George M. Dawson

Geological Survey

of

Canada.

1898.

May 28. 1898. Sir Henri Joly de Lotbiniere, Minister of Inland Rev. being anxious that I should visit the scene of a remarkable & destructive land slide in his constituency, Parish of St. Thuribe on R. Blanche, arranged to do so in his company. Left for Montreal at 6 Pm. Met Sir Henri there at 11 Pm. & took train for Grondines, near Quebec.

May 29. Arrive Grondines 4 am. Drive to St Casimire & then on to St Thurite. Examined & photographed land slide & got train back from Grondines at 3 Pm. Stopped some time at St Martin Junction & then on to Ottawa, arriving at 1 am.

May 30.

Aug. 10. 98. Had planned to leave for a few days in N.S. yesterday, to see over some of the formations in doubt there with Ami, but getting telegram from W.A. Fraser, in charge of boring operations in Alberta which indicate further trouble with Pelican tole, I thought it best to go there first. Left this Evg.

Aug. 11. On C.P.R. going west.

Aug. 12. " " "

In rear Cuttings at Dinsmore Station, not far East of Wabigoon, notice stratified contorted clays & silts, some beds near or at the top red, like the red clays of Kaministiquia valley. If the same, this would probably carry these clays up to a much higher level.

Aug. 13. On C.P.R. going W.

Aug. 14. Arrive Calgary 3 Am.

Aug. 15. Leave for Edmonton & am. train. arrive 7 Rm.

Aug. 16. Set off with team in Rm. for Victoria. Drive about 30 m. before dark & put up at settler's shanty for the night.

Aug. 17. Continue on to Victoria. Put up there with Gillis, telegraph operator.

Aug. 18. At well nearly all day. Put down thermometer, but got it jammed at bottom of well, with sand-pump. making fishing tool to extract it. Took photos. of rig &c

Aug. 19. Got remains of thermometer & the sand-pump out this a.m. Left for Edmonton in Rm. Drive to Edna.

Aug 20. on to Edmonton, arriving about 4:30

Aug. 21. Sunday. Talk with Evans about borings at Pelican & Victoria. The forces determined as we were progress proved became of gas & tar-sand. Then on

the way back. Arranges with F. to send three men down to Victoria when they arrive & work double gang there, with hope of getting full depth this season. Arranging about accounts & about tools etc to be brought from Pelican to Victoria. Also about new string of 3 5/8 Casing for Victoria.

Aug. 22. Drive to vicinity of Beg Egg L., about 27 miles to see tar or petroleum found there. The place that Edmonton people wanted boring operations to be conducted at originally. Returned in Rem., reaching Edmonton at 6 O'C. The tarry matter was first found at the surface, in ploughing, on N.E. quarter, Sect 30. Range 25. W of 4. An excavation made showed layer of tar soaked sand at depths of 8 or 10 feet, & according to E. Lyons, a second similar layer exists at greater depth. W. Pearce, who carried out some borings, one to depth S.W.?

of 120 feet, say 150 yards N.E. of Excavation (or north eastern pan) Stoke that it passed through 8 feet soil & clay, 8" tar sand. Then 'hard clay' (boulder-clay probably) to 40 feet, when layer of sand & gravel met water which rose to the surface. Then soft & hard sandstone (Laramie?) grey & brownish, to 120 feet.

It appears to be certain that the tarry matter was really found here & pieces of it may still be picked up in the material thrown out from excavation, & it seems probable that it may have reached the surface layers by means of fissures extending to a great depth. This implies considerable fluidity.

On another lot, said to be S.W. quarter Section 4 of 31, same range, a remarkable spring & mineral, not copious, but with emission of sulphuretted hydrogen. Another of the same kind & slightly saline, intermediate between this & the tar occurrences & all three nearly in N & S (true) line. Seem

to indicate a fissure with this course, or if not, then the outcrop of a parcus bed of the Laramie with the strike, with which fissure or fissures have communicated. The latter case seems to favor continuity of petroleum-bearing conditions this far to the westward, considerably enlarging the probable field.

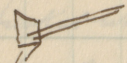
Elevation of country near the place where Carry Wolfes found, by barometer, seems to be about 540' above the town of Edmonton.

Aug 23. Took a skiff up the river on S. side on waggon & launched it above Big Island, for the purpose of visiting dredges & noting gold mining on the river.

Just above Big I. several miners at work on beach & bar along river. Some of them working on exposed bar, though water rather high at present. Others stripping from 5' to 8' of sand, same as that forming the low wooded flat here, & expose underlying bed of

gravel which affords moderate amt. of the usual run fine gold. Ground thawed out & worked at edge of river by hand with grizzly & blankets. $1.50 a day stated to be about as much as can be made at present. (See photo of apparatus).

Star Mining Co. of S. Edmonton H.W. Shepherd president. Dredge working on N. bank of river about 2 m. above Beg J. Is an ordinary scoop dredge, the bucket being swung round & emptied into grizzly with



blankets, of the usual type, at one side. 12 H.P. Engine. Digging at present 9' below water level, which about its capacity. Three full buckets make a cubic yard & about 40¢ in gold per cubic yard saved. Paying well at present, although a good deal of the very fine gold known to be lost. Whole machine somewhat primitive & rough in construction & acknowledged to be susceptible of improvement, particularly in the matter of imparting motion to the tables.

sold actually secured said to be from $25 to $40 per day. 3 men & a boy employed.

Loveland & Bros. At work in S. Channel at Bej J. Dredge formerly employed laid up there. New dredge has been at work only about a week. Same type of dredge as Carl, but much larger & thoroughly constructed. Two engines each 20 h.p. — one for ~~washing~~ pumping water for washing. Can raise 3 buckets a minute, 3/4 yard to a bucket when full, but sometimes come up only half full. Expect to be able to work all that can be raised when arrangements completed. At present a temporary arrangement of frigby & blankets fixed to side of dredge. Later intend to elevate the gravel & wash it at the stern

about 2 miles above town, another small dredge, but not now at work & not one on board. This again on same general plan, but with a

Car a truck on rails in which dirt is drawn up to stern of dredge for treatment. Engine & revolving perforated iron cylinder for screening gravel before washing over blankets. This is Dr Bowers dredges.

Dr Bowers.

Several hand dredges on the river. Saw one of them, a sort of Catamaran, or scow with long opening in it forward, in which a scoop like arrangement worked on the end of a pole & work the aid of a chain to lift it. Usual washing arrangements. 3 men. Seems a pretty poor & slow business. Saw probably 12 men working grizzlies at different places along the banks, but river too high yet for much work.

Aug. 24. Walked down to Fraser's
mill to see tusk found on a bar
in the river about 80 m up, nr.
Goose Encampment. It is a rather
small mammoth tusk, with the
ends end broken off & a good deal
worn. Offered Fraser $10 for it, but
he would not take it.
Walked up river along bank to
see other dredges.
— Brindley's dredge, now on the
bank, a small affair, resembling
that last described & with similar
arrangement for elevating gravels.
Said to have made about $10 a
day. Latterly employed dredging
in connection with bridge piers
— Braithwaite's dredge, further up
& partly submerged near the bank.
This is another small primitive
dredge with small engine used
in pumping water &c. 2 longitudinal
wells in the scow in which
scoop dredges on poles operated,
apparently chiefly by hand labour

Crossed the river to S. side, where at Wolter's mill a large & substantial dredge in course of construction for the Finance Discovery Corporation of London. This company has taken out Drolet's gold leases. The dredge will operate by an endless chain of buckets, raising the gravel to hopper 25 feet above the deck, where, after removal of large stones & pebbly it will be screened in revolving perforated cylinder. Fine stuff will pass onto 4 (or 6?) fine Vanners, for separation of gold. These to be placed on deck aft. The dredge will be moved by winches & ropes & will be lined along the river to required places. 4 Engines to be on board 1 for chain of buckets, 1 for winches & 2 for pumping water. This is altogether the largest & best constructed machine seen & Loveland's is the next in these respects.

also hull being a small steam wharf steamer for tenders, & carry coal &c.

The Lewis wood steam dredger
rigged up some years ago &
named Notre Dame de Nistanssini
is now a long way up the river
& not at work, Sam disarmed.

Aug. 25. From Edmonton to Calgary,
arriving at 7 P.m.

Aug. 26. Train at 2:55 A.m, going
west. Arrive Banff about 6 A.m.
To C.P.R. Hotel. In P.M. drive to
Anthracite with S. Sawbe, who
goes on train & stays here for
some days after completion of
collecting work on Red Deer.
Get photos. of mine houses & of
boulder-clay bluffs & specimen
of boulder-clay.
The cliffs of drift deposits near
Anthracite & running S.E. along
valley thence, consist largely of
pale hard boulder clay,
holding many well glaciated
stones, but with this much clayey

stratified gravel, a beds of coarse sand etc. The boulder clay is probably the oldest, but the whole series of irregularly stratified deposits with it appear to likely about contemporaneous & probably formed in water at or near the foot of a retreating local glacier of the valley. Whether of the Arbutus stage or a later reappearance of glaciers in the mountains, doubtful. Scarcely probable under any hypothesis that these boulder-clays held any marine Invertebrata, but specimens collected for examination.

Aug. 27. Train late this morning & able therefore to get breakfast at 7 am before leaving hotel. Arrive at Kamloops near midnight.

Aug. 28. Drive this morning with Mr H.G. Ashby, manager, to Pot Hook Mine, Mr. Sugar Loaf Hill. And Mr Parks the M.E. in charge & looked over the deposit & work. The group of claims is

situated near the little patches
Sedimentary Tertiary shown on my work
between Sugar Loaf & Cherry Bluff
Woods. The ground is all much broken
up & very pugging, but in several
there seems to be an irregular Base,
of considerable thickness of the
gabbro & associated rocks, charged
with greater or less quantities of
Copper pyrites, Grey Copper & native
Copper. The matrix is a
brecciated mass in general, & it
would appear that parts of this breccia
material are more or less water bedded,
probably resulting materials
associated with the Coal & Gravels
&c & underlying beds of Dufferin
Hill — these Tranquille beds.
Some of the lines which Parkes
takes for walls of vein seem to
me to be bedding planes of this
character, as e.g. that on the
Midnight fractional claim, where
the dip is distinctly S 80° E.

It seems to me we are to follow any of the stopped walls, for the ore is admittedly not confined by them & there & the main object should be to determine if possible a zone of wholesome character rich enough to work, by concentration or otherwise. Gold & silver values are small & we are mostly regarded as practically a copper ore.

On the same group of claims & running in the same E-W way. direction, but S. & the N. of the copper run, an important deposit of way-iron like that of Clay Bluff has lately been found. Iron occurs in very massive outcrops & of not a single continuous vein, constitutes a num of particular veins very probably running through the whole group of claims. Similar ore found in Sugar Loaf Mt. itself.

Interview with Mr Wood in Rem. about Claims worth working on Shuswap sheet, getting specimens of same & them from him.

Aug. 29. Leave for Vernon by train at 1.15 am. Arrive at Sicamous & Change abt. 5 am. Reach Vernon 8.30 am. Call on Mr. Turnbull to enquire about mineral claims here, within limits of ~~Kamloops~~ Shuswap sheet. In Rem with him to Bon Dickle Creek, about 4 m. away. This place was visited by McConnell & McEvoy last year, & the are appears to occur in association with a peculiar eruptive rock. (See McConnell's specimens & notes.) Blackish schists appear in junction with the grey porphyritic & sometimes schistose rock in question, at one of the openings dipping very distinctly N 20° W ∠ 20°. The quartz appears to follow zones in

there works on the contact zone. Probably no defined lead of large size, but much quartz which could be quarried from surface to begin with. Shows only rust on iron pyrites, but assays in some cases said to have been very high in gold. No work now in progress. Claims being held merely by annual work.

Aug. 30. Visit with Mr F.H. Latimer to visit Blue Jay mine, situated about a mile SW of Swan Lake, in the hills. Shaft 40' & tunnel 175 feet intersecting vein at depth of 100 feet. The vein cannot be followed for on surface, but is well defined in the workings. Str. N 45° W with dips NE. ∠ 60°. It is generally three or four feet wide with inclusions of crushed rock & quartz, holding pyrites, a little galena & decomposed yellow material near bottom of shaft said to have been very

high assays in gold, although no free gold showing. Everything looks favourable enough for further work & assays satisfactory, although the broken character of all this tract of country between Swan & Okanagan Lakes may render it difficult to follow veins far. Country rock is a sort of grey 'diorite' considerably sheltered & sometimes slickensided. The 'Falcon' Claim, about 1/2 m. W. shows pockets containing free gold quite rich. Claims along the N. side of Bay on which Okanagan Landing situated have also yielded good specimens of free gold.

Leave by afternoon train & reach Sicamous about dark.

Aug. 31. Sicamous to Glacier

Sept. 1. Leave Glacier this morn. & arrive Calgary midnight.

Sept. 2. At Calgary. Visit two sandstone quarries with Mr Pearce. Two more

from Ottawa & therefore conclude that I may go to Macleod as intended. Wire from Fraser. Banff & Victoria down 1200 feet. Wants slight change in order for Coming. Wrote Ottawa about this.

The C.P.R. Sandstone Quarry, in Porcupine Hill beds of Laramie, opened in bank on S. side of Bow about 3 miles west of Calgary. The bank is here probably 150' high, the quarry being opened on a band of sandstone about 30' thick & about half-way up. Strata about 25' thick top & the stripped by pick & shovel & barrow. As the work goes back to the full light of bank the stripping will be soon deeper, but it is probable that additional layers of good sandstone will be found above. The sandstone is somewhat irregularly & obscurely bedded, but is bounded by frequent vertical jointage planes. It breaks out fairly in irregular stoped lumps, but is soft & easily dressed, & a

light brown colour. Some irregular layers blush grey on fresh fracture & much harder. These are regarded as inferior. The stone worked is very soft in the quarry but hardens considerably on exposure & appears to stand the weather well in buildings in Calgary. It is of a pleasing appearance in walls, whether hammer dressed or finely dressed.

The second quarry visited belongs to Mrs Edwardsby. It is about half a mile further up the river, in a Coulee. The stone similar to the last, but comes out in better shaped pieces. Face about 25 feet of strata giving, consisting of gravel, at present only about 10 feet. The sandstone appears to occupy a horizon stratigraphically a little above that worked in the other quarry. The stone is being taken from this quarry for the new C.P.R. station at Vancouver

Sept. 3. Calgary & Macleod.

Sept. 4. Sunday. at Macleod.
Telegr[illegible] Ottawa that address till
Wednesday night would R Macleod.

Sept 5. Leave at 9 am by new Crow Nest
Ry for Fernie, at mouth of Coal Ck. on
Elk R. Arrive there 6 Pm.
Between Macleod & Scott's Coulée
notice numerous cuts, some 20' or
more deep, in well stratified grey
& brownish silts. Similar seen at
intervals beyond, especially about
& beyond crossing of S. Fork Oldman.
Then Coulées all somewhat fresh &
appear to approach clays in some
layers. Strat often singularly
crumpled ~~~ thus. Difficult
to understand exactly how caused.
Thin silts here seem to be of irregular
thickness on distinct boulder-clay,
without any well marked line
to be seen in passing between the two.
The plain about 73 mile point
(Cowley) seems to be about the
natural level of these silts, which

have been rounded away by denudation toward the valleys. Hence adequate exposures not seen till present Ry. cuts made. The level just referred to seems to be about the same with the highest well marked terraces along N. side of Middle Fork valley opposite.

~~At~~ Just beyond 56.8 m. (Lapandeux), Pincher Ck. crossed at mouth. Good exposures of nearly horizontal Porcupine sandst. Fine view of trough of Oldman Valley. Bridge Crossing of S. Fork & beyond, numerous fine exposures of tilted Laramie or Cretaceous rocks — largely sandstones.

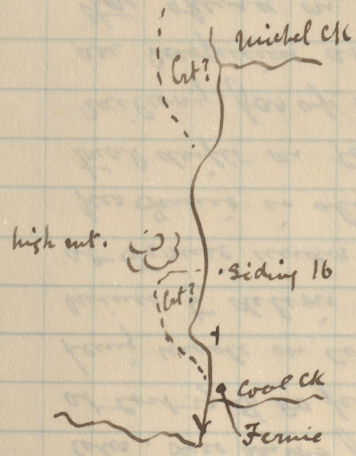
At 92 m. Sulphur spring.

At 98 m. outcrop of Volcanic beds of Cretaceous.

Sept. 13. Drove about 5 m. from Fernie up Coal Creek to place where Coal Co's mines are being opened up by Mr Blakemore. Spur line is finished up to this place.

Large yard is being graded & other work in progress for erection of bins, screens & loading facilities for the coal. Drifts opened on both sides of valley, the most important being on S. Side. They are just about to open this up into rooms. Work is also in progress for the installation of 100 coke ovens at Fernie, with the intention of doubling or trebling this later. Fire bricks from Wales, landed at cost of $ 80 per M. Dam is being made on Coal Ck. below the mines to deliver water for power etc at Fernie under 200' head.

Near Fernie is also opening out trial drifts on coal seams beside railway far up on Michel Ck. They are recognized as much lighter than those opened on Coal Ck, one being equivalent to the Peter seam, first prospected near Martin Creek. (Write Blakemore for thickness of seams being opened)


Michel Clk
Cut?
high cut.
Siding 16
Cut?
Coal Clk
Fernie

Mr Fernie informs me that explorations here showed that the coal field is interrupted by limestone for a good many miles between Michel Ck & Fording R. Also that an area of coal measures occurs E. of Elk R, but not very large.
Note westerly dips at ∠ 40° or so in Dy. Cots a mile or two N. of Fernie on Elk. The rocks E of W. of Elk may here be Crt. as shown opposite. Looks also like an area of the same kind opposite mouth of Michel Ck.
(Write Fernie for particulars)
Alto petes it looks as though the Crt. very probably passes under the limestones along W. side of Elk, along an overthrust fault. Structure similar to that found so characteristic by McConnell further north. If so would have important bearings on extent of coal field & would change section as given in my map

It also seems very probable that the same structure occurs along the E. edge of the Lots. in vicinity of Crow Nest Pass, the lower southern part of Fernie Mt. sp. looking like Cretaceous.
The Sulphur Spring would occur along line of this fault.
It is also possible that the same overthrust occurs at line of lower end of Crow Nest Lake, & even possible that the Crow's Nest Mt. may be an outlier of the limestone overthrust left by denudation.
This structure not recognized as in mind at time of previous examination.
Informed that a hot Spring occurs 18 m. up the Elk Valley from Michel Ck, on E. side of river.

Sept. 7. Left Fernie yesterday about noon, after long delays reach Macleod about 11 a.m. today.

Fail to recognize any exposures of boulder-clay distinctly such in the numerous & large Ry. cuts in mountains or in road cuts on Coal Ck. Frequent exposures of mixed clay, mud, gravel & boulders but all these seem to be wash from streams or gullies coming down mountain side & more or less strat. on slope. About "the Loops" on Michel Ck. extensive "Sumto" cuts in strat clays or silty clays of brown colour. May these represent glacial mud deposited when Cordilleran glacier blocked mouth of Michel Ck. etc & water discharged E. over summit of Crow Nest Pass? Much gravel in places & at head of loop

in cuts in terrace about 100' feet above pt. X on ~~loop~~ track, see Sumto distinctly resting on & passing down into beds of clayey well rounded gravels. (Compare with similar Sumto on Kicking Horse.)

Except points of inwash, as above described, all the gravel etc seen along Elk Valley may be attributed to river action. River gravel plains & terraces etc. In this probably agrees with other large low rivers in the west, the Columbia eg.

Leave Macleod 7 P.m. for Calgary, arriving 9.30 P.m.

Sept. 8. To coal banks showing boulder-clays & Recent shales at Lower end Alexander's bottom, about 3 miles from town. Get specimens of clays. Phts. & photos. of No. 3. Pit of Coal mine, near the working face.

Sept. 9. Examine coal banks near the town & collect specimen of clay. Train for Medicine Hat.

Sept. 10. Arrive Medicine Hat & go on Eastward.

Sept. 11. Travelling East.

" 12. " "

" 13. Arrive in Ottawa.

Journey to Nova Scotia.

Sept. 24. Leave Ottawa 3.50 Pm

Sept. 25. Sunday. At Montreal. Leave by C.P.R. Evening train for Truro

Sept. 26. Arrive Truro this Evg.

Sept. 27. Call on Ami, who has been ill. will be able to leave here tomorrow.

Sept. 28. Truro to Windsor Junction & thence to Wolfville, arriving 6.30 Pm.

Sept. 29. Drive with Ami this Am. to Angus Brook, running into Sanfarant River from South Mountain. Spent some hours up the brook examining section found there by Ami. In Pm. drove to Blue Beach, about 9 miles, beyond Harton Lighthouse & walked in 1½ miles of Hantsport Examined shore section here till sunset & then back.

Lower part of Dargan Brook shows typical Harton rocks, sandstones, fine flaggy, shales, sometimes black - a certain small percentage of reddish rocks throughout. Here dip down the brook regularly at low angle a mile & several hundred feet thick. Below them pale grey soft arkose sandstones & conglomerates, evidently chiefly granitic material, quartz, decomp felspar, some lightly micaceous dark grey or reddish slaty sandstones. Pebbles chiefly quartz, fairly rounded. Some of underlying Silurian slaty rocks. These are conformable with the typical Harton & evidently a part of the same series. Must be at least 50' thick, perhaps nearly double that. They rest directly on fine grey, greenish & pale reddish Silurian slates dipping at higher angle in opposite direction. Distinct unconformity. Cannot state that the arkose beds are the same rock here at Wicklow's

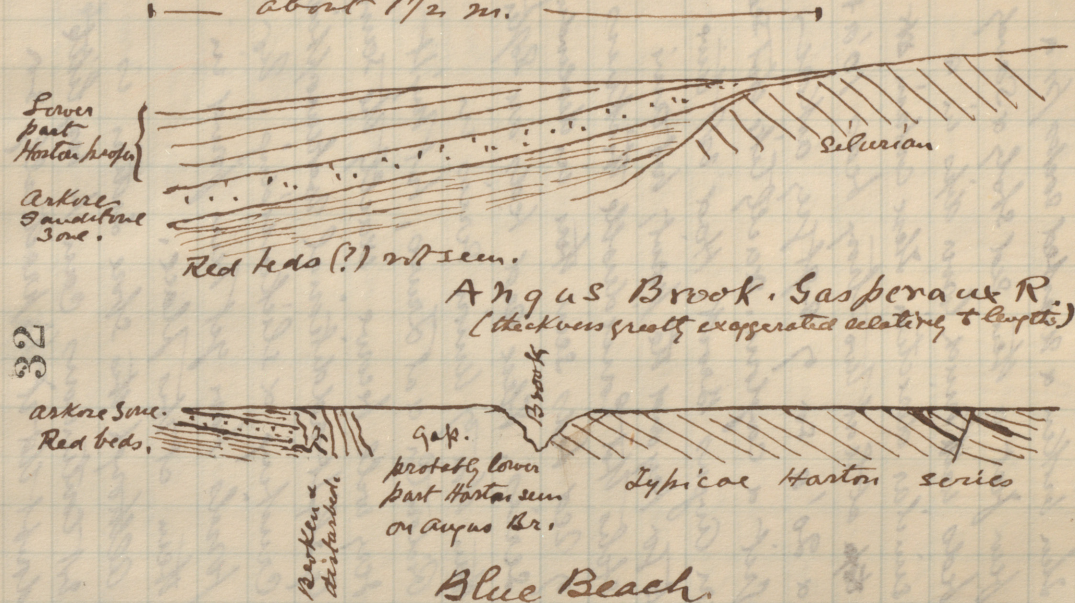
quarry at Woodville which have been spoken of as Triassic.)

Blue Beach reached by a steep narrow road that runs down along a gully or stream. To the West of this stream a regular ascending series in the cliffs dipping about 30° for about half a mile. Exposures almost Continuous. Next a small fault, making apparently an upthrow of 20 or 30 feet & undulation of dips, but similar rocks continued beyond in the point. Beds generally resemble those of Angus Brook above arkose sandstones, but finer grained & darker. Some fine blackish shales, less Sandstone beds & numerous calcareous bands of a few inches or feet in thickness. The whole typical Horton.

Along shore in opposite direction from the brook, no section for nearly 1/4 mile, then grey & dark flaggy sandy & shaly beds like those

above described, but with much less shale, dipping at very high angles, but in the same direction. Then broken & wasted rocks for a few feet & then red shaly & sandy beds with much lower dips in a similar direction. These contain ~~at~~ at least two strong beds 10' or + & 20' or so of soft grey arkose grit & conglom. exactly like that seen on Angus Brook. Had not time to go beyond the point, but am sure that considerable thickness of red beds seen there in descending series. These red beds are softer than those of Union series in Pictou Co & at Truro, but might very well become exactly the same by slight additional metamorphism & crushing & slickensiding. No fossils have yet been found in them at this place.

Although this shore section is not continuous can be very little doubt that it is practically so


about 1½ m.
Lower part Horton beds
Arkose & sandstone zone.
Silurian
Red beds (?) not seen.
Angus Brook. Gaspereau R.
(thickness greatly exaggerated relative to depths)
Brook
arkose zone.
Red beds.
gap.
protects lower part Horton seen on Angus Br.
Typical Horton series
Broken & disturbed
Blue Beach.

& that the red beds would be found in same relation to Hantsport Sandstone as Angus Brook has progression overlaps in that direction on the older rocks. How is a good clue here to the relations of the Hantsport & Union?

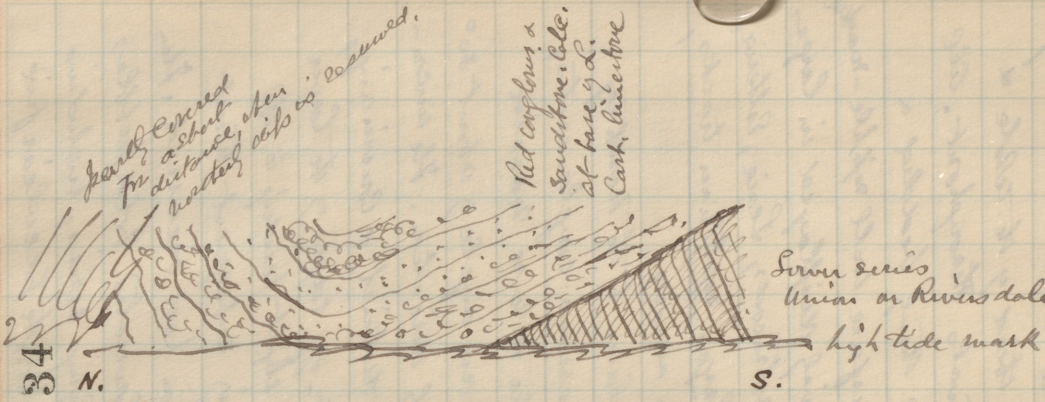
Oct. 1. Detained in Wolfville reading batch of proof which at length arrived.

Oct. 2. Wolfville to Kentville, Kingsport & across by steamer to Parrsborough pier. Spent most of Pm. at the point near pier & behind Partridge Island. Then to Parrsborough town & drove thence to Brodricks at Five Islands.

The west side of the point behind Partridge Island shows perhaps a thousand feet or more of beds which are assigned to the 'Union' group of Fletcher or about the Junction of that with the underlying Wasdale Series. Greenish, grey, blackish & red beds as well.

beds with very high & uniform Southerly dip & Sandstones, shales & occasional beds of fine calcareous conglomerate. The reddish beds may form about a third of the whole & occur at intervals throughout. All very regularly & thinly bedded & nearly every surface will ripple-marked & this often finely displayed in large faces. Find ostracods, Lepia, Estheria, Naiadites & large reptilian tracks, several inches across.

These beds overlain to the North by reddish calcareous conglomerates, somewhat softer & more massive & dipping at an angle of about 30° in a Northerly direction. The unconformity most distinct & convincing, although cut-off edges of the lower beds show a slight tending to the Southward as if subsequent thrust in that direction had occurred. The newer conglomerates hold pebbles of the underlying series, including fragments from the peculiar fine



Length about 40', at base of cliff & broken back about 50' high.

Sketch of actual contact N. of Partridge I.

Calcareous conglomes. of the series above alluded to. Also granitic or syenitic pebbles & others of varied origin. After a small local twist these upper conglomes are followed in ascending order by grey Carb. limestones with characteristic fossils & in these are narrow beds of reddish conglomerate intercalated like those seen at base of this formation & evidencing the unity of the whole. Also some greyish & reddish argillite beds, 20 to 30 ft.

In the reddish conglomes. of the Carb. limestone series are some fragments of grey limestone, apparently showing that some of these limestones had already consolidated & were being broken up nearly contemporaneously with their formation. This does not seem to be very uncommon in the case of limestones, at least I have seen it elsewhere.

The large reptillian tracks above

seem to show that the underlying series cannot be placed lower than the Carboniferous.

Oct. 2. Sunday. At Brodricks, Fiji Islands.

Oct. 3. Spent the day on Harrington River, examining section & collecting with Ami, who has measured section along this river.
Excellent & nearly continuous section of rocks correlated lithologically & by fossils with the Riversdale series, about a mile in length at an average ∠ dip of about 60° to the Southward, giving probably 3000 feet in thickness of strata. This counts from the farthest south exposure of intrusive rocks, down stream as far as the section continues regular, or to the old mill dam a short distance above the crossing of the

post road. This part of section consists of shales, sandstones & rocks of intermediate texture, grey & blackish in colour. Sandstones often quite hard. Shales sometimes very soft, fine, black & crumbling. Frequent alternations & two particularly marked horizons throughout. Fossils at frequent intervals & occasionally quite abundant, but save considerable shaly bands & nearly all the sandstones nearly barren. No red beds whatever & therefore probably lower in the series than the rocks seen near Partridge I. One erect tree about 6 inches diameter & say 10' long seen, but not well enough preserved to determine.

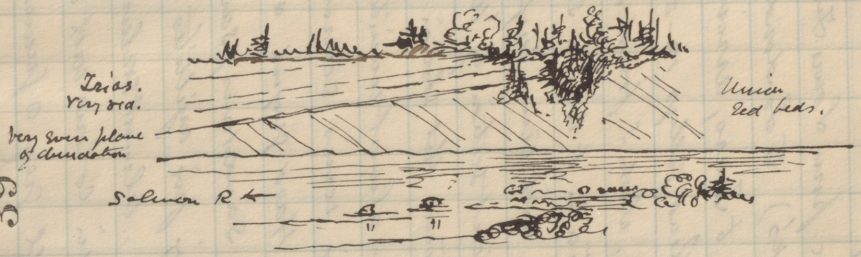
Stratigraphically below these rocks & further up the river, for about 3/4 m. nearly half the section is made up of gneiss & intrusive rocks, reddish & syenite-like, felsite & probably some diabase. Between these & considerable

disturbed by them are much
hardened & shattered sandstones
as quartzites, argillites & rocks of
intermediate texture, often breaking
with difficulty along the bedding
planes & occasionally containing
some talcose or chloritic material
along these planes. The gneissic rocks
often follow bedding planes roughly,
but are evidently subsequent
intrusions.
In this last series of hardened
rocks can find no fossils whatever,
plant or animal, while the intrusives
do not anywhere appear in the
fossiliferous section to the southward.
Fletcher considers, & wishes, the
hard series associated with the
intrusives as altered parts of the
fossiliferous series, or Riversdale.
It may be that intrusives alone
have hardened these rocks, but
the complete exclusion of intrusives
from the fossiliferous series, raises
the question whether the hard rocks

may not really be an older series, penetrated by intrusives before the fossiliferous Riversdale series was laid down. Other sections, however, may bear out the interpretation that Fletcher appears to give them on his map.

Oct. 4. Drove from Lower Fire Islands (Broderick's) to Londonderry & got train to Truro, arriving in the evening. Read galleys 12-24 of Stolworthy report proof, which I forwarded here.

Oct. 5. By train to Union Station & spent day with Ami carefully examining the magnificent section of 'Union' Red Rocks between that station & Valley Station. An almost uninterrupted descending series several thousand feet thick. Hard greyish & red-weathering or reddish sandstones, sandy shales & crumbling fire argillites in repeated alternations. Almost exclusively red or reddish in colour with only a few small grey or greenish-grey bands.


Texas.
very red.
very even plane
of denudation
Salmon R.
Union
Red Beds.

nearly barren of organic remains. A few unrecognisable impressions of plants, small worm tracks or burrows here & there, making up the list, although beds very carefully examined. In one or two places obscure impressions of trunks or branches several inches in diameter, but impossible to tell what of.

About a mile below reaching Valley, on opposite side of Salmon R, cliff with fine display of unconformity between the Union beds & the Triassic. Exposed a couple of photos on this, although light very poor at the time.

The Union rocks (as Truro series as Ami suggests they might be called) appear to me closely like the red beds below Harbor Series at Blue beach in litho. character, although without the peculiar anhydrite sandstone bands there locally developed.

Oct. 6. By train to Munjonick this morning. Hence by stage to McAra's Brook, 14 miles.

Oct. 7. Spend greater part of the day on McAra's Brook. Examined a collection in beds near the bridge at the road-crossing. Then descended the brook to the shore & had a look at some of the shore sections.

The beds near the road are red or reddish, sandstones & shales, with some grey or bluish sandstones. Pretty hard & generally not at all unlike the Munjon beds seen on the 6th. They hold, however, one or two narrow calcareous zones with stony pebbles & fish remains which are regarded by Woodward as probably uppermost Silurian. In going down the brook the section is generally descending & carbonaceous plant fragments are found in some beds, but quite undeterminable. The section is uninterrupted for a short distance near

& at the mouth of the brook, by Lower Carboniferous beds, unconformably overlying, but is assumed, a short distance to the east of the brook, by well characterized Silurian beds, with marine fossils numerous, & forming the upper part of the famous Arisaig Silurian section. These beds agree very well in strike & dip with those first seen on the brook, & I can see no reason to suppose that there is any unconformity between the beds at the two places. The higher Silurian beds of the main shore section are partly reddish or red in colour, although mostly greyish. If the beds at the two places are really conformable & parts of a single series, as appears altogether probable, there must have been a change in conditions, from open sea with numerous molluscs, to circumstances inimical to marine life, the fauna consisting of the above-mentioned fish remains only.

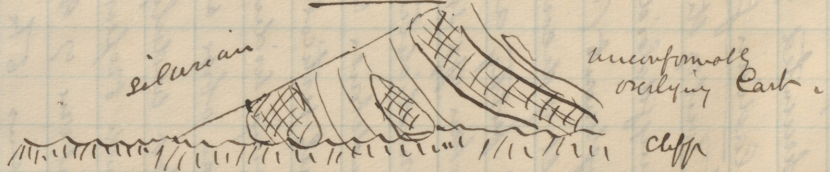
The covering rocks which intersept the section, consist of soft red sandstones & conglomerates with intercalated traps. These seem to me to evidently contemporaneous & to be very well represented by the section given in Acadian Geology. The trap tod to the west of the brook is frothy & very amygdaloidal at the top & the conglomerate (reddish) underlying it is full of decomposed fragments of this frothy amygdaloid, evidently broken off shortly after it had consolidated. At the brook, reddish sandstones material is seen to fill nearly vertical joints in the trap, having evidently been introduced from above when these were open. The underlying traps seem very much to repeat the conditions described, but one of them is quite scoriaceous & seems to be a narrow contemporaneous flow. The conditions in regard to these are not, however, quite so clear

Silurian? seen at the
Wood-crossing & supposed by
Fletcher to be unconformably overlying
Devonian.

Silurian
full of fossils.

Lower Carb. Traps, sandstones
& conglomerates.

Stone Section.



Plan.

as those in the first case.
The character of these traps is not such as to indicate that they may have disturbed the unconformably underlying beds at all. The point or points of eruption may have been quite distant from the positions the overflows now occupy. I had previously supposed that the trap was an eruptive boss breaking up here through the lower rocks & very probably indicating a real hiatus in the section.

Oct. 8. Drove back to Merigomish this a.m. Train to Truro & there got I.C.R. train for Montreal.

Oct. 9. Arrive at Montreal about 1½ hours late. Lost connection to Ottawa, but proceeded by 10 a.m. train.

Oct. 10. Reach Ottawa about 1.40 a.m.