The Astonishing Oil History of the Gaspé Basin and Its Long March Towards a First Commercial Success*

Jean-Sebastien Marcil[1]

Search and Discovery Article #70394 (2019)**
Posted September 9, 2019

*Adapted from an oral presentation given at 2019 AAPG Annual Convention and Exhibition, San Antonio, Texas, May 19-22, 2019
 DOI:10.1306/70394Marcil2019

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Abstract

The first published account of the occurrence of petroleum in Early Devonian-aged Gaspé Basin is in the Proceedings of the Literary and Historical Society of Quebec in 1836. As early as 1843, William Logan, founder of the Geological Survey of Canada, then on a field mission to find coal accumulations, found oil seepages in an area of the Gaspé Bay later named Tar Point. In a highly noticed report, Logan (1844) referred to bituminous matter and petroleum seepages in the Gaspé area. Logan's description of oil occurrence in Gaspé Basin sedimentary units has been cited as being possibly the earliest reference to accumulation of petroleum in an anticlinal structure (Zaslow, 1975). Encouraged by Logan's descriptions and the oil craze in Pennsylvania, Gaspé Bay Mining Company made the first oil well drilling in Canada in 1859 in the Gaspé Basin. In 1866, a pamphlet published in New York extolled Gaspé's merits as one of the most promising oil regions ever discovered. For the London market, the proximity of the port of Gaspé had advantages over the wells of Pennsylvania. Subsequently, the region saw several bursts of exploration activity toward the end of the last century, and in the early part of the present century. Many wells were drilled with little or no regard to geology or the regional structure (Ells, 1902-03; Skidmore, 1970). More than 80 scattered seepages have been mentioned by Logan (1863), Parks (1930), and McGerrigle (1950). Between 1890 and 1903 over fifty wells were drilled in eastern Gaspé. This period covers the first historical phase of exploration of the Gaspé Basin. Despite extensive oil and gas shows in the wells, and several seepages of oil in the Devonian Grande Grève carbonates and York River elastics, commercial quantities of hydrocarbons have so far evaded the explorationist. This paper will focus on the outstanding exploration efforts made by the Petroleum Oil Trust (POT) and their subsidiaries. The company was big at the end of the 19th century. Petroleum Oil Trust of London, England, drilled a total of 53 wells between 1892 and 1901, has built 120 kilometers of roads and houses for 200 workers. These wells were drilled with cable-tool equipment to depths of 1,500 to 3,700 feet. The project receives support from the government of Prime Minister Wilfrid Laurier, who aims to make Gaspé an important port. The presence of the oil industry would be an added advantage. As a builder and visionary entrepreneur, the president of POT, William Carpenter worked on the establishment of a regional railway and the development of an industrial port. In a decade, more than £800,000 will have been invested in Gaspésie. Oil was produced from some wells. A small refinery was also built on the initial encouragements, but sustained commercial flow was hard to obtain from low pressure wells. The Petroleum Oil Trust has pumped a few thousand barrels of oil before a major fire at its facility causes the bankruptcy of the company (Annett, 1983).

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The astonishing oil history of the Gaspé Basin and its long march towards a first commercial success

Jean-Sébastien Marcil (Derena Geosciences)

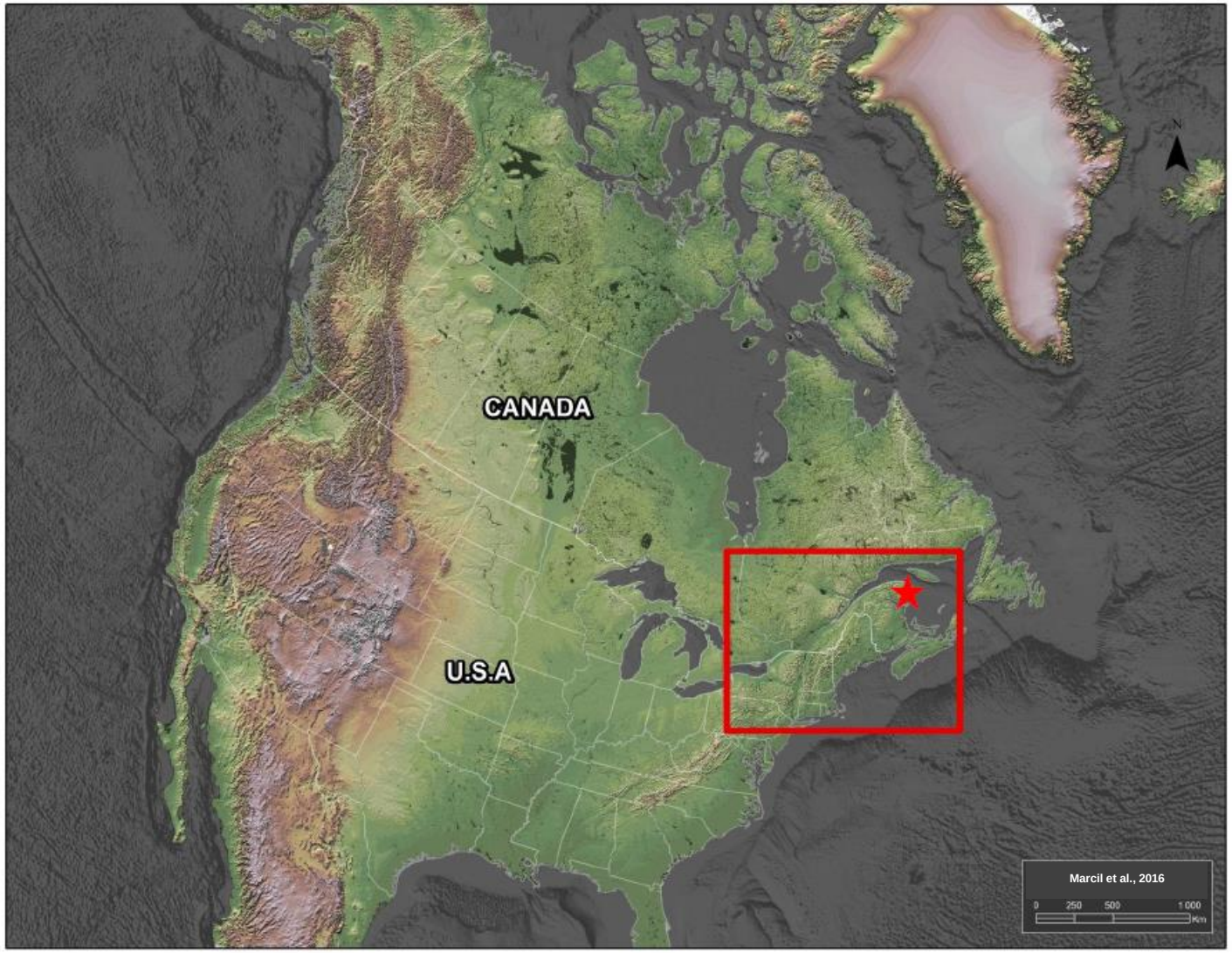
May 19th, 2019 – San Antonio, Texas

AAPG Annual Convention and Exhibition

Gaspé Basin : Lower Devonian sedimentary basin of the Appalachians

Quebec's Gaspé Basin is a successor basin located in the Eastern portion of the Appalachians in Canada.

Basin subsidence began at the end of the Ordovician and sedimentary units were deposited there until the Middle Devonian. The Acadian and Alleghenian orogenies have affected the basin while the basement structures are Taconian.



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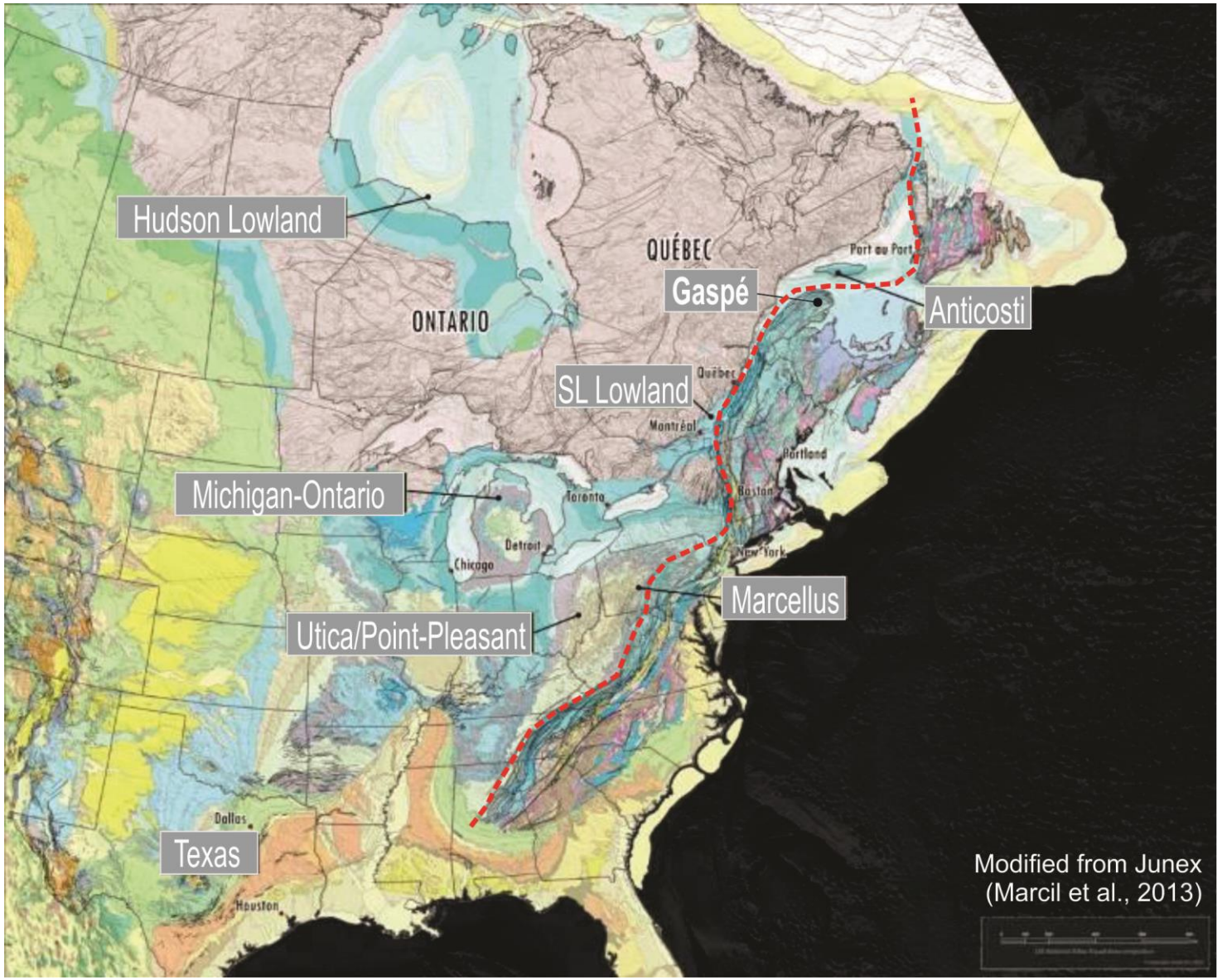
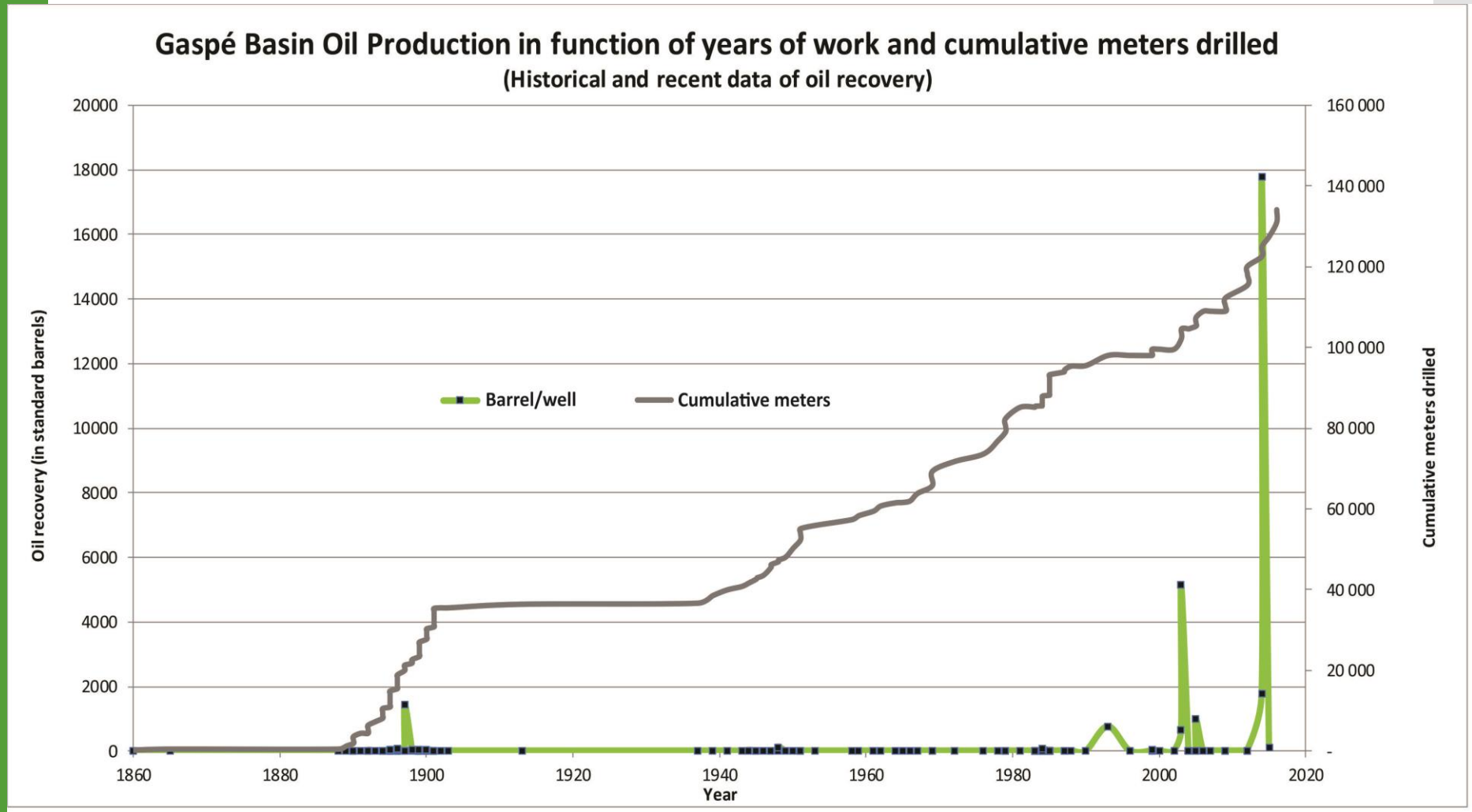


Oil and Gas Exploration History of the Gaspé Basin

Based on the review made by Lavoie et Bourque (2001) we can divide the oil and gas history of Gaspé basin in four phases.

This paper will focus on the outstanding exploration efforts made by the Petroleum Oil Trust (POT) and their subsidiaries in the first phase.



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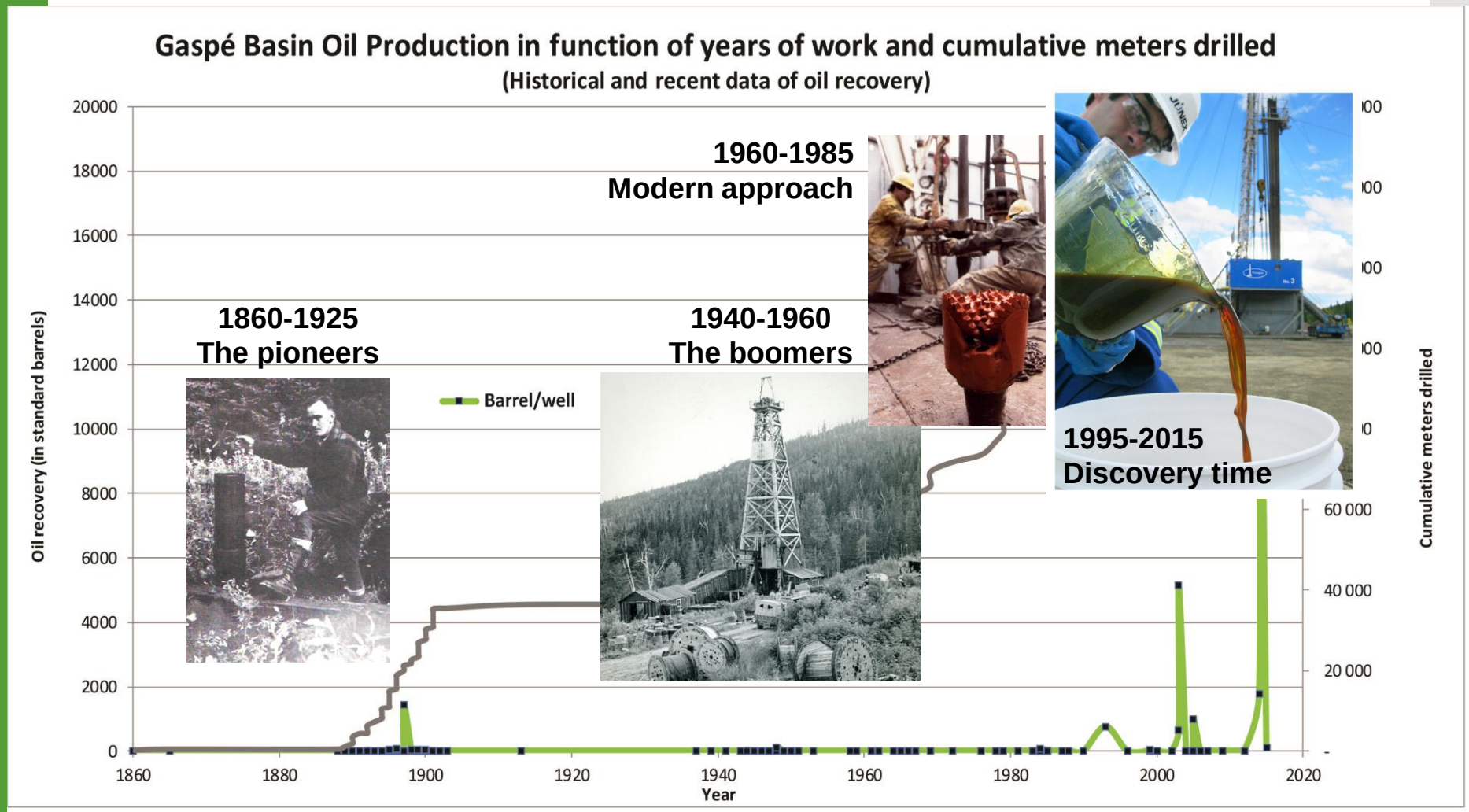

Gaspé Basin : One of the first petroleum district of North America

In the middle of the 19th century, the city of Gaspé is an important international fishing port, with 10 commercial consulates. Trade is essentially controlled by English companies. In addition, the small town is boosted by forestry, agricultural and tourism activities that allow residents to live relatively well despite their distance from major urban centers. (Mimeault, 1995)

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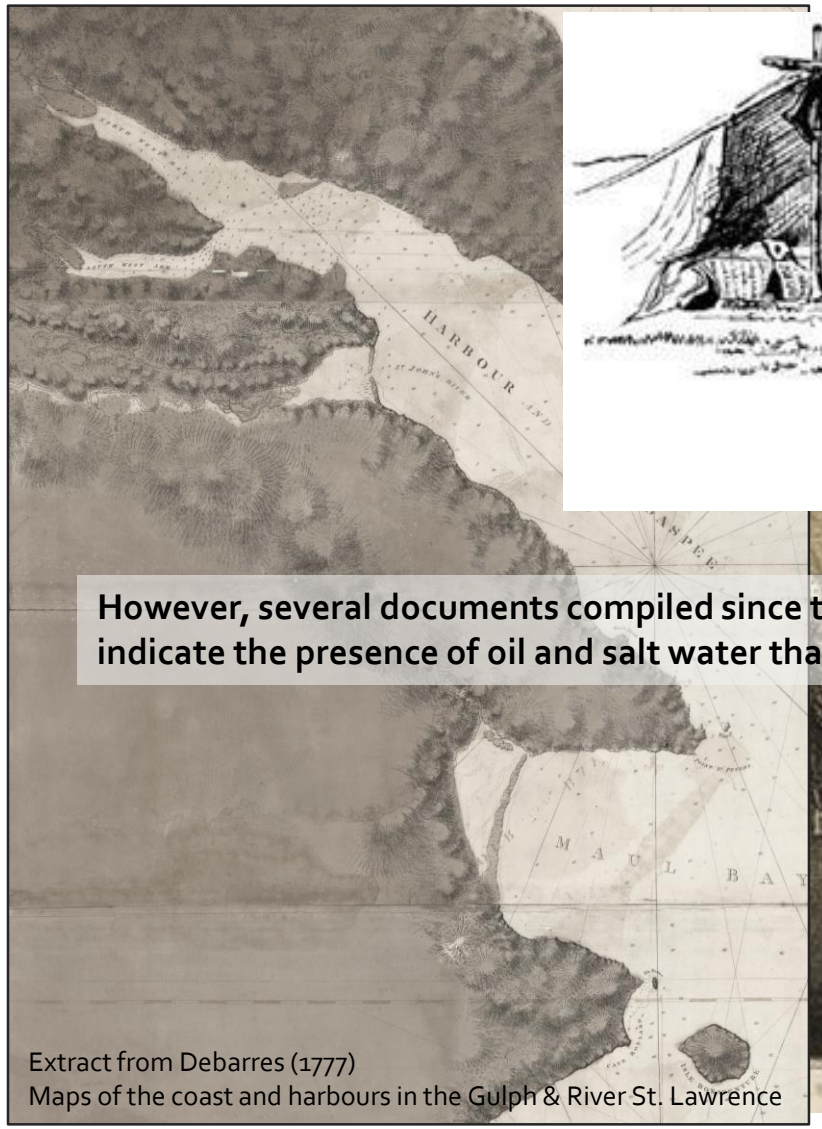
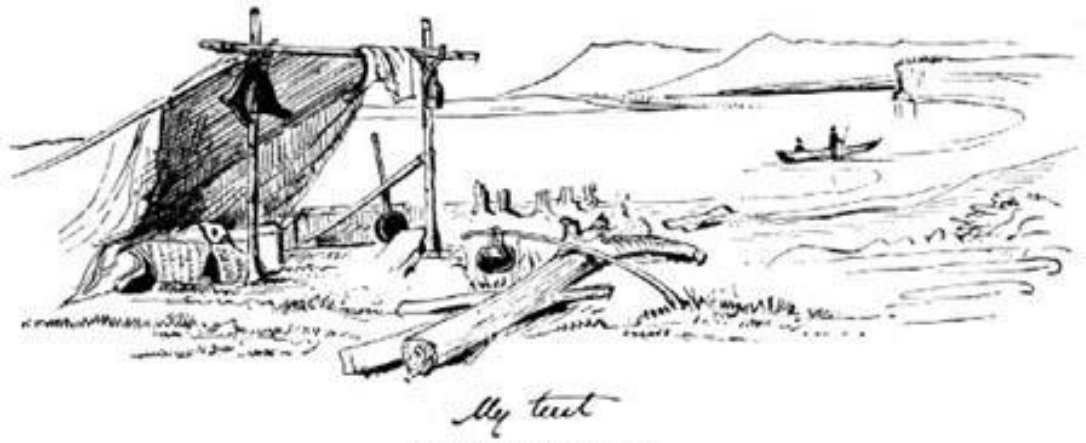
When W. E. Logan began his geological research in Gaspésie in 1843, most of the available scientific knowledge was in coastal areas. Inland work will be hard (Annett, 1983).



Extract from Debarres (1777)
Maps of the coast and harbours in the Gulph & River St. Lawrence



Logan's Journal, 1843.

However, several documents compiled since the beginning of the century indicate the presence of oil and salt water that motivate its work.

Extract of a letter from John D. M'Connell, Esq. Collector of Customs at Gaspé.

Fort Ramsay House, Gaspé, 8th Oct. 1830.

Sir,—This will be handed you by Mr. Benjamin Patterson, who takes with him a bottle of mineral water for the purpose of being analyzed, the produce of a spring in the vicinity of Gaspé Basin; he, as well as the neighboring inhabitants being desirous of ascertaining its medicinal qualities. I think it a very strong chalybeate.

The Indians have also discovered an extensive spring here, which emits a liquid bitumen, possessing all the qualities of the Barbadoes tar; it is my intention to forward a sample at early convenience.

I have the honour to be, Sir, &c.

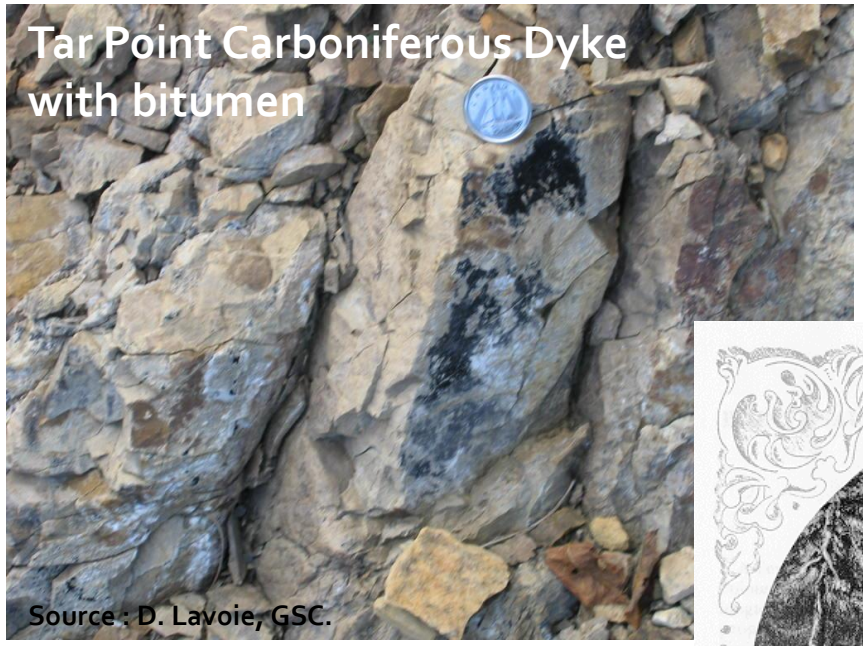
John D. M'Connell.

Early Publications of the Literary & Historical Society of Quebec 1824-1924

Gaspé Basin : One of the first petroleum district of North America

Indications of oil were noted in the Gaspé peninsula at a very early date and were recorded by Sir W. E. Logan in 1844 and in 1863, by Dr. T. Sterry Hunt in 1865, and by Dr. R. W. Ells in 1888-89 in the Reports of the Geological Survey of Canada.

Source : D. Lavoie, GSC.



Tar Point Carboniferous Dyke with bitumen

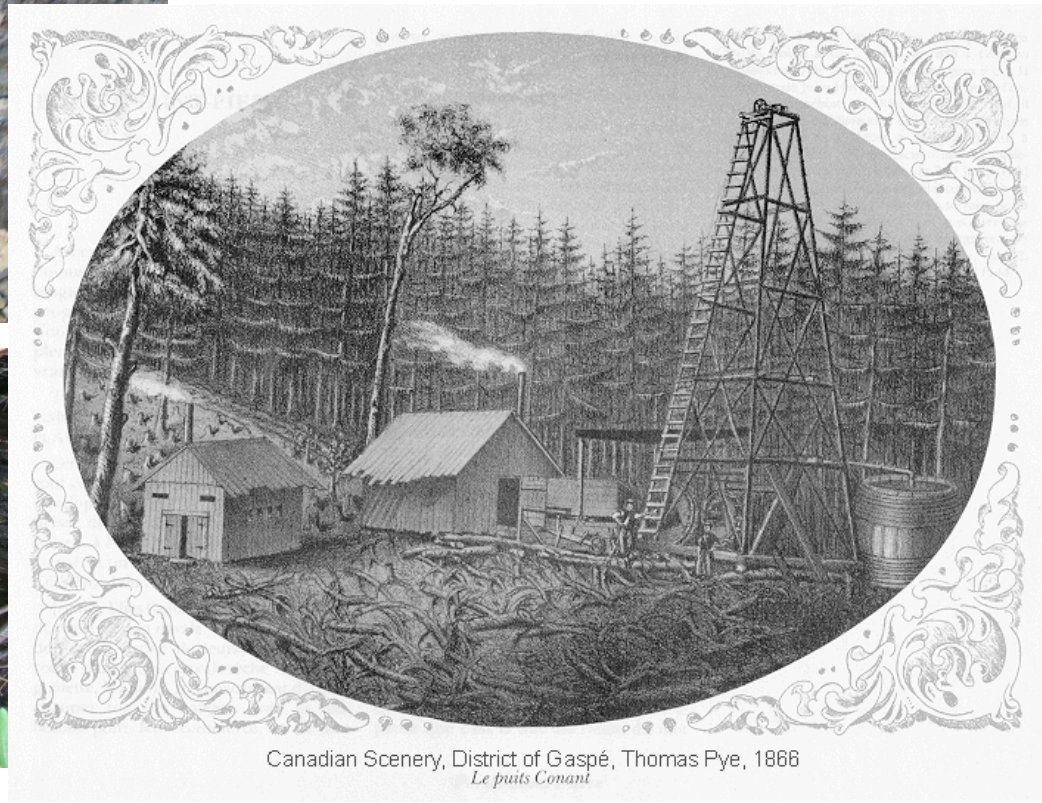
Source : D. Lavoie, GSC.

Oil seep near Grande Fourche

Source : J.-S. Marcil

In 1860, the Gaspé Bay Mining Co. drilled two wells using cable tool technique in the surrounding area of Gaspé. A third well was drilled near Sandy Beach in 1865 (known as the Conant Well, still flows oil today).

All these shallow wells were drilled directly in the surface extent of natural oil seepages.

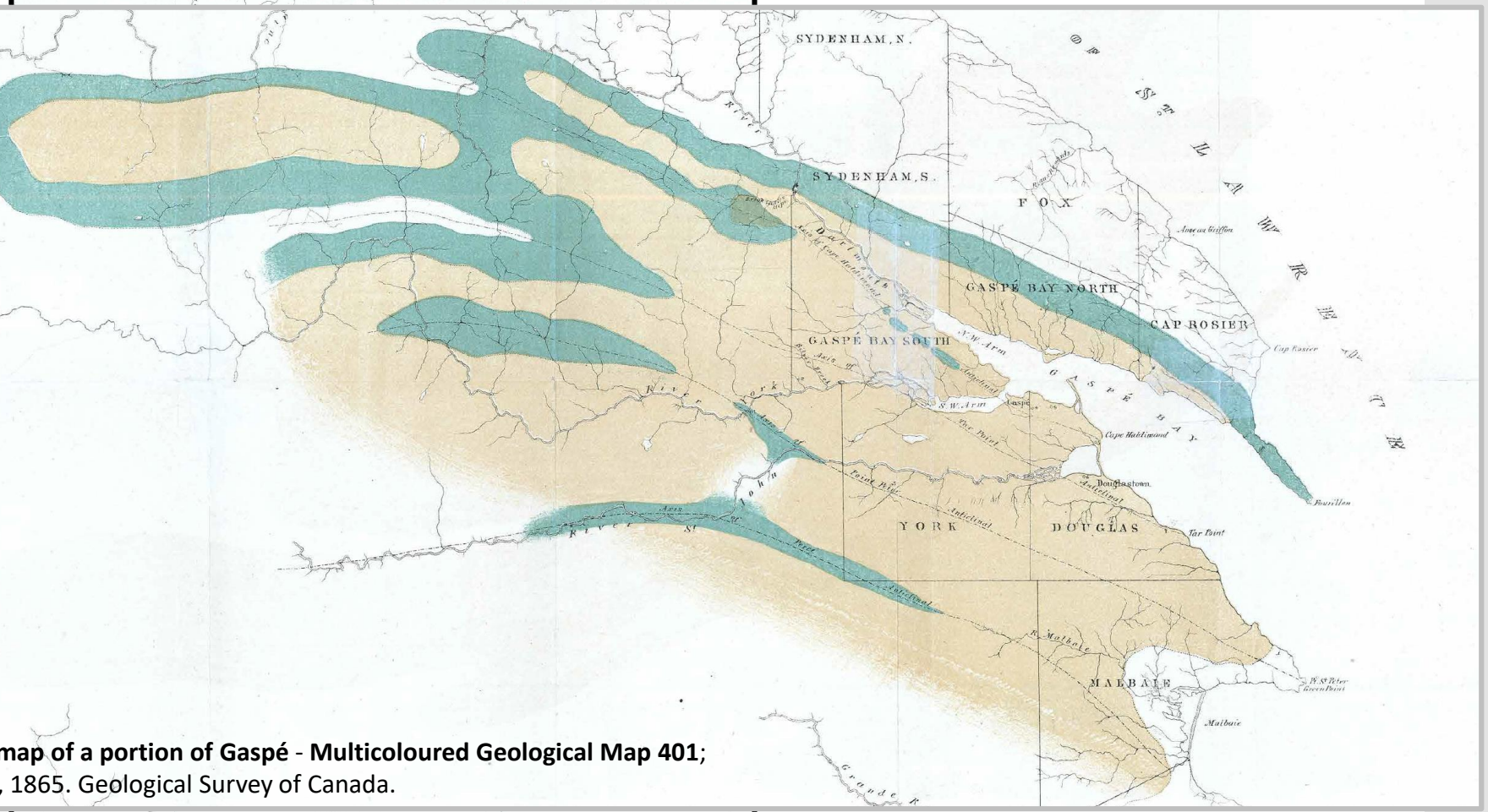


Canadian Scenery, District of Gaspé, Thomas Pye, 1866
Le puits Conant

Geological mapping of the peninsula at the end of 1880's

Field work completed by Logan and assistants was compiled by Hunt in its 1865 report on petroleum occurrence in Gaspé basin.

R.W. Ells and its team published in 1884 a first detailed geological map of the peninsula.



Geological map of a portion of Gaspé - Multicoloured Geological Map 401; Logan, W.E., 1865. Geological Survey of Canada.

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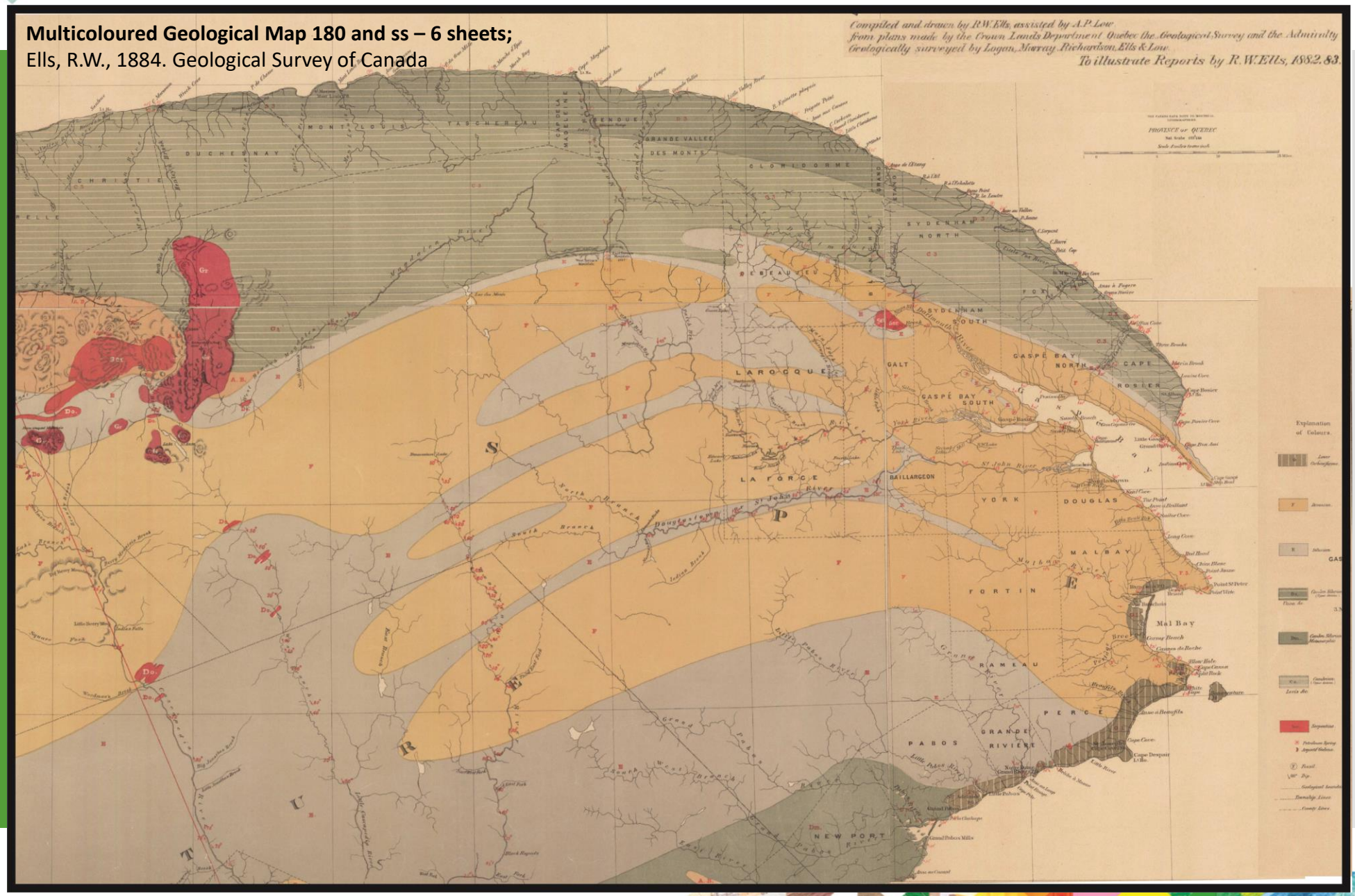
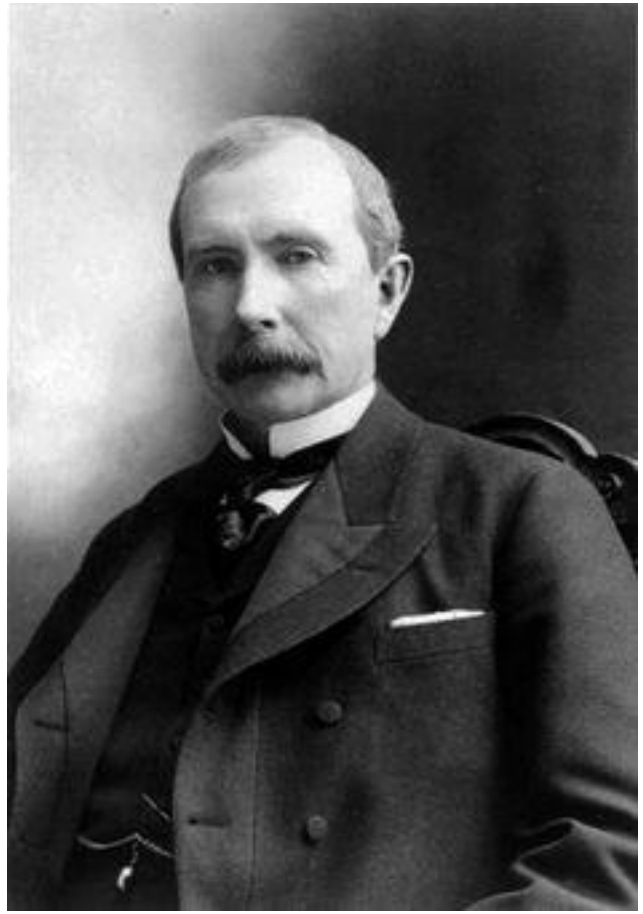


Multicoloured Geological Map 180 and ss – 6 sheets;
Ells, R.W., 1884. Geological Survey of Canada

Petroleum Oil Trust : London-based pioneer of the Gaspé oil

Petroleum Oil Trust (POT) and its branch companies, the Canada Petroleum Co. (CPC), Belgium Oil Company, Oil Fields of Gaspé, dominated the Gaspé oil drilling from 1895 to 1905.



Alfred W. Carpenter formed the Petroleum Oil Trust Ltd in 1889 in the purpose of acquiring and working the petroleum oil deposits in the Peninsula of Gaspé.

Based in England, Petroleum Oil Trust began operations on a larger scale in 1889 by acquiring 50,413 acres of land selected by Charles Robb , a recognized mining engineer with experience in Ontario and Pennsylvania. Robb and its team explored the area in 1865. The prospective lands were located in geological zones identified by Logan fieldworks and 68 distinct surface indications of oil were recognized.

In order to realized its development plan, A.W. Carpenter raised an initial capital of £430,000 for POT. After that, he raised an additionnal £300,000 for CPC.

The money will be invested in the Gaspé basin to bring drilling equipement, build roads in the deep forest and drill over 50 wells.

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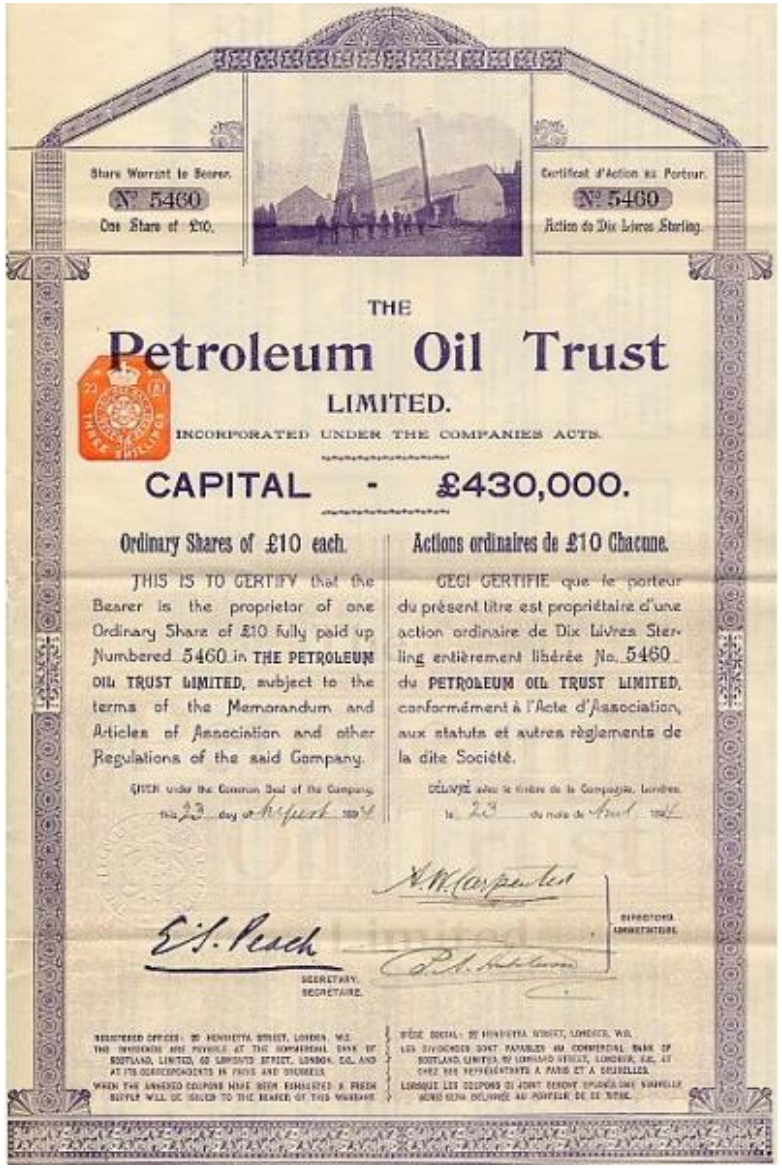

Share Warrant to Bearer.
N° 5460
One Share of £10.

Certificat d'Action au Porteur.
N° 5460
Action de Dix Livres Sterling.

THE
Petroleum Oil Trust
LIMITED.
INCORPORATED UNDER THE COMPANIES ACTS.

CAPITAL - £430,000.

Ordinary Shares of £10 each.

THIS IS TO CERTIFY that the Bearer is the proprietor of one Ordinary Share of £10 fully paid up Numbered 5460 in THE PETROLEUM OIL TRUST LIMITED, subject to the terms of the Memorandum and Articles of Association and other Regulations of the said Company.

Actions ordinaires de £10 Chacune.

CECI CERTIFIE que le porteur du présent titre est propriétaire d'une action ordinaire de Dix Livres Sterling entièrement libérée No. 5460 du PETROLEUM OIL TRUST LIMITED, conformément à l'Acte d'Association, aux statuts et autres règlements de la dite Société.

GIVEN under the Common Seal of the Company this 23 day of August 1894

DÉLIVRÉ sous le timbre de la Compagnie, Londres, le 23 du mois de Août 1894

SECRETARY. SECRÉTAIRE.

DIRECTORS. ADMINISTRATEURS.

REGISTERED OFFICES: 20 HENRIETTA STREET, LONDON, W.C.
THE DIVIDENDS ARE PAYABLE AT THE HONGKONG AND SHANGHAI BANKING CORPORATION, LIMITED, 9 BISHOPSGATE STREET WITHIN, LONDON, E.C. AND AT ITS CORRESPONDENTS IN PARIS AND BRUSSELS.
WHEN THE ANNEXED COUPONS HAVE BEEN EXHAUSTED A FRESH SUPPLY WILL BE ISSUED TO THE BEARER OF THIS WARRANT.

SIÈGE SOCIAL: 20 HENRIETTA STREET, LONDON, W.C.
LES DIVIDENDES SONT PAYABLES AU COMPTOIR NATIONAL D'ESCOMPTE DE PARIS, 14 RUE BERGÈRE, PARIS, ET A BRUXELLES.
LORSQUE LES COUPONS CI-JOINT SERONT ÉPUISÉS UNE NOUVELLE SÉRIE SERA DÉLIVRÉE AU PORTEUR DE CE TITRE.

SOUTH WALES DAILY NEWS, MONDAY, MAY 1, 1899.

Public Companies, &c.

The SUBSCRIPTION LIST will OPEN TUESDAY, May 2nd, at 11 a.m., and will CLOSE on or before THURSDAY, May 4th, 1899, at 11 a.m. for Town and Country.

THE
CANADA PETROLEUM COMPANY, LIMITED.

(Incorporated under the Companies Acts, 1862 to 1898.)

CAPITAL £300,000,

In ORDINARY SHARES of £1 each.

ISSUE OF 300,000 SHARES,

Of which 100,000 Shares will be taken by the Vendors in part payment of the purchase consideration, and 200,000 Shares are now offered for public subscription at par, payable as follows:—

2s 6d per Share on Application, 2s 6d per Share on Allotment, 5s per Share one month after Allotment, 5s per Share two months after Allotment, 5s per Share three months after Allotment.

DIRECTORS.

Sir W. H. BAILEY, J.P., Salford (Managing Director W. H. Bailey, Limited, and Director of the Manchester Ship Canal Company), Chairman.
MALCOLM GUTHRIE, J.P., Liverpool (Director Liverpool United Gas Light Company, Limited).
J. SPARKS DEWHURST, J.P. (late of Huddersfield), Foxhall Park, Letterkenny, and London.
ABRAHAM LORD, J.P., Tonge Mills, Middleton, Lancashire.
WALTER G. BAGNALL, J.P., Manchester (Chairman Bagnall Oil Company, Limited).
GEORGE CARR GLYN, 27, Grosvenor-place, London, S.W. (Director of the Anglo-Russian Petroleum Co., Ltd.).
JAMES FOLEY, Montreal and Gaspé, Canada (Managing Director Petroleum Oil Trust, Limited).

BANKERS.

THE UNION BANK OF LONDON, LIMITED, Princes-street, E.C., and Branches.
THE MANCHESTER AND LIVERPOOL DISTRICT BANKING COMPANY, LIMITED, Spring-gardens, Manchester, and Branches.
THE MERCANTILE BANK OF LANCASHIRE, LIMITED, Mosley-street, Manchester, and Branches.

SOLICITORS.

For the Company—VAUDREY and WILLETT, 1, St. James's-square, Manchester.
For the Vendors { LUMLEY & LUMLEY, 15, Old Jewry Chambers, E.C., and 37, Conduit-street, London, W.
C. PRESTON-HILLARY, Maiden-lane, London, W.C.

BROKERS.

LONDON: JOHN PRUST & CO., 37, Throgmorton-street, E.C., and Stock Exchange.
LIVERPOOL: MOCATTA & BROWNE, 17, Sweeting-street, "
MANCHESTER: MEWBURN & BARKER, 13, Pall Mall, "
GLASGOW: MACNAIR, ALLAN, YOUNG, & ROWAN, 27, St. Vincent-place, "
DUBLIN: VICTOR W. MANLY, Stock Exchange Buildings, "

AUDITORS.

EDWIN GUTHRIE & CO., Manchester, London, and New York, Chartered Accountants.

REGISTERED OFFICES.

120, BISHOPSGATE-STREET WITHIN, LONDON, E.C.

MANCHESTER OFFICES.

4, CATHEDRAL-STREET, MANCHESTER.

SECRETARY (pro tem.)

W. CHAS. DUNCAN.

PROSPECTUS.

This Company has been formed to acquire valuable rights and privileges from the owners of very extensive and proved Petroleum fields in the oil bearing region of Gaspé, Province of Quebec, Canada, with a view to supplying high-flash illuminating or lamp oil and Petroleum products to Great Britain, the Dominion of Canada, and elsewhere. Such owners possess about 38,000 acres of freehold land and perpetual mining rights over a further 5,000 acres.

In addition to the extensive Petroleum mining operations which have been carried on, the lands have been generally developed by the construction of roads, and by the erection of wharves, warehouses, &c., at the Harbour or Basin of Gaspé.

Since the acquisition of the lands by the Petroleum Oil Trust, Limited (hereinafter called the Oil Trust), a number of wells have been sunk in various localities with favourable results. Two subsidiary companies, hereinafter mentioned, formed to sink wells, have struck oil. The time has now arrived to make arrangements for laying pipe lines to the harbour, and marketing the products of these petroleum fields.

The most important feature of the Gaspé District is the excellent quality of the Crude Petroleum obtained. Samples of the Crude Oils have been submitted to eminent experts, whose examination and analyses show that they are of very high quality, that they give a large percentage of Kerosene of a remarkably free burning kind, with a flashing point (see analyses) above the legal minimum in this country and on

DERENA GEOSCIENCES

Development history of the Gaspé Oil Field

From 1888 to 1903, 54 wells were drilled by the Petroleum Oil Trust and its subsidiary CPC. Most of the well drilled were about 1000m depth. The deepest hole reach 2030m. Majority of wells only tested the Devonian sandstones. Cable tool drilling equipments were not strong enough to penetrate effectivly the siliceous Indian Cove Ls. 60% of the wells drilled during this period accounted occurences of oil. The best wells produced about 1500 bbls (Lavoie et Bourque, 2001).

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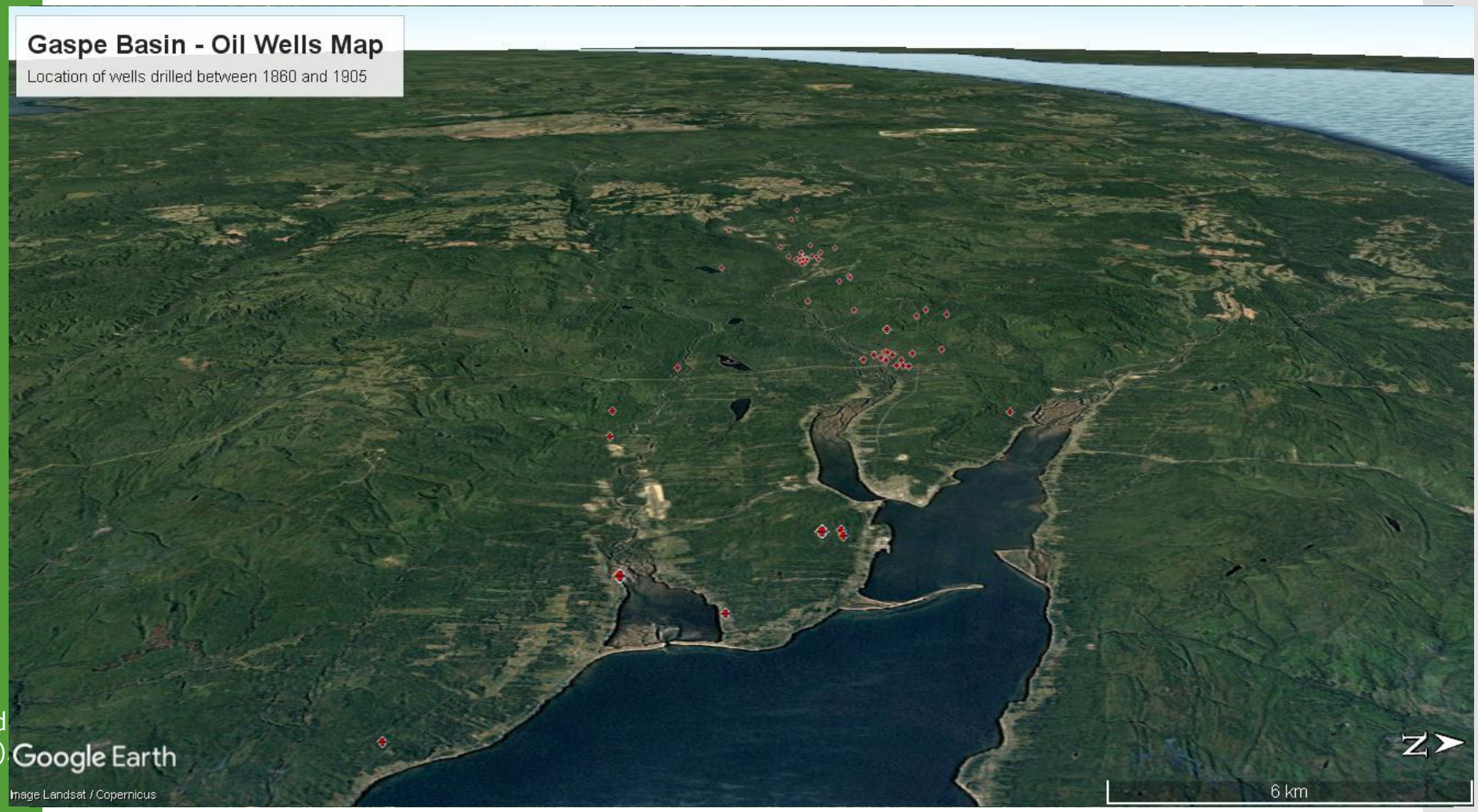

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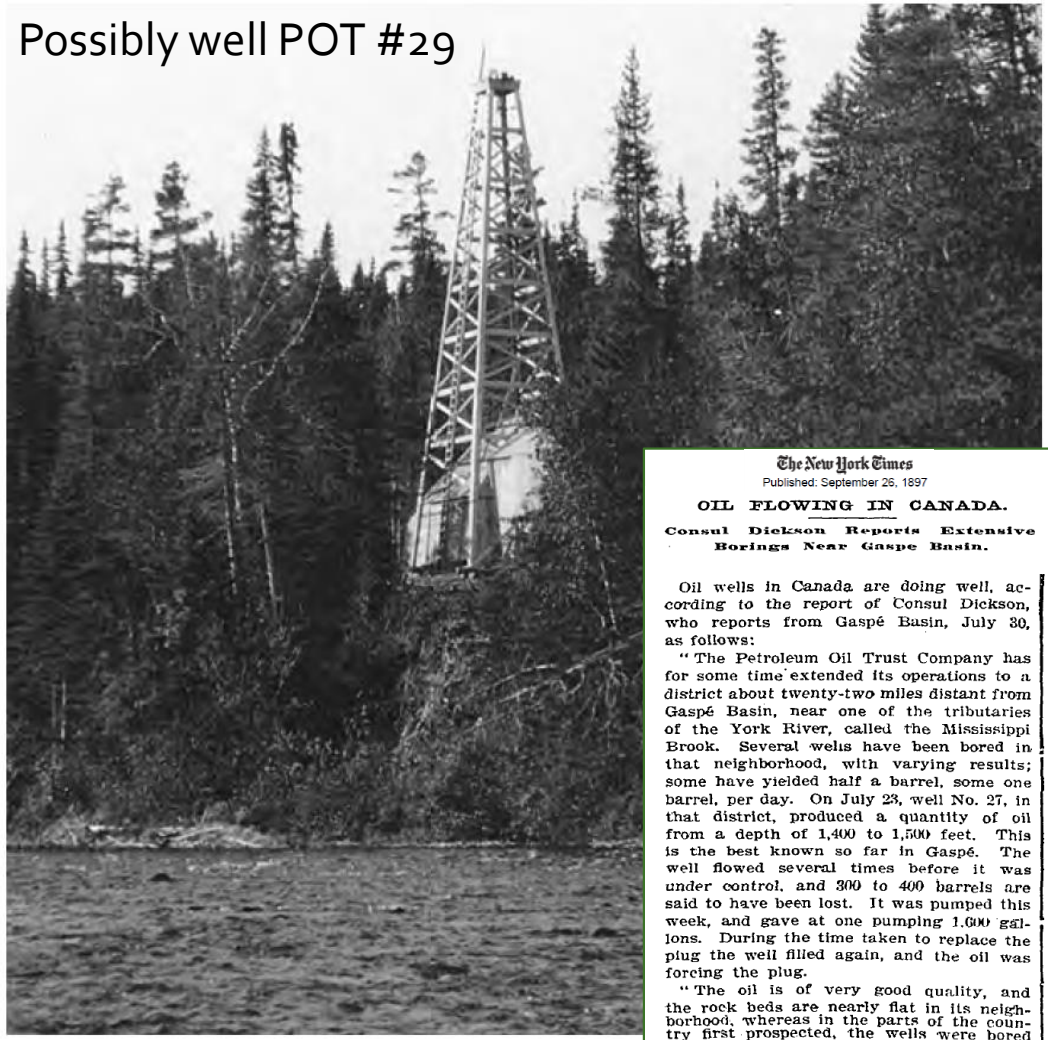
Limited but promising success

The Petroleum Oil Trust put down eight wells in 1893, finding a light green oil. The Trust continued its borings in 1894, on the left bank of the York River, south of the anticlinal of Tar Point. Several of the ten wells yielded moderately, and operations extended to the portion of Gaspe Basin called Mississippi Brook.

Possibly well POT #29



Un puits de pétrole aux abords de la rivière York.
Musée de la Gaspésie. Collection Richard Gauthier. P162/5/80/67.

The New York Times
Published: September 26, 1897

OIL FLOWING IN CANADA.

Consul Dickson Reports Extensive Borings Near Gaspe Basin.

Oil wells in Canada are doing well, according to the report of Consul Dickson, who reports from Gaspé Basin, July 30, as follows:

"The Petroleum Oil Trust Company has for some time extended its operations to a district about twenty-two miles distant from Gaspé Basin, near one of the tributaries of the York River, called the Mississippi Brook. Several wells have been bored in that neighborhood, with varying results; some have yielded half a barrel, some one barrel, per day. On July 23, well No. 27, in that district, produced a quantity of oil from a depth of 1,400 to 1,500 feet. This is the best known so far in Gaspé. The well flowed several times before it was under control, and 300 to 400 barrels are said to have been lost. It was pumped this week, and gave at one pumping 1,600 gallons. During the time taken to replace the plug the well filled again, and the oil was forcing the plug.

"The oil is of very good quality, and the rock beds are nearly flat in its neighborhood, whereas in the parts of the country first prospected, the wells were bored into the rock at a sharp angle. The company is having several tanks built around this well, and it is said they intend to bore other wells in the vicinity immediately."

One well in that section, completed in July of 1897, flowed from a depth of fifteen-hundred feet. Hundreds of barrels were lost before the well could be controlled. Its first pumping produced forty barrels, and two others in the vicinity are of a similar stripe. The results thus far are deemed sufficiently encouraging to warrant further tests in hope of developing an extensive field. The oil comes from a coarse rock of sandy texture, and in color and gravity resembles the Pennsylvania article. A large number of wells were drilled over ten years of activity.

Reference :

McLaurin, J.L., 1902. Scketches in Crude-Oil

Not Just a Driller, also a Dreamer and a Developper

The Petroleum Oil Trust, which did the drilling, went as far as to build a small oil refinery on the Southwest Arm of Gaspé Bay in 1900, along the shore of York River.

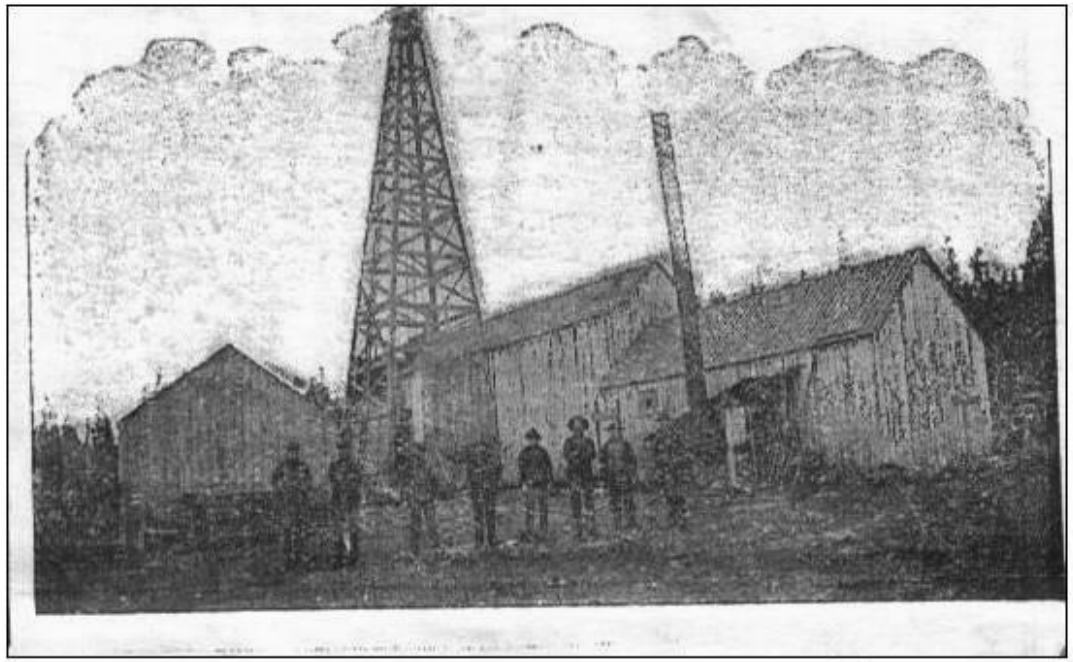
The refinery was built by the Canada Petroleum Company in 1900-1901 on the north side of the York river (lots 31 and 32, range I, Gaspé Bay South). The plant consists of two stills of 150 barrels capacity each, with a series of iron tanks and the necessary pumps and engines with central tank of 2,500 barrels capacity. The twelve storage tanks had 8,000 barrels total capacity.

A two-inch pipe of 15 miles (25km) connected the refinery with the Mississippi production area, located around the POT#27 wells. This well was considered the "gusher" after testing 2000 barrels in 1897.

Reference : Parks, 1929

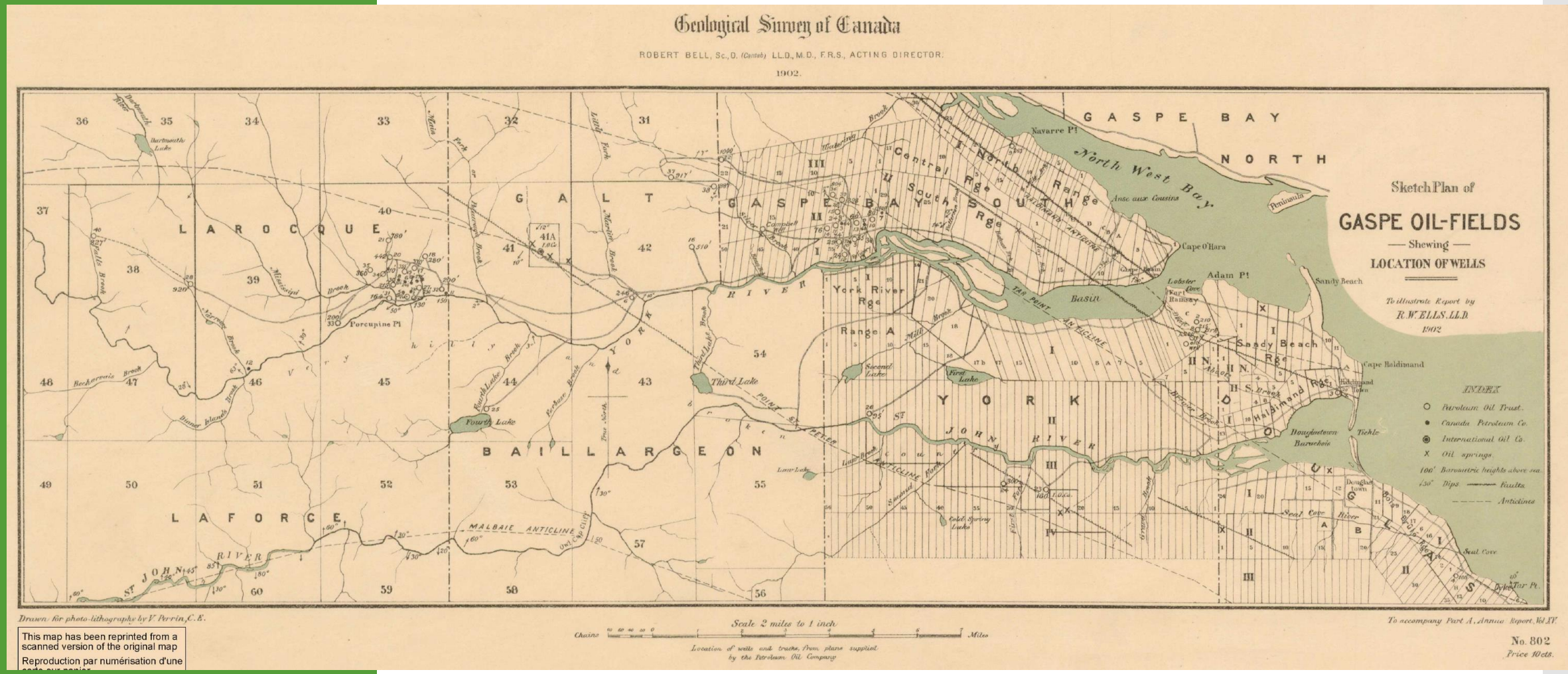
In 1901, wells production start declining severely, and in 1902, the storage tanks and the refinery were wiped out by fire, and the entire accumulated production completely disappeared.

Reference : Lauriston, 1922



Cardomoney www.delcampe.net

Map of the Gaspé Oil-Fields



This map has been reprinted from a scanned version of the original map
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In 1902, R.W. Ells published a map of the Petroleum Oil Trust activities, including drilling site locations, oil seeps, structural elements, refinery location and the road built by the company.

Adding value by developping the railway access

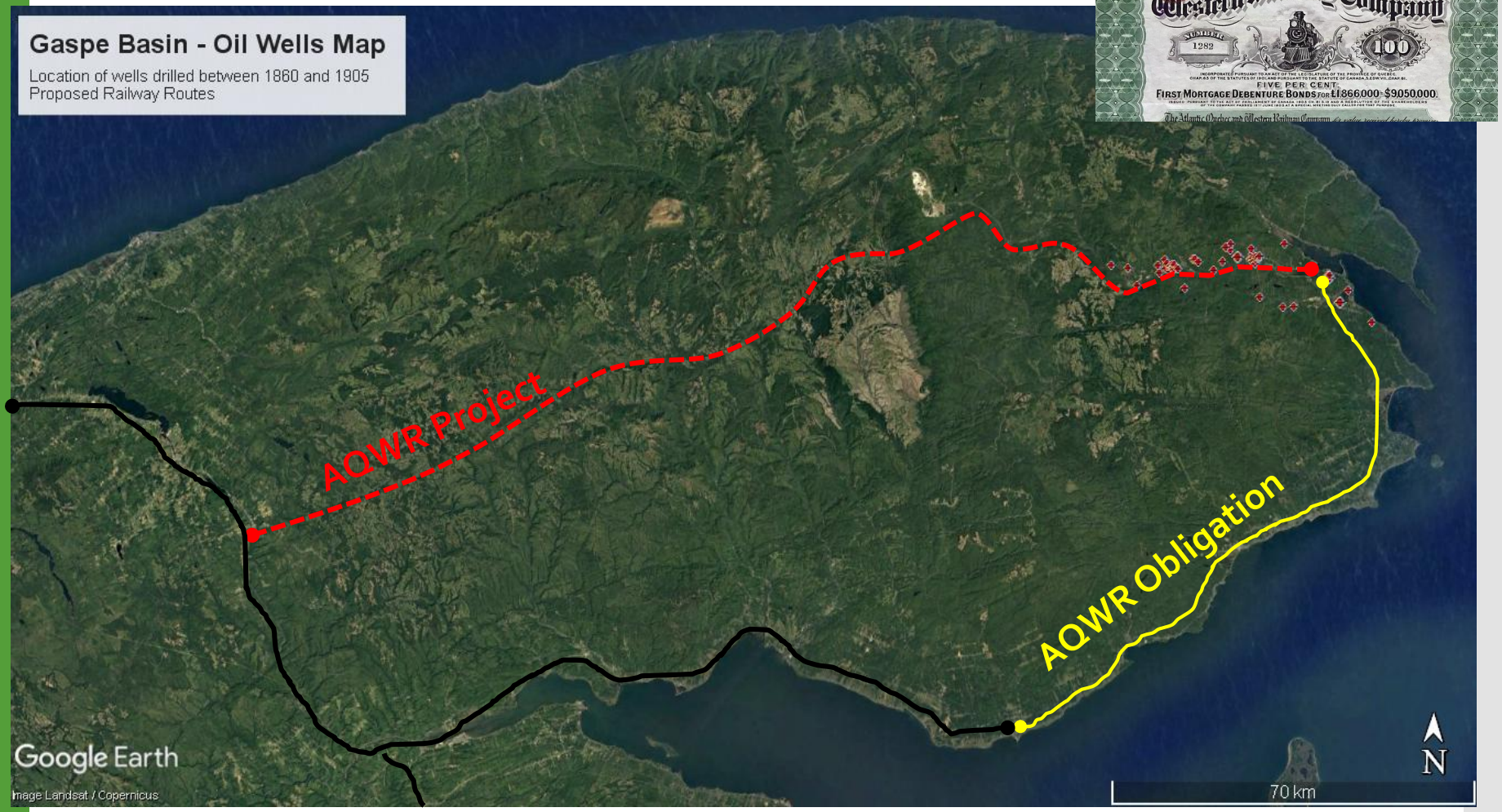
Control the transportation of the refined oil to the market

Valorize the forestry and the mineral rights acquired inland

Raised about a starting 1,000,000$ in 1901 of a total investment reaching 4,500,000$ in 2010.

High competition from the concurrent promoters

Incorporated in 1901, the Atlantic, Quebec and Western Railway (AQWR) which was chartered to build from Causapscal to the Baie de Gaspé.



Fifty miles (80.4 km) of track were opened in 1910 with the remaining 50 miles completed and opened in July 1912 (see Annett, 1983 for details).

The failure…

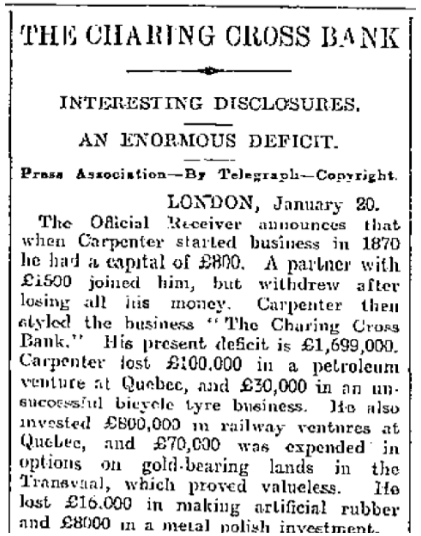
In 1904, the Petroleum Oil Trust ceased its activities. The costs of working in remote areas, the fires of some wells and especially that of the refinery have greatly hampered the feasibility of the business. The assets were liquidated in 1905.

Financial failure :

In January 1911, Alfred William Carpenter's Charing Cross Bank failed for $8,500,000. On December 18th, 1911, the Jury find Carpenter guilty of obtaining money on credit by false pretences; they desire to recommend him to mercy on account of his age and temperament.

It was asked to the Jury : *By "temperament" you mean to say you think he was sanguine and believed in these ventures, although he fraudulently obtained the money for the purpose of carrying them on?*

The Foreman: *Unduly optimistic*.



THE CHARING CROSS BANK

INTERESTING DISCLOSURES.

AN ENORMOUS DEFICIT.

Press Association—By Telegraph—Copyright.

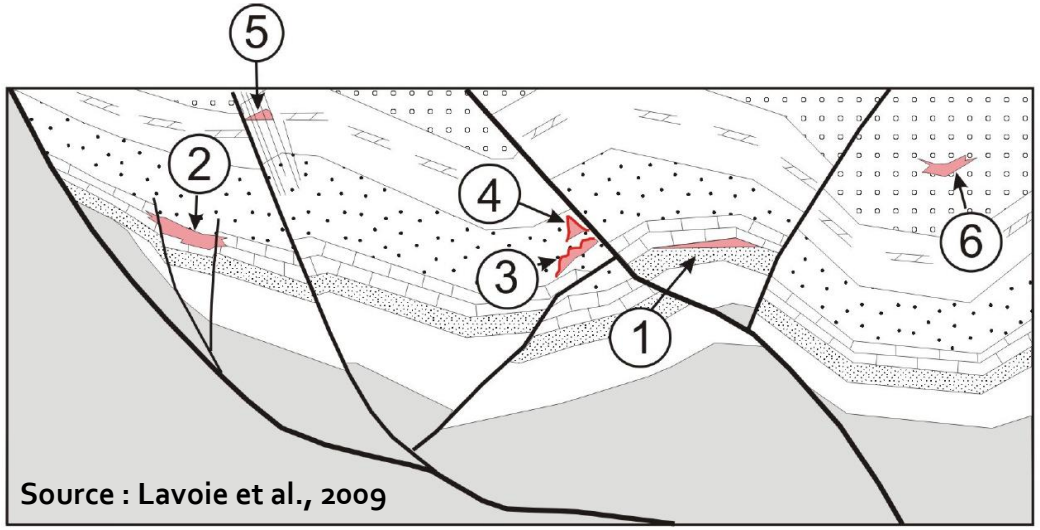
LONDON, January 20.

The Official Receiver announces that when Carpenter started business in 1870 he had a capital of £800. A partner with £1500 joined him, but withdrew after losing all his money. Carpenter then styled the business "The Charing Cross Bank." His present deficit is £1,699,000. Carpenter lost £100,000 in a petroleum venture at Quebec, and £30,000 in an unsuccessful bicycle tyre business. He also invested £800,000 in railway ventures at Quebec, and £70,000 was expended in options on gold-bearing lands in the Transvaal, which proved valueless. He lost £16,000 in making artificial rubber and £8000 in a metal polish investment.

Geological failure :

The limited knowledge of the subsurface geology of the Gaspé basin led POT to drill target around surface seepages in the hope to find close reservoir at depth.

Unfortunately, the drilling work, which was not deep enough, did not reach the expected closed areas.

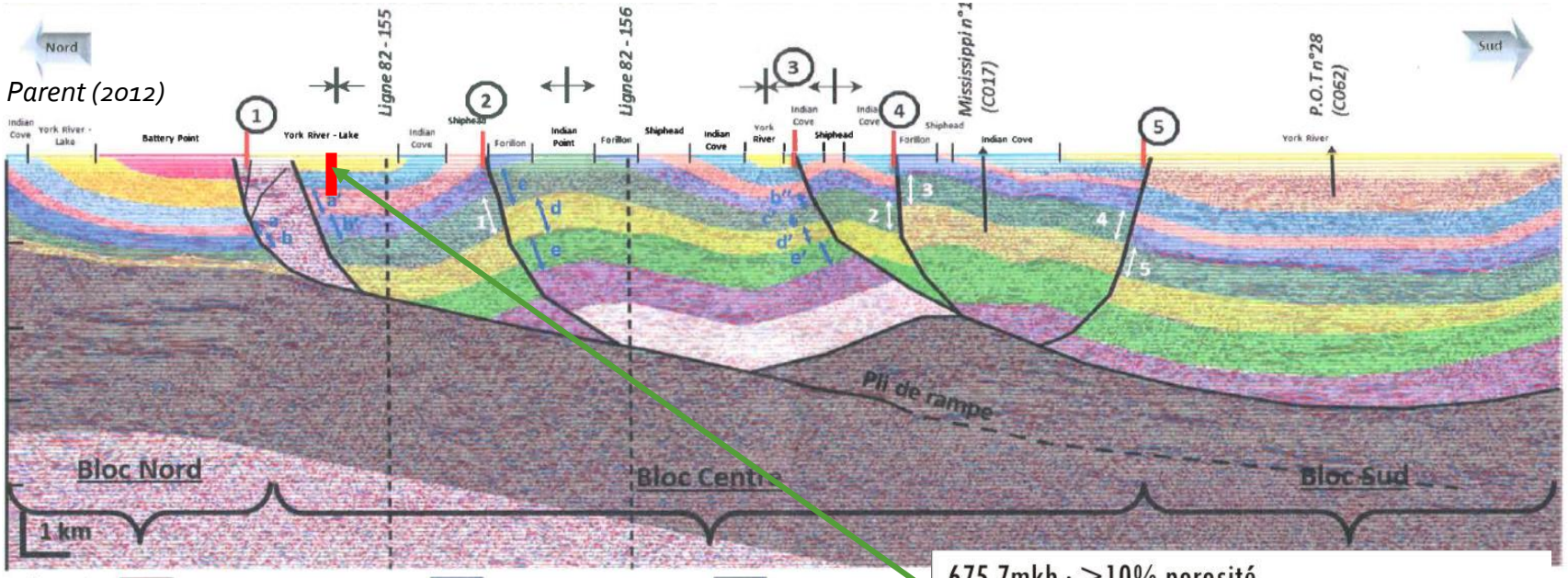


Source : Lavoie et al., 2009

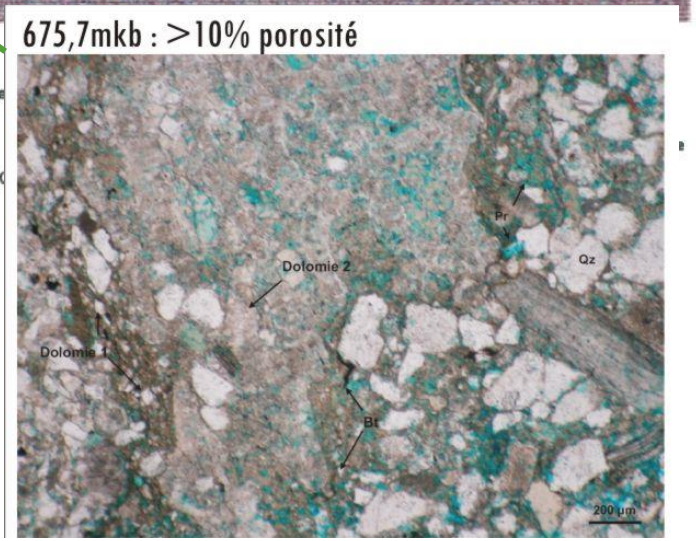
But is really a failure…?

Basically, the drilling campaign made by POT indicate the existence of petroleum over a considerable area in this region, some part of which may perhaps furnish available quantities of this material.

Parent (2012)



'6 : Image sismique profondeur de la ligne 82-152 et interprétation schématique de cette ligne.



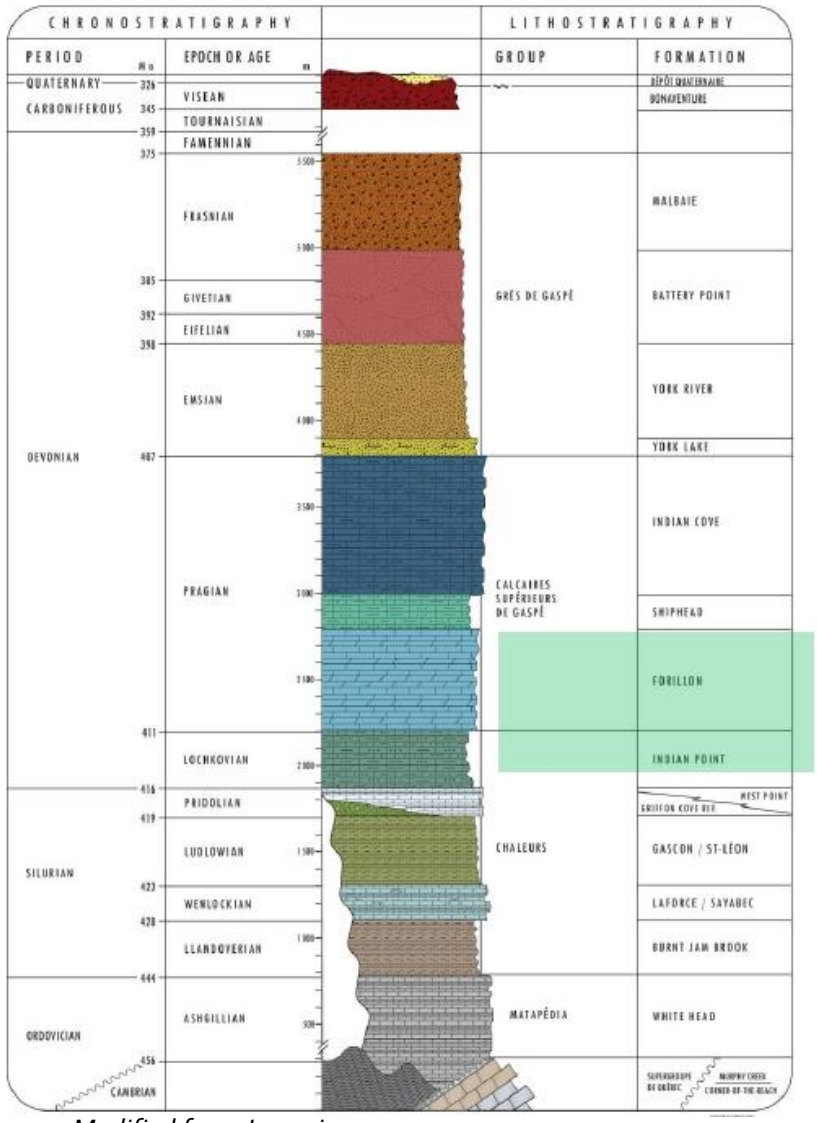
In the 1960's, geological models, geophysical surveys, and stratigraphic works gave new understanding of the Gaspe basin petroleum potential.

In example, coring at Gulf Sunny Bank #1 in 1969 revealed the origin of the reservoir zone at the Sandstone/Limestone contact.

Finding the reservoir

Another thing demonstrated by the work accomplished by POT is the relative inexistence of closure in the Devonian sandstone at shallow depth, at least under 500 meters .

Drilling of deeper wells have clearly reveal the existence of an oil saturated fractured carbonate, the Forillon Fm, trapped under a regional mudstone seal formed by the Shiphead Fm.

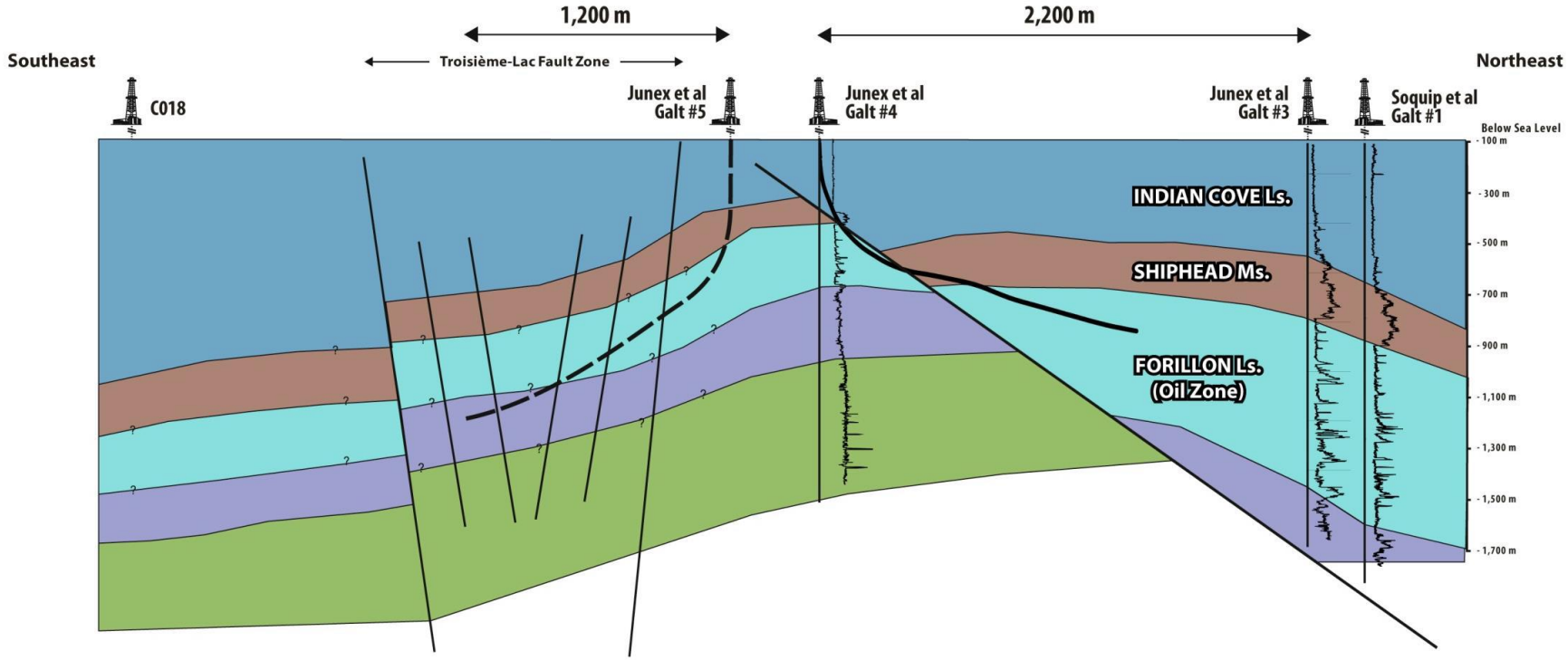


Modified from Junex inc.

Marcil et al., 2013

The success

In 2015, more than a century after the first try to produce oil in Gaspé, Junex announced that the Galt #4HZ obtained commercial rate of production.



Galt #4 Horizontal Well Oil Discovery – Milestone for Junex for Quebec

- 1st horizontal oil exploration well ever drilled by industry in Quebec
- Production test – oil production rates are highest ever seen in Quebec & translate into a commercial level of oil production

Reference : Marcil et al (2016)

Conclusions

More than a century ago, the remarkable efforts of the people at Petroleum Oil Trust were marked by hope and tenacity despite their relative lack of success. Time shows that their hard work has paid off and their vision of oil potential has finally proved right.

Petroleum Oil Trust's projects have led to several geological advances:

- Demonstrated the widespread occurrence of oil at depth in the Gaspé basin;
- Proved the excellent quality of the Gaspé light oil;
- Interested geologists around the world to explore the Gaspé Basin.

The impact of their work goes beyond geology alone and will have shaped the landscape of Gaspésie:

- Building forestry road and pipeline to access the inland resources;
- Developed a way of working in isolated forest sectors using new type of rigs.

Beyond the difficultly verifiable promotional aspects and financial shortcuts, it is undeniable that Petroleum Oil Trust acted as a pioneer of oil exploration in Canada and that they have given the envy to others to pursue even further the development of the Gaspé territory. This desire to explore is well demonstrated by the discovery of the Murdochville copper deposit in 1909, at the source of the York River, further west of the POT lands, where, precisely, the company wanted to pass its railway and enhance its mining rights.

Image from J.-M. Fallu

Thank you for listening and for this exchange opportunity about the history of Gaspé Basin petroleum development

Special thanks to Denis Lavoie (Geological Survey of Canada), Marie-Pierre Huard (Musée de la Gaspésie), Kathleen Hulley (Morrin Center), Mario Levesque (Utica Resources) and Mathieu Lavoie (Cuda Oil and Gas)

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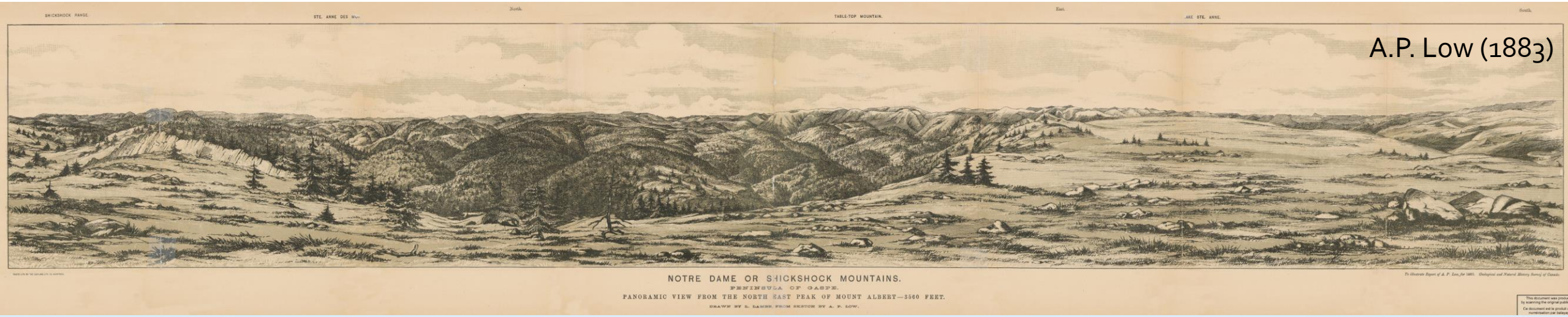
Historical Challenges and Technological Breakthroughs



A.P. Low (1883)

JS Marcil (2019) from Google Earth (2016)