1) Bath, Lt. D.G. Report on "The Dahadinni River" N.W.T., (Canada). Final Geological Report, Imperial Oil Ltd., Canol Project, January, 1944. Assignment No. 13.

(2) Bath, Lt. D.G. Report on "The Mackenzie River, Camsell Bend to Fort Norman", N.W.T. (Canada). Final Geological Report, Imperial Oil Ltd., Canol Project, January, 1944. Assignment No. 34.

(3) Hart, Lt. R.M. Report on "The Gravel River and the East Fork of Little Bear River", N.W.T., (Canada). Final Geological Report, Imperial Oil Ltd., Canol Project, January, 1944. Assignments 2 - 2A, 30 and 37.

(4) Hume, G.S. "Mackenzie River Area", District of Mackenzie, N.W.T. Geological Survey of Canada, Summary Report 1923, Part B.

APPENDIX

LIST OF SPECIMENS

"REDSTONE RIVER"

<u>Suite No.</u>	<u>Date</u>	<u>Location</u>	<u>Fossil</u>	<u>Accession No.</u>	<u>Age</u>
85103	Aug. 17	Sta. 15	Atrypa	42951	Beswworth
"	Aug. 17	Sta. 15	Cyrtospirifer	42952	"
85107	Aug. 19	Sta. 23	Atrypa	42953	"
"	Aug. 19	Sta. 23	Stropheodonta	42954	"
"	Aug. 19	Sta. 23	Pugnoides	42955	"
85105	Aug. 17	Sta. 18	Crinoid	42956	"
85102	Aug. 15	Sta. 7	Coral	42957	"
"	Aug. 15	Sta. 7	Atrypa	42958	"
85103	Aug. 17	Sta. 15	Crinoid	42959	"
"	Aug. 17	Sta. 15	Pelecypod	42960	"
"	Aug. 17	Sta. 15	Cyrtospirifer (flat sulcus)	42961	"
85104	Aug. 17	Sta. 17	Atrypa	42962	"
"	Aug. 17	Sta. 17	Bellerophon	42963	"
"	Aug. 17	Sta. 17	Cyrtospirifer (flat sulcus)	42964	"
"	Aug. 17	Sta. 17	Chonetes	42965	"
"	Aug. 17	Sta. 17	Goniatite	42966	"
"	Aug. 17	Sta. 17	Cyrtospirifer	42967	"
85106	Aug. 18	Sta. 20	Streptelasma	42968	"
"	Aug. 18	Sta. 20	Crinoid stem	42969	"
"	Aug. 18	Sta. 20	Paracyclaspis	42970	"
85101	Aug. 15	Sta. 7	Pelecypods	42971	Devonian
85107	Aug. 19	Sta. 23	Atrypa	42972	Beswworth
85100	Aug. 13	Sta. 1	Fucoids	42973	"

APPENDIX

## REDSTONE RIVER AREA -- By W. P. Hancock

<u>Suite No.</u>	<u>Date</u>	<u>Location</u>	<u>Fossil</u>	<u>Accession No.</u>	<u>Age</u>
85103	Aug. 17	Redstone River	Atrypa	42951	Bosworth
"	"	"	Cyrtospirifer	42952	"
85107	Aug. 19	Redstone River	Atrypa	42953	Bosworth
"	"	"	Stropheodonta	42954	"
"	"	"	Pugnoides	42955	"
85105	Aug. 17	Redstone River	Crinoid	42956	Bosworth
85102	Aug. 15	Redstone River	Coral	42957	Bosworth
"	"	"	Atrypa	42958	"
85103	Aug. 17	Redstone River	Crinoid	42959	Bosworth
"	"	"	Pelecypod	42960	"
"	"	"	Cyrtospirifer (flat sulcus)	42961	"
85104	Aug. 17	Redstone River	Atrypa	42962	Bosworth
"	"	"	Bellerophon	42963	"
"	"	"	Cyrtospirifer (flat sulcus)	42964	"
"	"	"	Chonetes	42965	"
"	"	"	Goniatite	42966	"
"	"	"	Cyrtospirifer	42967	"
85106	Aug. 18	Redstone River	Streptelasma	42968	Bosworth
"	"	"	Crinoid stem	42969	"
"	"	"	Paracyclas	42970	"
85101	Aug. 15	Redstone River	Pelecypods	42971	Devonian
85107	Aug. 19	Redstone River	Atrypa	42972	Bosworth
85100	Aug. 13	Redstone River	Fucoids	42973	Bosworth

January 4, 1944.

MEMORANDUM:

TO: Dr. T. A. Link  
RE: Fossil Identification

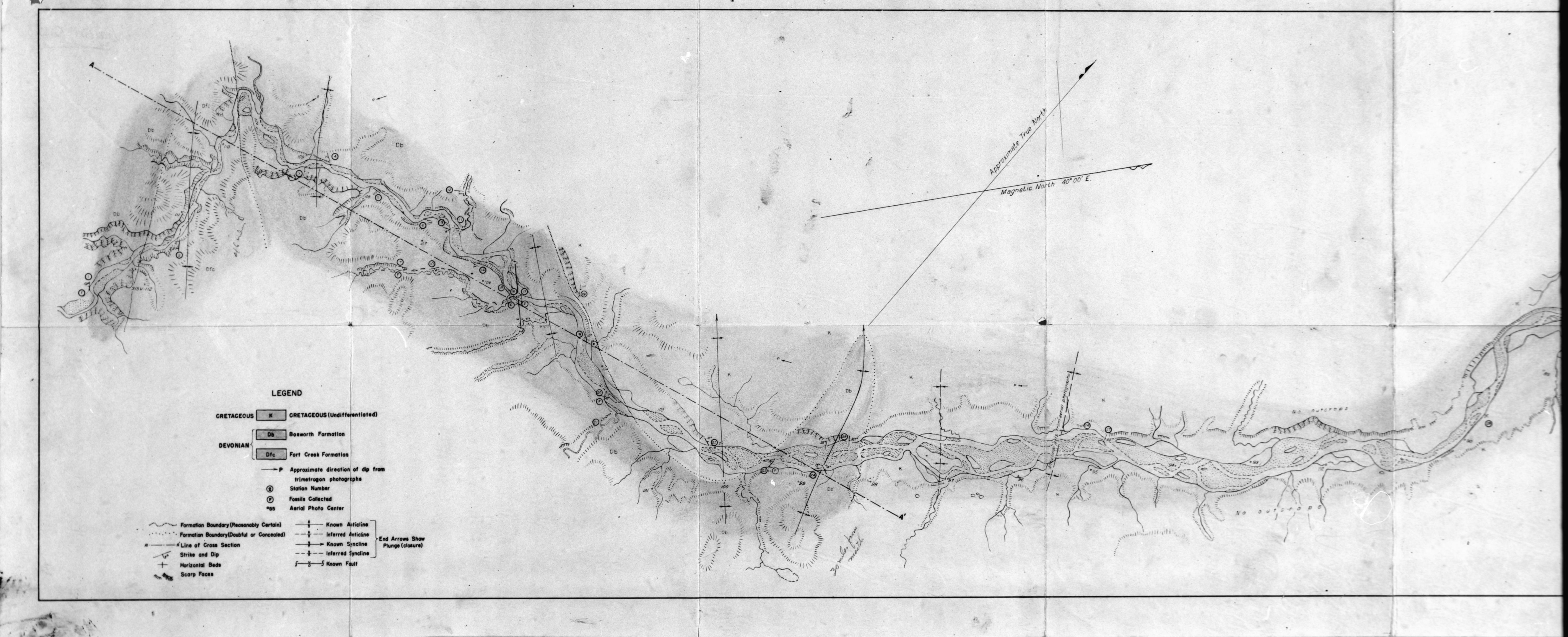
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Attached is a tentative identification of fossils  
collected by Mr. W. P. Hancock on Assignment No. 12, Redstone  
River Area.

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C. R. Stelck

KH/cm



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35

24x

West Canadian Graphic Industries Ltd.

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26

PLATE 2

RECONNAISSANCE GEOLOGICAL MAP  
OF  
THE REDSTONE RIVER

ASSIGNMENT No. 12, PARTY G.

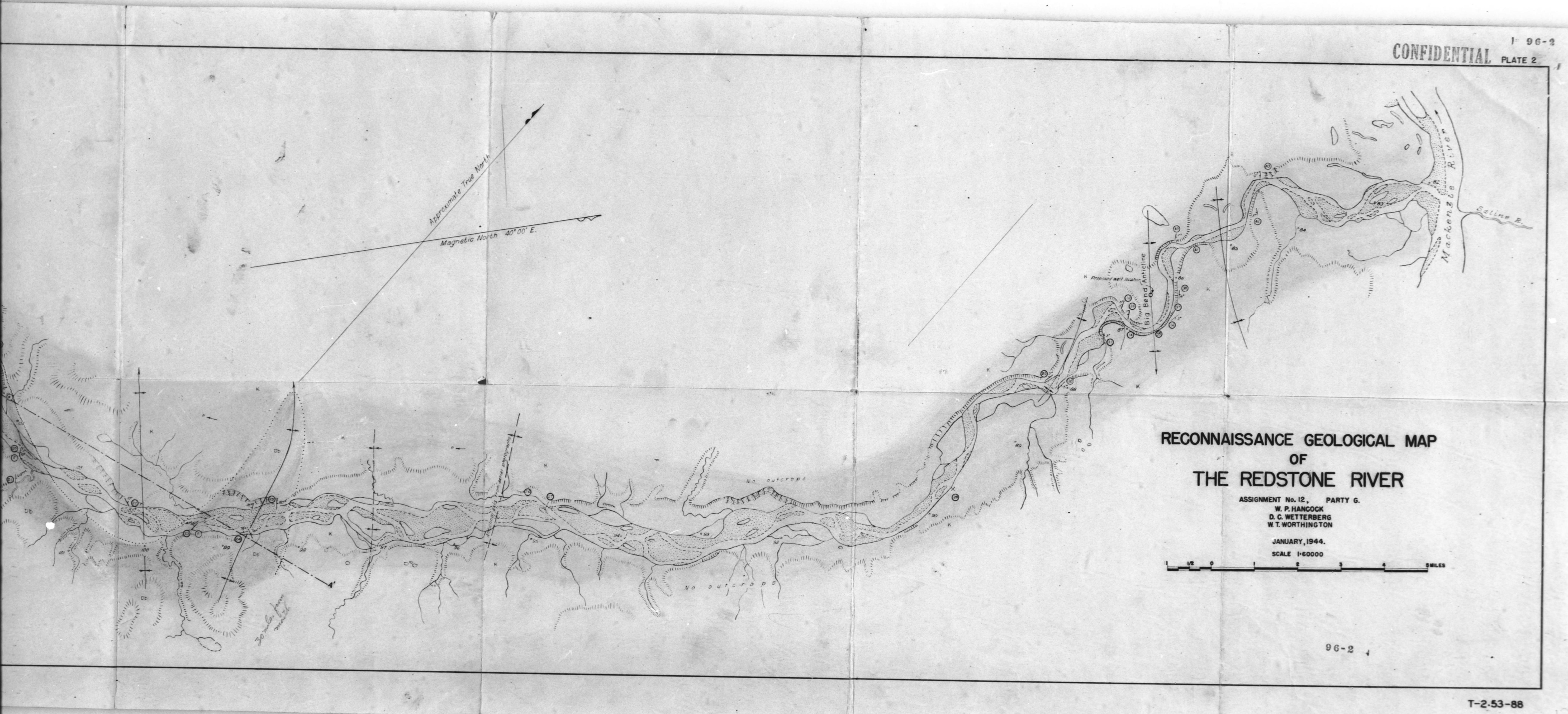
W. P. HANCOCK  
D. C. WETTERBERG  
W. T. WORTHINGTON

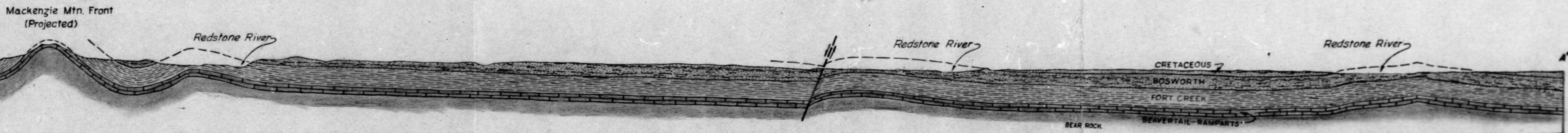
JANUARY, 1944.  
SCALE 1:60000

0 1 2 3 4 MILES

96-2

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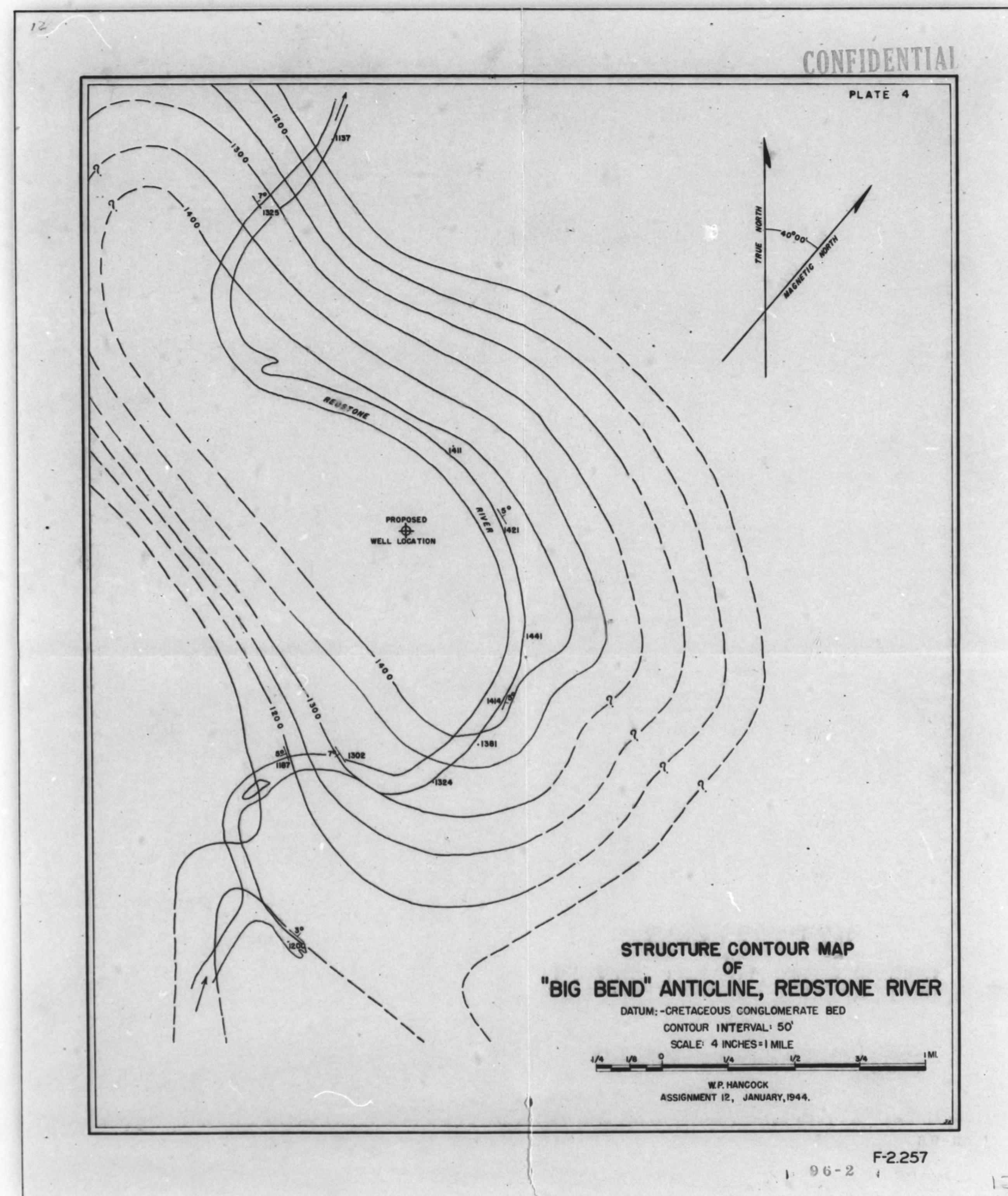


# CROSS SECTION UPPER REDSTONE RIVER

W. P. HANCOCK  
ASSIGNMENT 12, PARTY G.  
JANUARY, 1944.

VERTICAL & HORIZONTAL SCALES: 1 INCH = 1 MILE





24x

West Canadian Graphic Industries Ltd.

CONFIDENTIAL  
PLATE 3

COLUMNAR SECTION  
REDSTONE RIVER

W. P. HANCOCK  
ASSIGNMENT 12, PARTY G.

JANUARY, 1944.  
SCALE: 1 INCH = 200 FT.

Age	Form	Column	Description	Fossils	Suite No.
			60' Sandstone, fine to medium grained, soft, grey, strongly cross-bedded. Conglomerate near the base, shale and limestone pebbles.		
			200' Shale, silty, grey, soft with fine grained sandstone beds up to 5 feet thick.		
			7' (The position of the above 660' of section is not known.)		
			30' Sandstone, fine grained, cross-bedded, scattered small hard, block shale pebbles, coaly seam at top.		
			60' Shale, soft, grey, silty, carbonized plant remains.		
			240' Probably shale with some sandstone.		
			90' Shale, soft, grey with fine grained, cross-bedded sandstones. Small ironstone concretions in shale and sandstone. Coaly seam.		
			140' Sandstone, fine grained, grey, rusty weathering, thin shale bands.		
			<i>Unconformable Contact (Not Exposed)</i>		
			90' Shale, soft, grey, silty, sandstone beds up to 8' thick.	Pelecypods	85101
			140' Shales, sandstones and limestones, soft grey shales grading into fine grained sandstones, interbedded with thin, dark grey, dense limestone.	Corals, <i>Atypa</i> , <i>Strophodonts</i> , <i>Pugnoides</i>	85102 85107
			120' Probably shales and sandstones.		
			180' Shale, soft, dark grey, flaky, small ironstone nodules, becomes sandy toward the top.	Crinoid, Pelecypod, <i>Oryctospirifer</i> , <i>Atypa</i> , <i>Cyrtospirifer</i> (flat shells)	85103
			390' Sandstone and Shale, fine grey sandstone and shaly sandstone with brownish grey micaceous shale, thin, dark grey dense limestone in middle portion of section.	Streptelasma, Crinoid Stems, <i>Paracyclaspis</i> , Crinoid Stems, Fucoids	85106 85105 85100
			150'		
			100' Shale and Sandstone gradational beds between the Fort Creek and Bosworth formations.	<i>Atypa</i> , <i>Bellerophon</i> , <i>Goniatites</i> , <i>Cyrtospirifer</i> (flat shells), <i>Chonetes</i> , <i>Cyrtospirifer</i>	85104
			600' Shale, dark grey to black; platy; weathers rusty to yellowish; sulphur odor; bituminous.		
			7' Base of section not exposed probably shale as above.		

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