GEOLOGICAL NOTES.

1. Lac la Biche occupies a shallow basin excavated in stratified clay and sandy loam, of Post-tertiary age.—Page 27, C. C.

2. Small sections of dark drab and indigo-colored marls and shales with nodules and thin layers of clay iron-stone, lying quite horizontally, occur in the banks of this part of the Biche River.—Page 7, C. C.

3-3'. From the Biche to the Pelican River, a distance of about 52 miles, the Athabasca flows between sloping banks from 50 to 150 feet high, consisting of dark clayey Cretaceous marls, having a general horizontal attitude, and containing large calcareo-ferruginous argillite concretions and smaller nodules of clay-ironstone—Page 8, C. C.

3'-4. From Pelican to House River, a distance of 22 miles, the character of the banks of the Athabasca continues the same as in the last section. The rocks consist of soft grey sandstone below, with indigo-colored marls above.—Page 9, C. C.

5. For 4 miles in this vicinity, the sandstone forming the lower part of the banks has an almost uniform thickness of 50 feet, and is interstratified with some blackish marly bands.—Page 9, C. C.

6. The river, for a few miles above the Grand Rapid, is flanked on both sides by cliffs about 40 feet high, of soft, fine-grained bluish-grey sandstone, weathering yellowish-gray.—Page 9, C. C.

7. At the Grand Rapid the bed of the river breaks down into a band of sandstone, which is conspicuous for a distance of 30 miles below, owing to its being more or less thickly studded with spherical concretions, differing from the matrix in containing some argillaceous matter.—Page 10, C. C.

8. Bank of soft grey friable sandstone, 90 feet high, with the concretionary band, 20 feet thick at the base, for several miles along the left side of the river.—Page 11, C. C.

9. Banks of soft sandstone, 175 feet high, containing seams of lignite, one of which is 4 feet thick.—Page 12, C. C.

10. Cliffs 170 feet high of homogeneous grey sandstone, parts of which weather into pillars.—Page 12, C. C.

11. Sandstone cliffs with seams of lignite.—Page 12, C. C.

12. Cliffs 200 feet high of soft grey sandstone, weathering yellow, with the concretionary band at one-third of this height.—Page 13, C. C.

13. Seams of lignite in sandstone cliffs on the right bank, at 3 and 5 miles below Little Buffalo River.—Page 13, C. C.

14. At Burnt Rapids are beds of brittle light drab-colored iron-stone and of calcareous green sandstone containing Cretaceous shells and fragments of silicified wood.—Page 13, C. C.

15. Cliffs of sandstone 200 feet high, in four terraces.—Page 13, C. C.

16. The bank at Pointe Terre Brulé is 200 feet high, in three terraces, the concretionary band forming the central one.—Page 13, C. C.

17. At the Drowned Rapid, Cretaceous fossils occur in the harder sandstone beds. Here also the black, petroleum-bearing, fine-grained sandstone, first makes its appearance. It becomes abundant and conspicuous henceforward nearly to the delta of the river.—Page 14, C. C.

GEOLOGICAL NOTES.

18. The bank is here about 300 feet high. The top of the concretionary band, which is 50 feet thick, is 200 feet over the river.—Page 15, C. C.

19. The petroleum-bearing strata dip in different directions in this neighborhood.—Page 15, C. C.

20. The Devonian rocks are first seen on the upper side of Crooked Point. They consist of a few feet of bluish-grey limestones, mostly of an earthy character, lying horizontally.—Page 15, C. C.

The following is an estimated section of the Cretaceous rocks along the Athabasca, in descending order, from Lac la Biche to the top of the Devonian rocks at Crooked Rapid:—

	Feet.
Clayey marls, mostly indigo-colored, holding thin layers and tortoise-shaped concretions of impure clay ironstone. These strata form the banks from the Biche to the Pelican River....	200
Arenaceous marls and homogeneous fine-grained grey sandstones, in the banks from Pelican River to the foot of Grand Rapid..................	170
Bands of grey sandstone, studded with concretions which are mostly spherical, and of large size, from 30 to..........	50
Marls, mostly arenaceous, grey, drab, etc..............	140
Fine sandy strata, mostly blackened by petroleum..........	200
—Page 16, C. C.	760

21. At the Cascade Rapid, 80 or 90 feet of petroleum-bearing sandy marl are exposed in the banks. This is underlaid by about 15 feet of Devonian limestone, over part of which the river passes in low cascades. The limestone is exposed at the base of the Cretaceous rocks along the edge of the river for many miles below this rapid.—Page 17, C. C.

22. For 12 miles from The Forks, the right bank of the river is from 100 to 200 feet high, and consists of beds of thick homogeneous sandstone composed of fine quartz sand saturated with petroleum, which gives it a coaly appearance when freshly exposed, resting on a few feet of Devonian limestone.—Page 19, C. C.

23. The Devonian limestones which were observed as far down as this point, are generally yellowish-grey, thin-bedded and somewhat earthy, with rough surfaces. They form low ledges and bluffs along the edge of the river on both sides. The general attitude of the strata is about horizontal; the bedding is, however, seldom quite level for any great distance, but undulates slightly in all directions, until it finally disappears under the river.—Page 22, C. C.

24. Laurentian gneiss. At Fort Chipewyan it is strongly banded and ribboned, the prevailing color being red, and the strike S. 43° W. (true.) At the outlet of Lake Mammawee the strike is S. 36° W. (true.)—Page 24, C. C.

25. Masses of sandy pitch in the bed of the Clearwater River at 11, 13 and 17 miles above The Forks.—Page 24, C. C.

26. At the Cascade Rapid the rock is a hard, yellowish-grey limestone, with a bituminous odor on fresh fracture.—Page 25 C. C.

27. At the Pas Rapid and in the valley of the river above and to the north of it, much porous or spongy grey bituminous limestone is exposed. One bed in the vicinity of the rapid is stained with free petroleum. Islands and pillars of the limestone stand in the river at the rapid and in the sand which covers the bottom of the valley in the neighborhood. In some places the limestone is cavernous, and all the exposures are much decayed and eroded.—Page 25, C. C.

28.—At the Terre Blanche Rapid, the river passes down amongst high islands and points of grey limestone, which is much shattered on the surface by the weather, but otherwise it appears to be mostly of a massive character. No fossils were observed in the rocks at any of the rapids, but they appear to belong to a part of the Devonian system, somewhat lower down than the fossiliferous beds, which immediately underly the Cretaceous sandstones on the Athabasca.—Page 25, C. C.

29. At this place a number of copious springs of mineral water issue from the north bank in a space of about 300 yards. From one of them the saline matter was obtained by evaporation, and found by Mr. Hoffmann to consist of potash, soda, magnesia and lime, all in considerable quantity as sulphates, chlorides and carbonates.—Page 25, C. C.

30. The banks of the Clearwater consist for the most part of a stiff, pebbly, grey clay. On the Methy Portage trail, the brink of the bank is one and a-half miles from the river and 540 feet above its level.

Geological and Natural History Survey of Canada.

Alfred R.C. Selwyn L.L.D., F.R.S., Director.

MAP
OF PART OF THE
ATHABASCA RIVER
To Illustrate
Dr. R. BELL'S EXPLORATION.

Report 1882-84, pages 1cc to 37cc.

Scale 8 miles to 1 inch

8 7 6 5 4 3 2 1 0 8 16 24

Nat. Scale 1/506,880

1884.

Compiled & Drawn by
A.S. COCHRANE Assistant Topographer.

NOTE.

The Clearwater River and Lake Athabasca are taken from unpublished track-surveys, made in 1881, by A.S. Cochrane; the remainder of the map being from track-surveys by Dr. R. Bell.

The Burland Lith. Co. Montreal.