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GESNER, WILLIAMS AND THE BIRTH OF THE OIL INDUSTRY

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ABSTRACT: This paper outlines the contributions of Abraham Gesner and James Miller Williams in the birth of the oil industry. It also explores how their relationships with two other key figures in the industry's founding industry, James Young and Luther Atwood, affected their efforts, success, and—in the case of Gesner—financial failure. It draws in part from two of my books, the second edition of *The Great Canadian Oil Patch,* 2005; and *Ontario's Petroleum Legacy: The Birth, Evolution and Challenges of a Global Industry,* 2008. It also draws on newer research that provides additional detail and insight.

GESNER AND THE COAL OIL INDUSTRY

Abraham Gesner, of Nova Scotia, (Fig. 1) established North America's coal oil industry and thereby laid the foundation for the oil industry. James Young of Scotland (Fig. 2) established a business distilling a lubricating oil and solvent, and later a lamp fuel, and used his patent rights to bedevil other coal oil refiners. Luther Atwood was the American chemist who showed Young how to make lamp oil, and displaced Gesner at the refinery that Gesner had built. James Miller Williams (Fig. 3) was a carriage maker in Hamilton, Canada West (now Ontario) who discovered the world's first oil field to supply crude oil to a substantial petroleum refining industry, initially the coal oil refiners, built largely on Gesner's technology. Williams also established the continent's first integrated crude oil producing, refining and marketing company. This is the story of how these four interacted in the birth of the oil industry.

The story starts at Chipman Corner near the Bay of Fundy, Nova Scotia in 1816, *The Year Without Summer.* Ash from a gigantic eruption of Indonesia's Mount Tambora volcano had clouded much of the world, causing crop failures that resulted in some 200,000 deaths in Europe. Snow and ice lingered into summer causing more crop failures and hunger in northeastern North America. At Chipman Corner, more than just the farmers were hungry: so were their horses. To save some horses from slaughter and hopefully earn some money, 19-year-old Abraham Gesner collected a small herd of old nags and, working as a deckhand, shipped them for sale in the West Indies. The voyage took Gesner as far as South America. Barely covering expenses, Gesner returned home with no money but a boat load of rocks, minerals, shells, curious, and a pile of bitumen from the *pitch lake* in Trinidad (Fig. 4) that had caulked the ships of Walter Raleigh and others. Two succeeding horse-trading voyages were greater disasters—both ended in shipwrecks.

Gesner soon began experimenting with the Trinidad pitch, or bitumen, finding that it would be burn with a steady flame that left little ash. It was, by his reckoning, the first of some 2,000 experiments over the next couple of decades aimed at converting bituminous substances into a fuel for light.

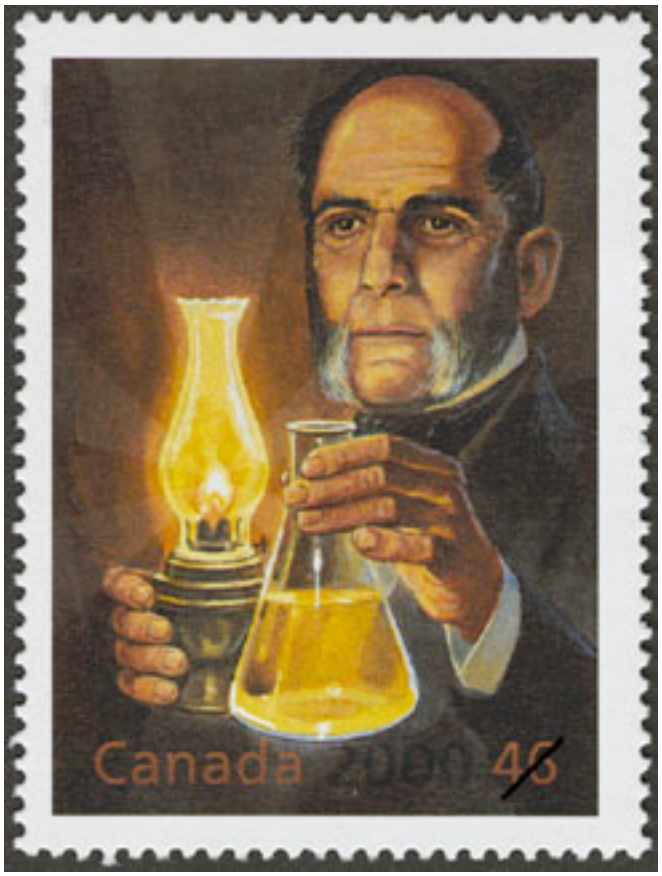

Figure 1. Abraham Pineo Gesner (1797-1864), The Father of the Modern Petroleum Industry, *according to a NASA educational web site*[i]*. (Library and Archives Canada, Canada Post Corporation).*

Bituminous experiments were only one of a staggering array of endeavours for a largely self-educated man, surely one of the last Renaissance men: farmer, physician, geologist, chemist, inventor, author of some 20 books and reports, the most popular lecturer in the Maritimes, an advocate for the rights and welfare of the Mic Mac Indians who were his guides on field trips, and a proponent of scientific farming practices.

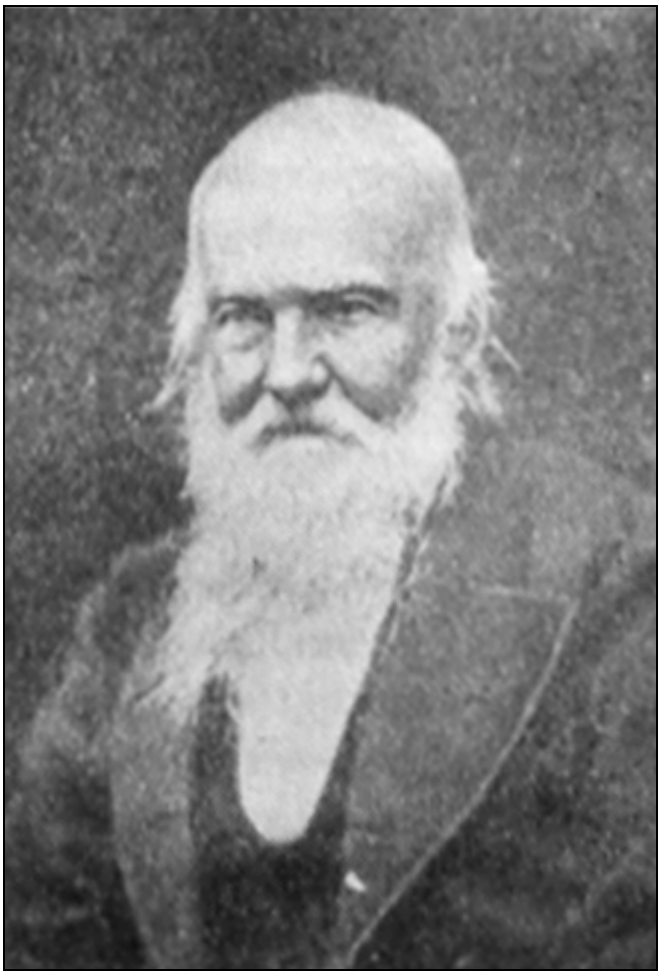

Figure 2. James Young (1811-1883), the Scottish chemist who built a large coal and shale distillation and refining business, initially producing a lubricating oil and a solvent, later a lamp fuel. [ii]

Gesner spent three years studying medicine in London but seemed more fascinated by lectures in geology and chemistry. As the first geologist appointed by a British colony, he made the first geological surveys of both New Brunswick and Prince Edward Island. His inventions included one of the first electric motors driven by a voltaic battery, briquettes made from compressed coal dust, a machine for insulating electric wires, a wood preservative, and a process for using asphalt to pave highways. He built the first science museum in Canada, a collection of some 2,000 stuffed animals and other artifacts that became a cornerstone of the New Brunswick provincial museum.

None of his achievements made him wealthy, and not all of his endeavours were successful: horse trading was just the first of his financial failures. His unbounded enthusiasm could lead to exaggerated claims, such as enticing prospects

Figure 3. James Miller Williams (1818-1890), the carriage maker who discovered the world's first oil field to supply a substantial petroleum refining industry and established the first integrated oil company. (Library and Archives Canada C002435).

for an envisioned New Brunswick iron ore industry, that resulted in failure and resentful investors.

He found a source of better bitumen than the Trinidad pitch, a deposit in New Brunswick's Albert County, that became known as *albertite* and erroneously classed as coal. He attempted to lease and mine albertite, but in a dispute that involved a suspicion of skullduggery by a rival, an armed standoff at the prospective mine site, and a celebrated legal case, he lost the right to mine the bitumen[iii]. He sought a franchise to provide Halifax with manufactured gas from bitumen, rather than coal, only to again lose out to his rivals.

About 1843, Gesner returned his attention to the bitumen he had brought from Trinidad a quarter of a century earlier, and which, as already noted, melted when hot and burned with a steady flame. Now, at temperatures below 800 Fahrenheit, he distilled from the bitumen an oil that he called *kerosene*

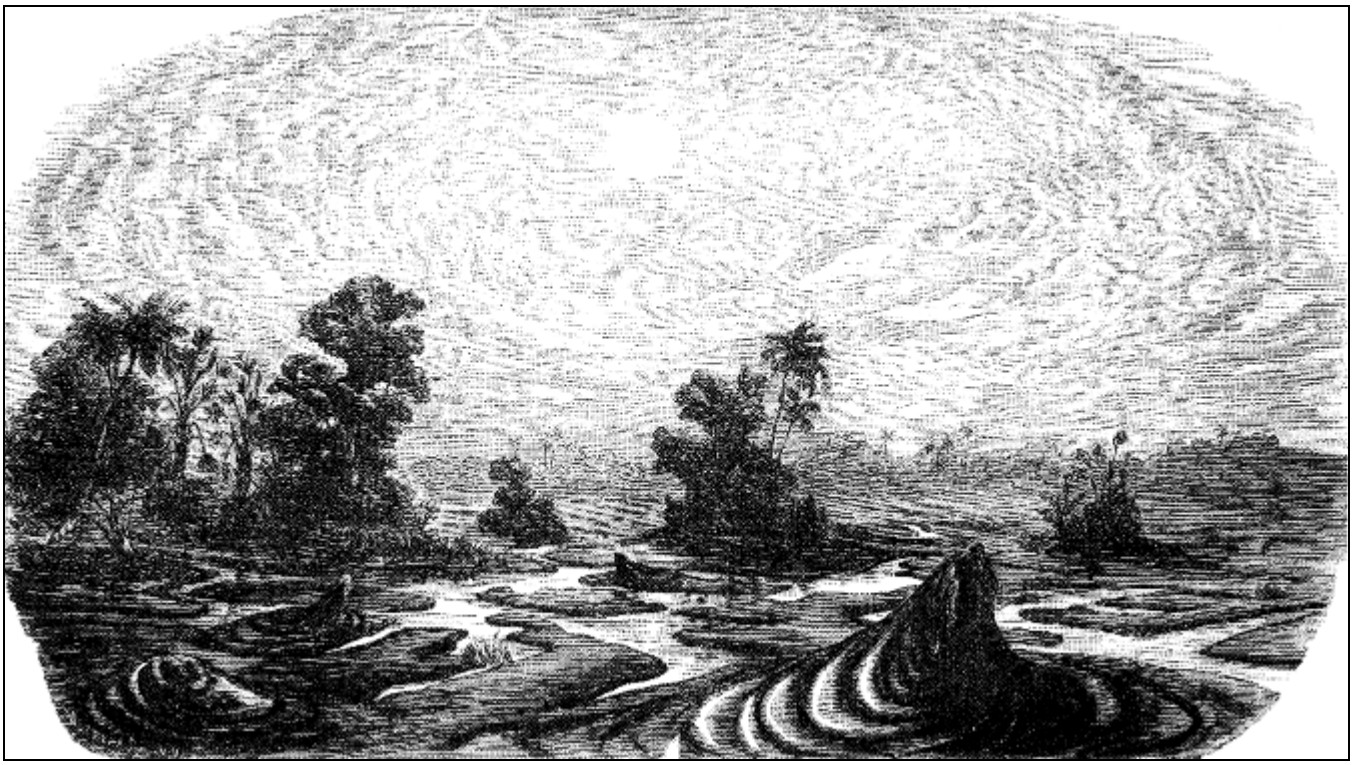

Figure 4. Bitumen from Trinidad's pitch lake caulked the ships of Walter Raleigh and other sailors, and was later used in experiments by Abraham Gesner that led to the development of kerosene.[iv]

oil; and at higher temperatures, into a gas fuel, which he called *kerosene gas*.

Gesner first publicly demonstrated his kerosene in a lecture at Charlottetown, Prince Edward Island, on June 19, 1846, an event about which too little is known. Writing about this, 15 years later, Gesner claimed that:

The first successful attempt to manufacture oils from coals in America was made by the author of this work. Oil from coal was made and consumed in lamps by him in his public lectures at Prince Edward's Island, in August, 1846, and subsequently at Halifax, Nova Scotia.[v]

In August, however, Gesner was out in the field on a geological survey of Prince Edward Island, and a brief note in Charlottetown's weekly newspaper, *The Islander,* makes it clear that the lecture was, in fact, on June 19.[vi] The newspaper devoted only five lines to the lecture. All it said was that *The subject chosen was "Caloric,"* i.e., heat; that the lecture was held not as customary in the hall of the Mechanics' Institute but in the court house, in order to provide more room for *the experiments;* and that it had been attended by *A numerous and delighted audience.* That this was an historic marker, however, is highlighted by one of Gesner's biographers: *This must have been the occasion of his demonstration of the new hydrocarbon lamp fuel. His audience was enthusiastic, but little knew they were witnessing the birth of the petroleum refining industry.*[vii] But was coal the source of the fuel, or was it bitumen? And was the distilled fuel kerosene oil or kerosene gas? The answers were not reported.

If not in 1846, then before 1850 when he arrived in New York with a big, promotional splash, Gesner's focus was fixed on his kerosene gas, which he claimed *affords the cheapest, safest, and most agreeable light ever used.* [viii] Gesner demonstrated his kerosene gas in January to a number of New York *gentlemen, somewhat distinguished for their scientific attainments,*[ix] distilled from Trinidad bitumen in a retort he had invented; garnered glowing reviews in at least seven New York newspapers; and obtained a U.S. patent.

Gesner's retort (Fig. 5) was designed to be built small enough to work with a kitchen stove, or large enough to work inside existing retorts of coal gas manufacturers. Thus it could be used in a house, a factory, or the gas works that supplied entire towns. The *New York Evening Post,* February 1, 1850[x] provided the most graphic account of Gesner's demonstrations:

About one pound of crude bitumen was enclosed in a retort in a common stove, from which a pipe led into a small tin

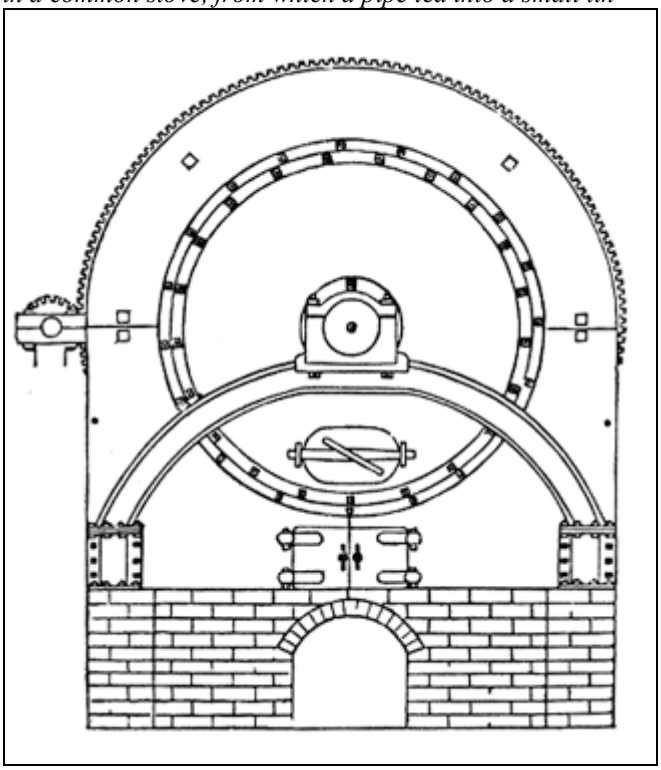

Figure 5. Retort and main, *used to distill oil from coal or bitumen.*[xi]

reservoir where the gas was condensed, and afterwards passed into another tin vessel that served for a gasometer. In a few minutes the heat of the stove generated about six cubic feet of gas, which, without purification or cleansing in any manner, supplied two large burners with brilliant and unflickering light for two hours.

Gesner's U.S. patent No. 7,052, dated January 29, 1850, was focused on the *manufacture of illuminating-gas from bitumen,* including *both compact and fluid bitumen,* and the use of his retort.[xii] By fluid bitumen, Gesner must have meant crude oil. He noted later that year that the bitumen was readily distilled into kerosene oil, but that this was not necessary to make gas, *for the crude material sends off its gas with great facility.*[xiii] What this patent failed to include was Gesner's process to extract oil, i.e., his liquid kerosene, from bituminous matter.

Gesner may have sought to correct that oversight on another trip to New York, 10 months later, in November. He also sought to commercialize his gas-making retort. A New York firm, Walworth, Nason & Guild, Eugene Le Gal of New York, and Abraham's son, Henry Gesner, were appointed agents to license the use of the retort for *manufactureries and other buildings.* License fees were as much as $1 per burner, depending on the number of burners. The Walworth firm was also authorized to manufacture the retort.[xiv]
While in New York on this second trip, Gesner is reported by the *Scientific American* to have applied for a patent, for *one of the most valuable discoveries ever made in the manufacture of oil, resin, or asphaltum gases.*[xv]

The reference to *the manufacture of oil* is significant. This preceded by two years the U.S. patent of Gesner's Scottish rival, James Young, for the distillation of a lubricating oil and solvent from coal and bitumen. But whatever happened to this latest patent application of Gesner's? There is no record of such a U.S. patent being issued. Possibly the report referred to the combined patent rights issued by the State of New York to Gesner and Thomas Cochrane, the tenth Earl of Dundonald, rights that would be subsidiary to a U.S. patent.

Following his New York splash, Gesner spent the next few years in his ill-fated bid to mine Albertite bitumen and supply Halifax with kerosene gas. He did, as a trial, supply kerosene in 1851 to light the beacon at Meagher's Beach lighthouse in Halifax, replacing whale oil and reportedly cutting fuel costs by nearly three quarters. The good doctor was also reported to have stated that he *can erect lights along the shore, without expensive houses, by raising poles and placing the lights upon them.*[xvi] If kerosene oil, rather than gas, was used at the lighthouse, this would have been its first significant use as a lamp fuel, preceding the coal oil industry by a few years.

At this stage, Gesner was associated in his illuminating efforts with Thomas Cochrane, who arrived in Halifax in 1848, a vigorous 73-year-old admiral of the British navy in the Western Atlantic, and the inspiration for C.S. Forester's Horatio Hornblowler.[xvii] Cochrane's naval career was perhaps even more spectacular than that of the fictional Hornblower. In the Napoleonic wars Cochrane captured more than 50 French vessels before being captured himself. Later, while serving as a Member of Parliament, he was jailed for a one-year term for fraud, on charges his defenders claim were false. Breaking out of jail, he stormed back into Parliament, only to be thrown back into jail for the remainder of his term. Released, he headed, successively, the Chilean, Brazilian and Greek navies, with more spectacular exploits, before re-joining the British navy.

Cochrane also had a long-standing interest in bituminous oil and Trinidad's pitch lake. Cochrane's father had patented a method of producing oil from coal tar, the by-product of gas distilled from coal. The oil was intended for use as a lubricant, waterproofing agent, and illuminating fluid, although commercial development never followed the patent. Thomas Cochrane himself, while serving his term in jail, patented a lamp intended for use with fuel extracted from Trinidad's bitumen. He also, by this time, controlled

the Trinidad bitumen, having purchased all the property surrounding the pitch lake. Gesner's work with Cochrane ended shortly after the admiral returned to England and retirement in 1851.

Rebuffed in his efforts in Nova Scotia and New Brunswick, Gesner returned to New York in 1853, this time with his family, to take up residence and make one more effort to establish a bitumen-based gas light business.

In New York, Gesner found financial backing with the help of a 28-year-old promoter and ship's broker with the splendid name of Horatio Eagle. Eagle issued an eight-page circular entitled *Project for the Formation of a Company to Work the Combined Patent Rights of Dr. Abraham Gesner, Nova Scotia, and the Right Hon. The Earl of Dundonald of Middlesex, England.*[xviii] This was presumably the patent issued by the State of New York.

Eagle's circular, dated March, 1853, offered for sale $100,000 in shares of a new company at first called the Asphalt Mining and Kerosene Gas Company. Gesner, the circular noted, had been hired as the chief chemist *at a modest salary.* A wide range of possible uses for kerosene oil was listed: waterproofing, paving, insulating underground telegraph wires, making paints and varnishes, as solvents, *burning fluids,* and to produce gas *for lighting manufactory.* Within months, the goal shifted from gas to liquid kerosene lamp fuel. The corporate name was changed to North American Kerosene Gas Light Company, then North American Kerosene Company, and finally the New York Kerosene Oil Company.

Gesner's U.S. patent for *a new liquid hydrocarbon, which I denominate "Kerosene," and which may be used for illuminating and other purposes,* was issued January 27, 1854,[xix] almost a year after Eagle's circular. The patent was assigned to the company.

The patent described three types of kerosene. Kerosene A and B were essentially gasoline and mostly flared. Kerosene C was the lamp fuel. The patent described the process of distillation from coal or bitumen and subsequent refining with sulphuric acid and calcinated lime and re-distillation to produce a fuel that burned in an Argand lamp *with a brilliant white light without smoke or the napthalous odour so offensive in many hydrocarbons resembling this but possessing very different properties.*

The company's large coal oil plant on Newton Creek, Queens County, New York was under construction by the time the patent was issued. Kendall Beaton, whose *Business History Review* article did so much to establish Gesner's contribution to petroleum refining, claimed, *We can be fairly certain that it began operations in the first half of 1854.*[xx] There were start up problems, not surprising for the first application of a new refining process. By February 1856, however, a company circular cites the claims of independent chemists that kerosene oil *gives a better and more brilliant light than any other substance known, at less than one-half the cost of candles or camphene.*[xxi]

Gesner's refinery remained the dominant plant throughout the short-lived U.S. coal oil industry. (Fig.6) The business was near its apex when the *Scientific American* estimated the production of kerosene in December, 1859 at nearly 23,000 gallons a day, from some 50 to 70 plants. The Gesner works accounted for more than 10 percent of the total, at an estimated 2,500 gallons a day, followed by 1,500 gallons from Samuel Downer's Boston plant.[xxii] But Gesner's association with the enterprise promoted by Horatio Eagle in 1853 would last barely five or six years.

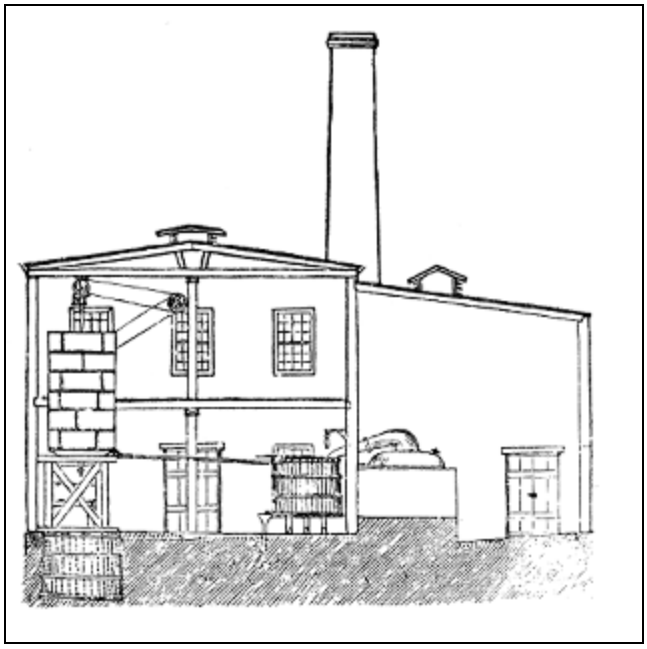

Figure 6. Cross section of a coal oil refinery where oil from the retort was redistilled and treated.[xxiii]

THE COMMERCIAL SUCCESS OF SCOTTISH RIVAL JAMES YOUNG

When Gesner was pursing his ill-fated quest to establish a bitumen-based gas light business in Canada, his Scottish rival, chemist James Young, was making rapid progress in Great Britain. How much technological progress Young made is debatable, but he did spectacularly well in making a fortune, in part by enforcing his British and American patents for distilling coal.

In distilling coal and shale, for half a dozen years Young produced only a lubricating oil and a solvent. In New York,

Luther Atwood also developed a lubricating oil. And certainly lubricating oils were needed at this stage of the industrial revolution. As historian Leonard M. Fanning observed:

You held your nose against the smell of rancid animal and vegetable oils used to lubricate the spindles and machines. You shouted to be heard over the shrieks and groans of ponderous steam engines. You sat helpless in the railroad coach when the cumbersome locomotive hotboxed to a stop because its bearings had become overheated and acid-eaten.[xxiv]

Young did, for a short time, produce an illuminating oil, not from coal or shale, but from crude oil. Three hundred gallons a day of light crude oil seeping in a Derbyshire coal mine first got James Young into the oil business in 1848. As Young described it, the oil *has the consistency of thin treacle [molasses or syrup] and with one distillation gives a clear liquid of brilliant illuminating power.*[xxv] Producing a burning fluid by a simple one-pass distillation of crude oil was at least as old as Greek Fire in the first century AD. Young's first illuminating oil business quickly ended when the coal mine seepage was exhausted.

Young then experimented with distilling oil from coal. On October 7, 1850, he obtained a British patent *for the obtaining of paraffine oil…and paraffine* [wax] *from bituminous coals.*[xxvi] It would be six years after this British patent before another chemist showed Young how to further refine this lubricating oil into a suitable lamp fuel, similar to Gesner's kerosene. Young's U.S. patent followed in March, 23, 1852.

In 1851, at Bathgate, Scotland, Young established what has been described as *the first truly commercial oil-works in the world,*[xxvii] first using a bituminous coal, and later, shale. From 1851 to 1856, Young's oil works produced principally his lubricating paraffin oil and naphtha, used as a solvent for rubber and paint manufacture.

It was Luther Atwood and his associate, Joshua Merrill, who inadvertently showed Young that his lubricating oil could be redistilled and refined to yield a suitable lamp oil.[xxviii]

Atwood had developed a lubricating oil, distilled from coal tar. He called it *coupe oil,* apparently viewing this as the chemical equivalent of Louis Napoleon's *coupe d'etat.* Atwood's firm, the United States Chemical Manufacturing Company, was subsequently purchased by Boston whale oil dealer Samuel Downer (Downer & Son).

In 1856, on the heels of Gesner's plant, new coal oil refineries were starting to pop up in New York and elsewhere in the eastern United States, most of them using coal from U.S. mines. In Glasgow, James Young learned how to turn his paraffin lubricating oil into a lamp fuel. Atwood and Merrill were also in Glasgow, helping George Miller & Company establish facilities to make and market Atwood's coupe oil. Miller & Company was a large manufacture of coal tar naphtha, which was mixed with Young's paraffin oil to dissolve rubber and form a waterproofing compound, used on raincoats—known as Macintoshes. Atwood experimented with a five-gallon batch of Young's lubricating oil, re-distilling and refining it to produce *a water-white beautiful article of illuminating oil*.[xxix] On a visit to Miller's office in the Fall, Young saw his refined lubricating oil burning in a lamp. He cut off sales of his paraffin lubricating oil to Miller, and began making his own lamp oil, two years after Gesner's New York plant was producing its kerosene lamp oil.

Young's lamp oil, according to Merrill, did not *compare with Mr. Atwood's in quality,* but it was good enough to generate quite large and very profitable sales. When other British firms saw this, they too, began to make lamp fuel from coal or shale. One was the Miller firm, Young's former customer. Young sued Miller for patent infringement, winning damages so extensive that Miller & Company was bankrupt. From another English firm, *Furney & Co*., he collected $250,000 in damages.

Young was aggressive not just in Europe in enforcing his patent rights. New York lawyers *Benedict & Boardman* in a notice published in November, 1858, advised what was now a large number of U.S. coal oil refiners, that Young *had transferred to a company in the United States the right to use in the United States his patent for making oil from coal.*[xxx] The refiners were warned, that *legal measures will be immediately adopted against all persons infringing said patent.* The licensee with the exclusive right to make oil from coal in the United States was the Downer firm in Boston.

Such legal action to stop anyone distilling oil from coal or other bituminous material was undoubtedly contentious. Aside from coal gas, for more than a century at least a dozen Europeans had experimented with distilling oils from crude oil seepages, from bitumen, coal tar, petroleum-impregnated rocks, and even wood. Archibald Cochrane, the ninth Earl of Donald, distilled an oil from coal tar and burned it in lamps in 1781. French chemist Alexander Selligue in 1835 patented an oil distilled from rock, and operated three small refineries, producing oil that was sold as a lamp oil and to enrich coal gas.

Young's method of distilling oil from coal was depicted by Thomas Antisell, the man who was instrumental in approving Young's U.S. patent, *as a small step in advance of previously applied knowledge, an advance so slight as hardly to have elicited any surprise.* Antisell, a Georgetown University chemist, was also the U.S. Patent Office official

responsible for examining numerous applications involving chemical processes. The description is from Antisell's 1859 book on the distillation of *burning fluids* from coal.[xxxi] But Antisell also wrote that there was *no shadow of a doubt* that Young's process *was a bona fide improvement in an art* when the U.S. patent was issued in 1852. And Young prevailed in his suits against the U.S. coal oil refiners, who were thus obliged to pay him royalties.

Other than in a list of patents in his book, Antisell devotes only one sentence to Gesner's work: *The first manufacture* [of coal oil] *in this country was the attempt of Solomon [sic] Gesner on the bituminous shales of Dorchester, New Brunswick.*[xxxii] In his list of American patents involving *the distillation of oils from coals, bitumens, and schists,* there is no mention of Gesner's 1850 patent. His list starts with Young's 1852 U.S. patent.

After Atwood and Merrill returned from Britain to Boston in late 1856, the Downer firm took out its licence to use Young's patent, and in 1857 began producing lamp fuel, paying Young a royalty of two cents a gallon. The Downer firm then became associated with the New York Kerosene Oil Company; obtained an exclusive right to use the registered trade name *kerosene;* Samuel Downer changed the name of his company to Downer Kerosene Oil Company; and Atwood became chief chemist for both firms. With those changes, Gesner was gone from the New York Kerosene Oil Company and *the Gesner works.*

Atwood is credited with improving the refining processes at the former Gesner works, and no doubt he did. He also inherited a model refinery, as described by Kendall Beaton:

From engineers' drawings of the plant which have survived, we can appreciate Dr. Gesner's very real abilities as a practical manufacturing chemist. His plant was laid out in orderly fashion and the individual pieces of equipment were well planned and well constructed, differing very little from similar pieces of refinery equipment being built as late as the time of the First World War.[xxxiii]

James Young retired in 1870 and used his fortune for good causes. He financed many of the African expeditions of his university classmate David Livingstone, purchased from Arab traders the freedom of African slaves, and continued to finance the anti-slavery movement even after slavery had been abolished in Britain and the British Empire.

Gesner remained in New York for several years, combining his medical practice, geological consulting, and writing his 1861 landmark, *A Practical Treatise on Coal, Petroleum, and other Distilled Oils*. He examined prospective oil lands in Canada West, and authored a paper on the gold mines of Nova Scotia.[xxxiv] In ill-health, he returned to Halifax in late 1863 and died there the following April. Ignored and forgotten, he was buried in a grave that was unmarked for 69 years, until Imperial Oil erected an impressive monument. (Fig. 7)

a.

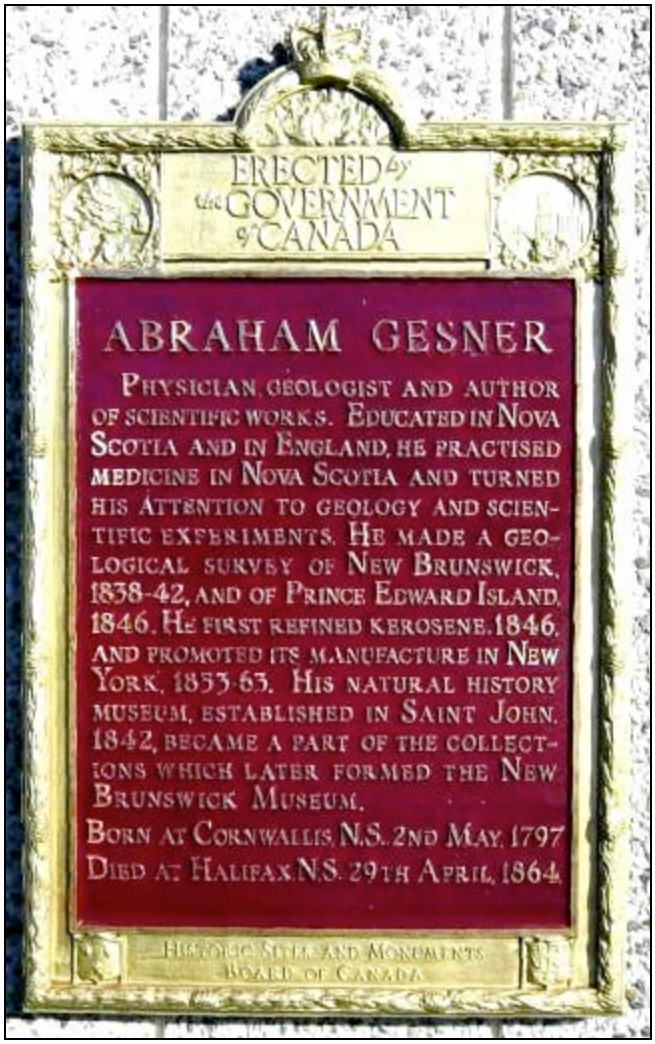

Figure 7 a. Monument erected by Imperial Oil in 1933 to mark the grave site of Abraham Gesner. b. Gesner Plaque.[xxxv]

As for his role in establishing the oil industry, Gesner claimed only this: *The progress of discovery in this case, as in others, has been slow and gradual. It has been carried on by the labours, not of one mind, but of many, so as to render it difficult to discover to whom the greatest credit is due.*[xxxvi]

WILLIAMS, GESNER, YOUNG AND THE FIRST CRUDE OIL REFINING

The coal oil refiners in the 1850s did everything to create the oil industry except find crude oil. They created the product, a lamp fuel; developed and improved the technology to produce it from bituminous materials; built the refineries; gave rise to improved oil lamps; and created the marketing facilities and market demand. All that was then needed was a supply of crude oil, which could greatly cut the cost making lamp fuel from solid bitumen.

That was the missing link first supplied by James Miller Williams. He was reportedly drawn into the oil business by the success of James Young, and by a bankrupt customer who owed him money for the purchase of wagons. There are conflicting reports about the possible influence of Young and Gesner on Williams refining operations. With no corporate records of Williams' operations available, only a scanty picture can be stitched together. In any event, Williams' initial effort was to distill and refine oil from bitumen. Events leading up to his entry into the oil business can be told here only in brief highlights.

It was Thomas Sterry Hunt (Fig. 8), the brilliant American chemist and geologist with the Geological Survey of Canada, who first drew attention to the bitumen deposits on the banks of Black Creek in Enniskillen County in the GSC's annual report for 1849. The GSC had been sent a sample of the bitumen. In his analysis of this sample, Hunt pointed to potential commercial uses: *to build roads, to pave the bottom of ships, to manufacture gas for lighting, for which it is eminently suited.*[xxxvii]

Charles Nelson Tripp, an energetic and visionary prospector and promoter and his brother Henry, devoted half a dozen years to the daunting task of exploiting this commercial opportunity, working in an isolated forest area, near the southwest tip of Canada West, one of the last areas in the province to be settled. It was an area of seasonal swamp, a shin-busting tangle of fallen trees, with no roads or railway and more than 20 miles from the nearest water transportation, at Sarnia.

Charles Tripp sent another sample of the bitumen to Thomas Antisell, who reported that the *most appropriate use* for this *very valuable variety of bitumen* was as either a gas or oil for lighting. The Hamilton Gas Company also said it would be very useful for making gas. Despite these reports, Tripp focused his efforts on mining the bitumen then boiling it in open pots, to produce a paving material. His paving material won a prize at the 1855 Universal Exhibition in Paris, and he

Figure 8. T. Sterry Hunt (1826-1892).[xxxviii]

also won an order for asphalt to help pave the streets of Paris.[xxxix] But he was already going broke, with judgments piling up for unpaid bills, including money owed to Williams for the purchase of wagons.

In late 1856, after working briefly for Williams, Tripp left Canada to prospect for mines in the southern United States. On a return visit to Canada ten years later, Tripp boasted to a newspaper reporter that he had amassed a fortune in Mexican silver mines.[xl] A few weeks after that he died in a lonely hotel room in New Orleans, reportedly of *congestion of the brain.*[xli] He was 43. His obituary claimed that he knew more *about the mineral wealth of every southern state than any other man alive* and had been organizing companies to develop *on a gigantic scale* deposits of *oil, copper, lead, zinc and iron* that he had discovered in Louisiana and Texas.[xlii] A prototypical promoter, Tripp was resourceful, energetic, everlastingly optimistic, and always with a vision of wealth to sell.

Williams and several associates began to acquire Tripps' properties in early 1856, before Tripp left to prospect in the southern United States. Williams later bought out his partners and organized a new firm, *J.M. Williams & Company* (re-organized four years later as the *Canadian Oil Company*, in which he held one-third of the capital stock). By 1857, Williams *undertook the distillation of this tarry*

bitumen, according to Sterry Hunt.[xliii] Mining engineer Charles Robb says Williams was inspired in this effort by the success of James Young in making both lubricating and lamp oils. He says Williams obtained a license to use Young's patent, and set out to distill the bitumen *for the purpose of using it as a substitute for coal in the manufacture of such oils.*[xliv] Hunt and Robb thus both imply that Williams relied on Young's refining process, not Gesner's.

Yet Williams was surely aware of Gesner's New York refinery, which—as we have seen—had been producing kerosene for lamp fuel since early 1854, according to Beaton. Young did not begin to produce a lamp fuel (in addition to his lubricating oil and solvent) until 1856, according to Merrrill, as we have also seen. Thus when Williams started his distillation of the bitumen in 1857, Gesner's plant had been producing kerosene for three years, while Young had been producing a lamp fuel for no more than one year, and Samuel Kier of Pittsburgh had been refining crude oil since 1850[1].

Williams in 1857 built a refinery on *Coal Oil Inlet* in Hamilton to distill and refine the bitumen.[xlv] There is no report that he managed to produce a commercial product from bitumen. The next year, however, the Hamilton refinery began producing fuel from crude oil, from the field that Williams' well diggers discovered. It was thus North America's first crude oil refinery. With later expansion and much modification, it remained in operation for more than three decades, until 1891.

A number of published accounts say that Williams was distilling the bitumen at the site of the deposit on Black Creek, 100 miles west of the Hamilton refinery, before he found crude oil. One account says that a simple retort in which bitumen was distilled stood *on a gentle slope, between the creek and the fringe of the far-flung forest,* less than 200 feet from where a well would find crude oil two years later.[xlvi] This seems unlikely, and is contradicted by the Sarnia *Observer*. When the Williams well struck oil, the *Observer* reported that:

As yet no works for manufacturing the oil into a merchantable commodity have been erected on the premises, what has been obtained having been barreled up and sent to Hamilton to be prepared there.

It was thought by the *Observer* that Williams intended to *put up suitable work* to process the oil at the discovery site, *with as little delay as possible.*[xlvii]

The date of the Williams discovery has generally been reported as August, 1858, but it was earlier than that, perhaps in July or even as early as May. The discovery of crude was first reported in the *Sentinel,* the weekly newspaper in Woodstock where lived both GSC geologist Alexander Murray, who had examined the bitumen deposit in 1851, and Henry Tripp, the brother of the departed Charles. No existing copies of this issue of the *Sentinel* are known, so the precise date of the first published report of the oil discovery is also unknown. The *Sentinel* article, however, was republished, probably a week later, in the Sarnia *Observer,* also a weekly newspaper, on August 5. The brief article reported that *An important discovery* had been made *a short time since,* by a party *digging a well at the edge of a bed of bitumen.* The oil was said to have been *accidentally discovered,* adding credence to suggestions that Williams, or rather his men, were digging for a supply of clean water. This *inexhaustible* supply of oil, according to the article, was great enough to yield *not less than one thousand dollars per day of clear profit.* (Fig. 9)

The *Sentinel* item was very likely published during the last week in July, and the nebulous *short time since* phrase suggests that oil was likely found at least a week before that, perhaps a few weeks. Thomas Gale, writing in a book with a foreword dated June 1, 1860, claims the well *has been in operation over 2 years.*[xlviii]

Reports even differed about the depth of the Williams' well. The first known inventory of Oil Springs wells, compiled by a Mrs. Richardson about 1862, says the well was dug to 14 feet, and later deepened.[xlix] Gale says the well was *49 feet deep, 7 x 9 feet square, cribbed with small logs.*[l] As others rushed to dig in the vicinity of the discovery well, the *Observer* noted on August 26, 1858 that *a hole dug 8 or 10 feet in width and about the same depth, will collect from 200 to 250 gallons a day.* Evidently, the discovery well encountered oil at about 14 feet, was later dug to the reported 49 feet, and still later drilled a further 100 feet into rock, according to both Mrs. Richardson and the Toronto *Globe.*[li] By the time Sterry Hunt visited Oil Springs in December, 1860, oil well digging appears to have given way to spring pole drilling. Hunt found that *nearly one hundred wells had been sunk* to depths of 40 to 160 feet.[lii]

It is worth noting how quickly Williams was able to offer distilled and refined lamp fuel after finding crude oil. Less than two months after reporting the oil discovery, the *Observer,* on September 23, complained that *this most superior illuminating oil* was being offered by Williams' Sarnia agent for $1.25 per Imperial gallon, while advertised in London for only $1 per gallon.

Williams did, as the *Observer* predicted, build a simple one-pass still at Oil Springs, which operated for a less than two years, venting the lighter fractions in the air and possibly

[1] See the paper about Kier by Brice in this issue, p. .

simply dumping the heavy ends. The purpose was to reduce the volume of oil moved to Hamilton for refining, to reduce transportation costs. Charles Robb reported that:

Figure 9. Angus Sutherland, foreman for Fairbank Oil Properties, in 1957, examines a plank for the cribbing of North America's first well to produce crude oil for the nascent petroleum refining industry (initially the coal oil refining industry). The well was dug in 1858 by workers employed by J.M. Williams. [Lambton County Museum, 365642-01].

At first the distillation was carried on at the wells, but latterly the percentage of loss in refining being so small (about 30 or 35 per cent), it was deemed expedient to remove the works to Hamilton, and convey the oil thither in barrels.[liii]

A more likely reason for abandoning distillation at the wells was a fire that destroyed the still.

Williams probably used a pair of maple sugar kettles to make his pot still. Early Oil Springs producers used dozens of such stills. Colonel Robert Harkness, Ontario's natural gas commissioner in the 1950s, who did much to record the province's early oil history, has described one such sugar pot still, used by Hugh Nixon Shaw:

His still looked like two sugar kettles, placed one above the other forming together an iron globe, from the top of which rose a pipe which was connected to the worm [a long tube in which the gases from distillation are condensed. The worm at Gesner's refinery in New York was 100 feet long.] *The vapours passed up this pipe through a fine iron mesh, and then a brass wire mesh, which Shaw claimed held back many impurities. From this iron pipe connecting the still to the worm, rose another small iron pipe through the roof to the open air which allows the 'benzole' to pass away as a vapour. The remaining vapour condensed in the worm, from*

which it drained into a collection tank. By this method 50 percent illuminating oil was gained; the remainder was lost.[liv]

Operators of both pot stills and refineries faced two problems. One problem was the Enniskillen *sour* crude. It contained sulphur, which caused distilled or refined products to smell like rotten eggs. The skunk oil problem was one that the first American producers, with their sweet crude, did not have to face, at least until the discovery of the sour crude oil fields in Ohio in 1884.

The second problem was that both pot stills and refineries tended to either catch fire or explode with almost monotonous regularity. The Williams refinery in Hamilton was reported by the *Hamilton Times* to have twice been engulfed in flames during a six-week period in March and April 1860, causing some $10,000 in damages, while the pot still at Oil Springs burned down on June 12.[lv] At Petrolia, the *Carbon Oil Company* refinery, Eniskillen's largest at the time, is reported by the *Imperial Oil Review* to have *opened in 1871, and ran for a year, then exploded. A whole year was spent rebuilding it and on July 30—the very day it opened—it exploded again.*[lvi]

It took 30 years to completely eliminate the skunk odour. In an advertisement in the Toronto *Leader,* March 18, 1859, Parson Brothers, distributor of American-refined coal oil, assailed the Canadian Oil Company lamp fuel as *a disgustingly nauseous compound… worthless and offensive stuff.* On May 31, the *Leader* reported that University of Toronto chemist Henry Croft *has succeeded in deodourizing the natural oils found in the County of Lambton.* More than a year later, on July 4, 1860, Canadian Oil Company claimed in an ad in the Hamilton *Spectator* that:

…recent experiments have been attended with great success, and have resulted in our obtaining a process by means of which we can now entirely remove the objectionable odour.

Yet still another year later, on March 28, 1861, the company promised in a Toronto *Leader* ad: *We shall from this date furnish our customers with an Oil superior to any we have yet manufactured.*

Never mind. Rancid animal oils burned in lamps didn't smell very sweet either, and gave less light and more smoke. Enniskillen lamp oil also cost much less. *It is,* wrote Professor H.Y. Hind of the University of Toronto, *…incomparably the cheapest illuminator which has yet been manufactured; and it threatens, for domestic purposes, to drive all other means of illumination out of the field.*[lvii]

Thus, despite the odour, *J.M. Williams & Company* and its successor *The Canadian Oil Company*, prospered for nearly a quarter of a century, until it was finally merged with other Canadian refiners into the *Canadian Carbon Oil Company*. Its lamp fuel, trade named *Victoria Oil*, was sold not only in Canada but also in Europe, South America, and Asia.

DID GESNER GUIDE WILLIAMS?

It is Colonel Harkness who has argued that Abraham Gesner played a crucial role in guiding Williams' refining efforts and the struggle of *Canadian Oil Company* to eliminate the odour of its lamp oil. Certainly someone with knowledge of chemistry and petroleum refining must have, and there was no one more knowledgeable than Gesner. At the very least, whoever was in charge of refining would at some point undoubtedly have consulted Gesner's 1861 treatise on distilled oils, if not consulted Gesner himself.

The company's secretary, William P. Fisher, in a letter January 7, 1861, to Toronto's *Journal of the Board of Arts,* said the company had spent *several thousand dollars* to improve its refining process. But unfortunately, for competitive reasons, Fisher declined to provide details, or indicate who was responsible for that effort.

Harkness advances a number of conjectures in arguing that Gesner was Williams' refining expert:

1) He cites the description of Enniskillen oil given in Gesner's 1861 treatise on petroleum refining: *It differs very essentially from the bitumens of the West Indies and the oils require careful purification.*[lviii] This, says Harkness, *could not have been gained from Dr. Antisell's report of 1853. Either Williams must have sent a large sample to Gesner, or else Gesner must have visited Oil Springs prior to the time that he finished writing his book.*[lix]

2) Harkness states*: It is very doubtful that there would be a chemist in Canada, with the possible exception of Hunt, who would have any knowledge of the complicated chemistry of sulphur compounds in petroleum, a knowledge required for any realistic effort to eliminate the sulphurous odours*.[lx]

3) Williams *would scarcely risk so much money in a new venture without consulting the most outstanding authority on the North American continent.*[lxi]

4) Harkness says that Gesner was *interviewed by the Spectator in Hamilton on March 11, 1861,* implying that Gesner was there to meet with Williams or others at Canadian Oil Company.

In this last conjecture, however, Harkness was wrong. Gesner was not interviewed by the Hamilton *Spectator,* and there was no report indicating that he had been in Hamilton. The item in the *Spectator* was a reprint from an item in the Chatham *Planet,* published three days earlier. Gesner was in Kent County to examine oil prospects near Bothwell where

seepages had been long known, and reportedly told the *Planet* that:

…this section is unquestionably full of the oil of the same quality as that to be found in Enniskillen. He [Gesner] *is in the employee of a company of Pennsylvanians and New Yorkers, and his trip to Kent was in their interest. He left the same night for New York to report, and intends to return to Chatham shortly.*

Except for this last point, Harkness' argument seems reasonable. Yet the Chatham *Planet* report casts a shadow of doubt.

We are also left with a conundrum in the claims of both Hunt and Robb that in his effort in 1857 to distill a lamp fuel from bitumen, Williams was guided by the work of Young. Why not Gesner who had been producing his lamp oil for three years, while Young had been producing lamp fuel (as distinct from lubricating oil and a solvent) for only one year?

Barring the unlikely emergence of corporate records, we might never know what role the founder of North America's coal oil industry played in establishing the continent's first integrated crude oil producing, refining and marketing business, at Hamilton and Oil Springs, in Canada West, one hundred and fifty years ago.

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