THE GREAT CANADIAN OIL PATCH, SECOND EDITION. By Earle Gray

Drilling rigs in the Petrolia oil field, southwestern Ontario, in the 1870's. The rigs were sheltered to protect drillers from winter snow and summer rain. Photo courtesy Lambton County Museums.

"Text from 'The Great Canadian Oil Patch. Second edition: The Petroleum era from birth to peak.' Edmonton: JuneWarren Publishing, 2005. 584 pages plus slip cover. Free text made available courtesy JWN Energy. The book is out of print but used copies are available from used book dealers."

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Preface and acknowledgements have been omitted from this digital version of the book.

Part One: In the Beginning

Abraham Gesner Lights Up the World

He was buried, ignored and forgotten in an unmarked grave for 69 years; it was Imperial Oil that finally recognized his efforts, erecting an impressive monument in 1933. Chiselled on the granite shaft are the words: "Erected as a token of appreciation for his important contribution to the oil industry."

By 1864, “coal oil,” the popular name for the liquid he named kerosene, was the almost universal lamp fuel in North America. It proved efficient, relatively safe, and cheap enough to be used by both city merchant and backwoods farmer. It transformed home lighting, and its development gave rise to the giant international oil industry many years before the invention of the motor car.1

“He” was Abraham Gesner and 1864 was 18 years after the first public demonstration of a new lamp fuel he had developed. He used a contraction of the Greek word keroselaion, meaning wax oil, to name it kerosene, but it was known as coal oil because most of it was at first produced from coal — until an adequate supply of crude oil provided a far cheaper feedstock for scores of coal oil refineries that had arisen within a decade.

Gesner was a Nova Scotian farmer, horse trader, physician, geologist, naturalist, entrepreneur, lecturer, author, and “the father of the modern petroleum industry,” in the words of the U.S. National Aeronautics and Space Administration.2 With his restless mind, he experimented with ways to use bitumen for fertilizer, developed one of the first electric motors, driven by a voltaic battery, and produced an array of inventions: briquettes made from compressed coal dust, a machine for insulating electric wires, a wood preservative, a process for using asphalt to pave highways. He endured shipwreck, arrest, extraordinary toil, bitter losses, and domestic tragedy. He made investors wealthy but never found the fortune he sought. Rights to a rich bitumen deposit that historians say should have been his were awarded to a rival who reaped a fortune. Another rival who independently developed a coal-based lamp fuel years after Gesner, reaped a fortune and died a wealthy benefactor. Gesner died poor, forgotten and ignored in his own country, buried in an unmarked grave in his native Nova Scotia.

Almost from the beginning of time, man had struggled against the dark, with bonfires, torches and, thousands of years ago, had burned olive oil and fish oils from the open half of sea shells or other primitive lamps. But for the most part, darkness still reigned.

Wood was the all-purpose fuel in the home of most early Canadian settlers, from the 17th into the early 19th century. Burned in open fireplaces, it was often the only fuel used for heating, cooking, and lighting. It didn’t give much light, but after intense physical labour from dawn to dark, early settlers tended to go to bed early.

Starting fires with flint and steel was a difficult business. In winter months, the trick was to never let the fire on the hearth go completely out.

Next to the open hearth, candles made from the fat of sheep and cattle were the most ubiquitous form of light. Beeswax candles were better but cost more. An 1839 recipe gives the following instructions for making a good candle: “Melt together ten ounces of mutton tallow, a quarter of an ounce of camphor, four ounce of beeswax, and two ounce of alum. Candles made of these materials burn with a very clear light.”3

Tallow candles had their problems. When burned, they dripped messy fat. Too close to the hearth, or in the heat of summer, they melted. Unless carefully stored, mice and rats ate them. Candle holders varied from tin cups to elaborate chandeliers of cut glass with intricate designs and ornamentation.

Next came the oil lamps that burned olive oil, fish oil, a variety of other fluids, and above all, whale oil. There were, briefly, lamps that burned lard in solid form. The great variety of fuels and lamps, with their different designs, features and methods of operation, bears testimony to the fact that none were found fully satisfactory. And they all, candles and lamps alike, posed a constant threat of fire. None were more dangerous than the “camphene lamps” that burned an explosive 10-to-one mixture of alcohol and redistilled turpentine. On June 12, 1846, at the St. Louis Theatre in Quebec City, at the site of the present Chateau Frontenac, a camphene lamp, one of an array of lamps on stage, was accidentally knocked over. Fire quickly engulfed and destroyed the building. Forty-five charred bodies were recovered the next morning. It was not an uncommon occurrence.

The best light came from the whale oil lamps. But whale oil was expensive, and increasingly so by the mid-19th century when at least some species of whales faced extinction.

Whale oil was used not only for lamp fuel but also for heating and lubrication, for making soap, paint, and varnish, and in the processing of textiles and rope. The pliable bones from the jaws of most whales were used to make corsets, skirt hoops, umbrellas, buggy whips, and carriage springs. What was left of the whales was sold for fertilizer.

The whaling industry hit its peak in the mid-19th century, when 80 percent of the world’s whaling ships were American. In 1846, the year Gesner first publicly demonstrated his kerosene, whalers aboard 735 American ships were hurling their harpoons off Newfoundland, the West Indies, Brazil, rounding Cape Horn to fish the Pacific, “even through Bering’s Strait, and into the remotest drawers and lockers of the world,” as Herman Melville wrote in Moby Dick. The right whale was being killed at a rate of 15,000 a year, and only an estimated 50,000 were left by the time hunting for them stopped. “Had it not been for the discovery of Coal Oil, the race of whales would soon have become extinct,” the California

Fireside Journal declared on September 3, 1860. “It is estimated that 10 years would have used up the whole family.”

Spermaceti, commonly called sperm oil, was the best whale oil for lamps. It is found only in the nose of the sperm whale. Other whale oil was called “train oil.” By 1856, the price of sperm oil in the United States had risen to $1.77 a gallon while train oil fetched 95 cents. With the introduction of Gesner’s kerosene, the whale oil industry disappeared almost overnight, while the price of coal oil steadily dropped to as little as seven cents a gallon.

The adventures of Abraham

Born in 1797, Gesner was one of 12 children of Loyalists who had fled to Nova Scotia after the American Revolution, to take up farming at Chipman’s Corner on the Bay of Fundy.

Publicly funded schools had not yet arrived in Nova Scotia and only the fortunate received formal education at private schools, however primitive some of them might have been. Gesner was one of the lucky ones, and lessons on natural science provoked a fascination that endured all his life.

By the time he was 15, schooling was over and Gesner was working full-time on his father’s farm. He devoted most of what time was left to reading, collecting sea shells, fossils, rock samples, and experimenting with chemistry in an old shed behind the farmhouse.

Eighteen-fifteen and 1816 were disastrous years for farmers in Cornwallis Valley. An unprecedented invasion of mice utterly destroyed the crops of 1815, and when they suddenly died, the mice were raked up by the tens of thousands in huge heaps. Then 1816 was the year without summer, when sunspot activity, and a gigantic volcanic eruption in the South Pacific that blocked off the sun with a cloud of dust, plunged temperatures so low that Nova Scotia saw frost in July while in Europe there was famine.

The Gesner family knew hunger. Abraham hatched a scheme that he hoped would save them. He would become a horse trader, shipping Nova Scotia farm horses, which were otherwise destined for slaughter because of the lack of feed, to the West Indies where they might be sold for cash. The farmers were to get a share of whatever profit ensued. To pay for his passage, Gesner worked during the voyage as a sailor on board the schooner.

At Trinidad, Gesner visited the island’s “pitch lake,” a dark pool a mile across where gas bubbled up leaving the rotten stench of sulphur dioxide and a black, sticky bitumen known as asphaltum. Gesner collected a bag of bitumen to take home with him. He had no idea just how big a role the

Trinidad pitch lake would come to play in his life, and in the development of kerosene.

The horses — "old nags, mostly," according to biographer Allison Mitcham4 — were sold, but barely covered expenses. The voyage continued to South America, and Gesner arrived home in mid-winter with no money, but enough rocks, minerals, shells, South American curios, and Trinidad pitch to load a sleigh that was pulled to his old shed on the farm.

Two more horse-trading voyages followed. The first was planned to Bermuda and the second again to the West Indies. Both were disasters. On each voyage, the ships were wrecked in storms, the horses were lost, and so almost were Gesner and the crews. On the second voyage, a December storm drove the sailing ship onto the rocks off Nova Scotia's Briet Island, sweeping overboard the horses, the crew, and Gesner. All 20 horses were lost. But the shipwreck, Gesner later noted, provided an opportunity "for surveying this island," while adding that "the marks of frost still remaining on our lower extremities, will not allow the circumstances to flee our memory."5 Gesner's frostbitten toes bothered him the rest of his life.

Now bankrupt at 24 but in love, Gesner married Harriet Webster, daughter of a prominent and prosperous neighbouring doctor. Despite the debts incurred from his ill-fated horse-trading, he was able to borrow enough money to buy a small farm, where he set out to practice "scientific farming."6 It seems to have been little more successful than horse-trading. Harriet gave birth to the first of their 11 children, four of whom would die in childhood. Gesner fell deeper in debt. He was placed under house arrest, in danger of being thrown in debtors' prison, and losing his farm.

At 28, Gesner was bailed out by his father-in-law, on condition that he go to London, study medicine, and become a physician. In London, he studied not only medicine, but also chemistry and geology, establishing a lifelong relationship with Britain's leading geologist, Charles Lyell. He also saw for the first time gas lamps lighting city streets, and thought how marvellous they would be in Halifax, where there was coal to make gas.

Gesner returned from London for a brief visit after the death of his youngest son. Harriet gave birth to a third child before his medical studies were completed. There was at that time no prescribed length of study required for certification as a medical doctor: students became doctors when instructing physicians said they were ready. Gesner was ready in two years. He hung up his shingle in Parrsboro, Nova Scotia, not far from the family farm. For a decade, his saddle bags were packed with

medicines and rock samples as he travelled to visit rural patients and survey the province's geology. Writer Grace MacLeod Rogers describes him setting out on his trips:

> Broad shouldered, of medium height, with jet-black hair and eyes, he rode a tall, black horse. For his expeditions he dressed in stout buckskin, and carried a knapsack on his back ready to climb precipitous mountain passes, thread his way through trackless forests, or follow dangerous coastlines… [Visiting the cabins of his patients, he brought] news of the outside world, advice as to the best crops for newly turned virgin soil, descriptions of wondrous inventions of science. He would play for them on a treasured flute which he carried always with him.7

Public lecturers who could inform and entertain were the early 19th century equivalent of television stars. Lecturing beckoned Gesner as a new opportunity, another source of income, and an enterprise more appealing than doctoring or farming. With his boundless enthusiasm and good humour, stories of his adventures, his vivid layman's expositions on science and geology, and displays of all the artifacts he had accumulated over the years, he soon packed the halls wherever he spoke. He became one of Nova Scotia's most popular lecturers.

That popularity undoubtedly helped sales of his first book, Remarks on the Geology and Mineralogy of Nova Scotia, eight years after he had begun his medical practice. It expanded on an earlier work with an almost identical title, Remarks on the Mineralogy and Geology of Nova Scotia, by an American physician and geologist Charles T. Jackson and an associate. But Gesner's book was not only more exhaustive than the U.S. study, but more readable with plain language for laymen and vivid descriptions. It was a bestseller.

The American scientists were miffed. They accused Gesner of plagiarism. Tenacious, determined, and opinionated, he dismissed the earlier work with caustic comments. It was typical of his lack of tact that would fan the flames of professional jealousy and hostility. He was, claims Nova Scotia writer Hans Durstling, "eminently likable to his friends" but "obnoxious" to his many opponents, and "decidedly his own worst enemy."8

Gesner would follow this first published work with more than 20 books, papers and reports, ranging from The Industrial Resources of Nova Scotia: Comprehending the Physical Geography, Topography, Geology, Agriculture, Fisheries, Mines, Forests, Wild Lands, Lumbering, Manufactories, Navigation, Commerce, Emigration, Improvements,

Industry, Contemplated Railways, Natural History, and Resources of the Province, to a study on how to turn bitumen into manure, and what would become his landmark work, A Practical Treatise on Coal, Petroleum and Other Distilled Oils.

Following the success of his first book, Gesner became the first government geologist hired by a British colony, to survey New Brunswick's geology and resources.

The Micmac Indians who guided him on his field trips by canoe, horseback and on foot across New Brunswick's wilderness were hired by Gesner in the winter months to work in the third-floor attic of the Gesner family's new home in Saint John. There he taught them the art of taxidermy, and they began stuffing wild animals.

Gesner was a champion of his Micmac guides and animal stuffers. He led a protest delegation of 10 chiefs from the Micmac Nation who petitioned the legislature for relief from the destitution of their people. Years later, when he lived in New York, he displayed the same regard for the less privileged. He diverted a barrel of Sunday school treats intended for the children of affluent families, and delivered them to less fortunate children.

Gesner was nothing if not forever enthusiastic, an enthusiasm that sometimes ran away, leading him to exaggeration and extravagant claims. So it was, it seems, with his four successive annual reports on the geology of New Brunswick that portrayed glowing economic possibilities for coal and iron mines and other mineral possibilities. When investors found their efforts to cash in on these possibilities less profitable than they had hoped, their wrath was turned on Gesner. His appointment as the colony's geologist was abruptly cancelled, and his final pay was withheld for a year.

Unemployed, Gesner launched yet another venture. Assembling the stuffed animals, his rocks and other artifacts, he opened Gesner's Museum in Saint John, with some 2,000 items housed in the city's handsome Mechanics Institute building, and the public was invited to view his collection for a modest fee. It was the first science museum in Canada, but like every Gesner enterprise, it was not a commercial success. Friends purchased the collection in 1842, donated it to the Mechanics Institute, and in time it became the nucleus for New Brunswick's provincial museum.

Making gas

Gesner then returned to the family homestead at Cornwallis to be with his father, now 87, and resumed his multi-facet activities of doctoring, writing, lecturing, and experimenting.

His attention returned to the bitumen he had brought from Trinidad more than two decades earlier, and which he had already found melted when hot and when ignited burned with a steady flame that left little ash. Heating the pitch in a retort, Gesner produced a liquid fuel, the substance he would soon name kerosene. The product was not entirely satisfactory, however. It smoked and gave off an offensive odor, the raw material was difficult and expensive to obtain, and his experiments suggested it would yield only about 42 gallons of oil per ton of Trinidad pitch.

There was a better raw material. During the first year of his geological surveys of New Brunswick he had found a thick vein of bitumen on the Petitcodiac River in Albert County, which he named Albertite. Gesner continued his experiments, using Albertite.

On June 19, 1846, during a public lecture in Charlottetown, Gesner gave the first public demonstration of his kerosene. The distillation of coal to produce gas for lamp fuel was by this time commonplace, and experiments had also been made in distilling gas from various forms of bitumen. But this was the first time that a liquid fuel had been distilled from either coal or any form of petroleum.

Gesner, however, still had gas on his mind. The idea of burning liquid kerosene in lamps with wicks in the same manner as whale oil and other oil lamps would be developed later. The process Gesner first pursued was this: to distill kerosene from bitumen or coal, then distill the liquid to gas. In the demonstration at Charlottetown and others that followed in Nova Scotia, New Brunswick and New York, Gesner's audiences saw kerosene heated in a retort, the gas that this produced bubbled through water to remove impurities, through a "gasometer" to regulate the flow, and finally to the burner tip or lamp.

This was the process that Gesner now sought to improve in continuing experiments, demonstrate in his lectures, and promote in a planned venture to light the streets, factories, offices, and even homes of Halifax.

Meanwhile, there were other things to do as well, like earning a living. Barely a week before his Charlottetown lecture, he had been appointed Indian Commissioner for Prince Edward Island, at which he worked for a year, and followed by writing another popular book, a 338-page guidebook, New Brunswick with Notes for Immigrants, followed in 1849 by his equally large The Industrial Resources of Nova Scotia.

His term as Indian Commissioner for Prince Edward Island finished, Gesner and family moved back once more to the farm in Nova Scotia where he could be near his aging father.

It was probably no mere happenstance that soon thereafter Gesner made the acquaintance of a man who had been deeply involved for many more years than Gesner himself in attempts to wrought a lamp fuel from coal or bitumen. The relationship that followed would profoundly affect the work and life of Abraham Gesner. His new associate was Thomas Cochrane, the Scottish 10th Earl of Dundonald, who arrived in Halifax in 1848, where he was stationed for three years as admiral of the British navy in the Western Atlantic.

Gesner was already employed by Cochrane when, in the final weeks of 1850, he moved to Sackville, near Halifax, following the death of his father, "Colonel Henry," at age 94.

Gesner had much in common with the still-vigorous 73-year-old admiral and naval hero. Both were bluntly candid, opinionated, volatile; both had abiding interests in finding practical applications for natural science, uses that hopefully would also be financially rewarding; both had suffered the slings and arrows of outrageous fortune; both had been arrested (Cochrane jailed, not placed merely under house arrest), but most of all, both were deeply immersed in the sticky asphalt of Trinidad's pitch lake.

Thomas Cochrane's father, the ninth Earl of Dundonald, had some 70 years earlier (in 1781) obtained a patent for a method of producing an oil, perhaps somewhat akin to kerosene, for use as a lubricant, waterproofing agent, and illuminating fluid, among other things.9 The ninth Earl produced this illuminating oil by distilling coal tar, the by-product of gas distilled from coal. Thomas Cochrane followed his father's footsteps by experimenting, while in jail, on ways to yield a lamp fuel from the bitumen of Trinidad's pitch lake, and in fact obtained a patent on a lamp intended for this use.

Thomas Cochrane's daring and controversial career is the stuff of television series, a role model for Horatio Hornblower. In his first 15 months in command of a naval ship, he captured more than 50 prize vessels before being captured himself by the French. Released in a prisoner exchange, he continued prize-taking in the Azores, winning a handsome £75,000 as his share of the booty. Elected to Parliament on a second attempt, reportedly with the help of judicious bribing, he campaigned vigorously against naval corruption and the ruthless press gangs that Shanghaied able-bodied men of almost every nationality to man British war ships. Sentenced to a one-year prison term on fraud charges that his defenders claim were false, he broke of out jail and stormed back into Parliament, only to be thrown back in jail for the remaining three months of his sentence. Out of jail he commanded Chile's navy in a winning war against Peru, storming 15 of Chile's

strongest forts. He next served as commander of the Brazilian navy, then the Greek navy, before his 1848 return to the British navy as admiral of what was termed the British and North American West India Station.

Gesner and Cochrane together explored the fisheries resources off Nova Scotia, Newfoundland, Labrador and in the Gulf of St. Lawrence, before returning their attention to finding practical applications for bitumen. Cochrane, by 1850, had bought all land completely surrounding Trinidad's pitch lake, assuring a supply of bitumen for experiments aimed essentially at producing lubricants, waterproofing material, fertilizer, and other products. Together they planned a commercial enterprise to supply Halifax with gas distilled from kerosene, and a mining operation to produce the kerosene from the vein of Albertite or bitumen that Gesner had found in New Brunswick. Neither enterprise had been brought to fruition before Cochrane returned to England, where he became rear admiral and continued investigating non-fuel uses of the Trinidad bitumen. Gesner, meanwhile, was soon cheated out of both the planned Halifax gas project and the New Brunswick mining operation, with accusations of skullduggery and hints of jury bribery.

Gesner had organized a company to undertake the Halifax gas service, but the city fathers awarded the franchise to Halifax businessmen who had formed their own Halifax Gas Company. The mining venture fared even worse.

Presumably to finance the mining venture, Gesner appears to be have been associated with Saint John merchant and capitalist Edward Allison. Allison and his associate William Cairns seem to have decided to undertake the venture on their own, cutting Gesner out of the deal entirely. They obtained from the New Brunswick government a lease to mine coal at the site of the bitumen deposit, and, without the customary public notice, had a bill introduced in the legislature to incorporate the Albert Mining Company. Gesner protested the bill, "but in language so abrasive and ill chosen that the Lieutenant Governor demurred presenting the petition to the Law Lords in Britain."10

Gesner knew that the deposit at Albert County wasn't coal, and so obtained a lease to mine bitumen. In January, he attempted to start mining the bitumen covered by his lease, but was chased off the site by Cairns and a party of 26 armed men.

A trial in the Albert County courthouse the following year to determine who had the right to mine the deposit became one of the more celebrated court cases in New Brunswick's judicial history. At issue was the question, is the deposit coal or some form of petroleum? Experts were brought in. One of those who argued it was coal was none other than Charles T. Jackson, the Boston physician and geologist who, nearly 20

years earlier, had been so incensed by Gesner's first published work on the geology of Nova Scotia, claiming that Gesner had plagiarized his own, earlier study. Jackson, at the time of the trial state assayer for Massachusetts, has been portrayed by the Dictionary of Scientific Biography as a man who was "irritable and peremptory to the point of downright paranoia," who later claimed to have invented the telegraph and the medical use of anesthetics, and who died insane.11

The trial was decided by a jury of local farmers, with later hints that they had been carefully chosen and perhaps bribed. Beyond doubt, the deposit was a petroleum substance, but the jury decided it was coal. With its lease affirmed by either a mistaken or rigged jury verdict, the Albert Mining Company successfully mined the vein for nearly 30 years, selling the production to New York coal gasification works where it was used to enrich the manufactured gas. The mining company shareholders made millions, and Gesner was once more impecunious.

Gesner lights the coal oil boom

Gesner had one shot left for fame and fortune. Rebuffed in Nova Scotia and New Brunswick, he would go to New York, where he had already demonstrated his kerosene to appreciative audiences, to establish a coal oil manufacturing business.

He arrived in January, short months after the unfavourable 1852 jury finding in Albert County, and lost no time in finding financial backing. In March, three months after his arrival, Horatio Eagle, a young partner in the firm of Eagle & Hazard, issued an eight-page circular entitled "Project for the Formation of a Company to Work the Combined Patent Rights of Dr. Abraham Gesner, of Halifax, N.S., and the Right Hon. the Earl of Dundonald, of Middlesex, England." The patent rights referred to were issued by the State of New York; to Gesner's great disadvantage, it was more than a year later before a U.S. patent was issued. The new firm sought to raise $100,000 from the sale of shares, which could be purchased at the offices of Eagle & Hazard. At first it was called the Asphalt Mining and Kerosene Gas Company. The kerosene, claimed the prospectus, could be used as a solvent, as paving material for walks and roads, as a lubricant, to waterproof such porous materials as wood and brick, as insulation for underground telegraph wires, in making paints and varnish, as "burning fluids . . . which could be manufactured at a lower cost than the various fluids now most in use," and to produce gas "for lighting manufactory."

"Dr. Gesner's services," said the circular, "have been secured to the company for a term of years, at a moderate salary." It's not known whether he received any shares in the new company. It certainly didn't

seem an arrangement that would make him fabulously wealthy, but for a few years it provided the Gesners with a comfortable, steady income, enough money to buy a house in Brooklyn, where Gesner was soon ensconced as a pillar of the community and a warden of Christ Church.

It's not known why it was more than a year after the publication of Eagle's glowing circular before a U.S. patent was obtained. When it came on June 27, 1854, it was issued not to Gesner, but to the company. The name of the firm had by now been changed to the North American Kerosene Gas Light Company, Horatio Eagle and his associates had purchased land for a refinery on Newton Creek in Queens County and transferred it to the company; and Gesner was hard at work laying out the plant and designing every piece of equipment that would go into it. In the patents, Gesner described three types of kerosene, which he called kerosenes A, B, and C. Kerosenes A and B were the light ends from the distillation process, similar to gasoline. Since there were no cars and no markets for A and B, it was flared. Kerosene C was the lamp fuel.

By early 1856, the world's first coal oil plant was producing kerosene, using New Brunswick coal; for whatever reason, bitumen mined by the Albert Mining Company on leases that Gesner had claimed were properly his, was not purchased. The name of the firm had been changed to North American Kerosene Company, the term 'gas' having been dropped to reflect the fact that it was supplying lamp fuel to be burned as a liquid, rather than first converted to a gas. The lamps with flat wicks were fundamentally no different than today's kerosene lamps. An early company advertisement boasted,

No material has hithertofore been offered to the public capable of producing such a light as Kerosene oil. It gives a better and more brilliant light than any other substance known, at less than one-half the cost of candles or camphene . . . is extremely clean, gives no odor, will not congeal in any climate, and is perfectly safe in any hands. . . . In consequence of the economy and safety of its use, and brilliancy of the light which it emits, [it] must soon be used in every house in the country.12

A description of the company's works in the New York Commercial Advertiser on August 24, 1859 disclosed a plant that cost $1.25 million, employed 200 men, used 30,000 tons of coal per year, and had a manufacturing capacity of 5,000 gallons of kerosene per day. Plant facilities covered half of a 14-acre site, including "a bulkhead four hundred and ninety feet long, at which the lighters can discharge their cargo of coal and receive the oil for shipment." One of the plant buildings contained 13 stills. Another, under construction, was to contain eight

finishing stills, while yet another “will contain a large number of stills: also two six-thousand-gallon tanks from which the oil will be drawn off, and barrelled ready for shipment.” There was a two-storey engine house and a “large boiler room with a chimney one hundred and thirty feet high: here are placed two steam boilers forty-two inches in diameter and sixty feet long.”

The coal oil industry by now is truly booming, scores of new refineries are in operation or being built — and Gesner has been pushed out.

His latest troubles stemmed from the efforts of Scottish chemist James Young who, in England, began experimenting with the distillation of a petroleum fuel from coal in December 1847. That was years after Gesner had started his experiments, and 18 months after his first public demonstration of kerosene at Charlottetown. Young and Gesner had both independently followed the same basic procedure to distill a liquid fuel, by heating coal or bitumen to about 800∞F, considerably lower than the temperature required to yield gas by distillation. Young called his product “paraffine” oil. It was essentially the same as Gesner’s kerosene, although Young’s method of purifying it after distillation apparently produced a somewhat smokier fuel. Nevertheless, Young obtained a British patent for his paraffine oil on October 17, 1850, established a lamp fuel business in Britain, and secured a U.S. patent on March 23, 1852 — two years before the U.S. patent issued to the North American Kerosene Company.

A series of lawsuits followed. In the end, the North American Kerosene Company was compelled to pay a royalty to Young, despite the fact that it was producing kerosene using methods developed by Gesner. In 1857, some three years after work had started on construction of the Newton Creek refinery, Gesner was replaced as the company’s chief chemist by Luther Atwood, who was also chief chemist for a rival coal oil producer in Boston.

While Gesner once more looked elsewhere to earn a living, Young collected royalties, returned to Scotland to retire wealthy, made more chemical inventions, experimented with measures to determine the speed of light, and became one of the principal patrons of an old Glasgow friend, the missionary-explorer of African fame, David Livingstone.

By Gesner’s reckoning, there were an estimated 70 U.S. plants turning coal into coal oil by 1860. There was something else too. Seemingly overnight at least 15 other plants had sprung up to manufacture essentially the same product by essentially the same methods, but using crude oil. The days of the coal oil era were numbered, just as before them had been the days of the whale oilers.

Refining kerosene from crude oil from the fields of Ontario and Pennsylvania was much cheaper than producing it from coal.

In existence less than a decade, the coal oil era left behind it a valuable legacy for the fledgling oil producing industry. It bequeathed a built-up market for illuminating oils, an established chain of distribution and retail outlets, a manufacturing technology capable of turning crude oil into saleable products, a string of operating plants quickly capable of converting from coal to oil, and a product name that still endures, kerosene, used not merely to light a relatively few lamps but also to power jet aircraft.

Most of the coal oil refineries survived the switch from coal to crude oil, but none more successfully than the Newton Creek works of the North American Kerosene Company. After a series of successive changes in ownership it passed in 1876 into the hands of one of John D. Rockefeller's Standard Oil companies, Standard Oil Company of New York, later named Socony-Vacuum after a merger with the Vacuum Oil Company, then Mobil Oil Corporation, and finally, in 1999, ExxonMobil. It operated for nearly a century, until it was shut down in May 1951, and sold to a junk dealer.

Gesner's contribution to the early development of North America's petroleum industry has been perhaps best summed up by Kendall Beaton of the Oil Company. Referring to Gesner's initial plans in 1853 for the first coal oil refinery, Beaton wrote:

From engineers' drawings of the plant which have survived, we can appreciate Dr. Gesner's very real ability as a practical manufacturing chemist. His plant was laid out in orderly fashion and the individual pieces of equipment, shown in detailed drawings, 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. For all his self-education, Gesner was far better grounded in the theoretical aspects of his business than were the long stream of 'practical' refiners who would follow him and dominate the American oil refining business for the next half century.13

Unemployed once more, Gesner returned briefly to his medical practice in New York, which seems not to have been very successful, and to writing his l861 landmark, A Practical Treatise on Coal, Petroleum, and Other Distilled Oils. February 2, 1863, hoping to return to Halifax, Gesner wrote to Dalhousie University seeking a position as a professor of chemistry. It was more than eight months before he received a response, on October 19, a brief letter of rejection. He returned to Halifax in any event, in ill health. The following year, on April 29, he was buried, ignored and forgotten at Halifax's Camp Hill cemetery, in an unmarked

grave that remained that way for 69 years. It was Imperial Oil that finally recognized Gesner's efforts, erecting an impressive monument in 1933. Chiselled on the granite shaft are these words: "Erected as a token of appreciation for his important contribution to the oil industry."

Gesner himself was loath to claim the credit he had so richly earned. Writing on the development of the coal oil refining industry or, more properly, the hydrocarbon refining industry — he 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 labors, not of one mind, but of many, so as to render it difficult to discover to whom the greatest credit is due."14

As his valedictory, so to speak, it was untypical Gesner modesty, but typically Canadian.

Chapter 2: Birth of the Oil Industry

"Today he has the prospect of being the wealthiest man in Canada," wrote the correspondent for the Toronto Globe.

The oil rushed up Shaw's three-inch hole, filled the four-by-five-foot well dug through 50 feet of clay, and overflowed at the surface, a great, black, bubbling and gurgling spring of oil.

Depending upon the history you prefer, the oil producing industry was born in Enniskillen township, in the province of Canada West (now Ontario), sometime between 1852 and 1858, commercial oil production having been developed by Charles Nelson Tripp, James Miller Williams, or a certain Mr. Shaw who has been reported as James Shaw, John Shaw, and Hugh Nixon Shaw. Shaw is reported to be either an itinerant American photographer, a "sturdy laborer, muscular and uneducated," or a merchant from Cooksville, Canada West; and who, having been somehow cheated of his fortune, "died broken hearted and quite unknown" at Titusville in 1860, or in "abject poverty" in Petrolia in 1876 or was drowned in his own oil. To prove that truth is stranger than fiction, Hugh Nixon Shaw did indeed drown in his own oil, after having been lowered down into his well to connect a pipe.

This much about the start of the oil producing industry in North America is certain. It didn't start with the completion of Edwin L. Drake's famous well at Titusville, Pennsylvania on August 28, 1859, as virtually every American history has proclaimed. By the time oil was first pumped at a rate of eight barrels a day from a depth of 69½ feet at Drake's well, an oil producing, refining, and marketing business had been underway

in what is now southwestern Ontario for at least two years, using, using bitumen and then crude oil. The first successful well may have been drilled in Ontario as early as 1857, but the first one that has been positively confirmed was in 1858, producing oil at 60 barrels a day, about eight times the output from Drake's pumper. For a brief time, Canada was the world's leading oil producing nation, with its products used domestically, in the United States, and in Europe.

But American oil production did quickly overtake and far surpass Canada's output.

From its start in Ontario, the petroleum industry grew with phenomenal speed, fuelled the internal combustion engines that sped the 20th century into a new age of mobility, fuelled and lubricated a technological-industrial revolution, created a new chemical industry, and spawned commercial empires with wealth and power such as the world had never seen. What coal was to the 19th century, petroleum was to the 20th century — only perhaps even more so. No other single event so affected development in the first half of the 20th century as the advent of the petroleum producing industry.

In the United States, within a year of Drake's Titusville discovery, oil had been found in West Virginia, Kentucky, Ohio, and Kansas; in Colorado in 1862, Wyoming in 1867, and California in 1875. For the U.S. oil industry, the 20th century roared in with the Spindletop discovery in Texas in 1901. Spouting oil at a rate of some 100,000 barrels a day, it was the world's first great oil gusher. Oklahoma and Louisiana followed with giant discoveries, and in 1930 a bankrupt wildcatter, "Dad" Joiner, brought in the five-billion-barrel East Texas field, North America's largest oil field for nearly 40 years.

In Canada the story was unfortunately different. Following the first wells at Oil Springs in Enniskillen township, a few modest discoveries (giant by the standards of that day) briefly kept Ontario in the forefront of the new oil producing business. But the contrast with what was happening in the United States was drastic. In more than half a century, from the first wells at Oil Springs until the first show of oil at Alberta's Turner Valley field, wildcatters had found less than some 100 million barrels of oil reserves in southwestern Ontario and some teasing indications in Western and Northern Canada.

The fact that Canada's oil potential lay dormant for so long following the Oil Springs discovery in Ontario reflects no lack of Canadian enterprise. Canadians were among the first oil gamblers, and if their efforts bore little fruit, it was because it was difficult to exploit the nation's petroleum potential until the circumstances of geography,

geology, technology, and economics had all combined to make the time ripe.

The earliest oil fields were found by a combination of two methods: sheer luck, and a rudimentary form of geological science that followed up surface indications. Seepages of oil and gas percolating from the ground pointed the way to the first — and some of the world's largest — oil discoveries. Oil seeps led to Ontario's Oil Springs discovery; to Drake's discovery at Titusville, in 1859; to the Turner Valley discovery in Alberta in 1914; and to the Norman Wells field in the Northwest Territories in 1920.

In Iraq, flames had burned from a natural gas seep for thousands of years, and are believed to have been the Bible's "fiery furnace" where Shadrach, Meshach, and Abednego walked. The Turkish Petroleum Company in 1927 drilled a mile and a half from the fiery furnace. It brought in the Kirkuk discovery, a stunning gusher spewing a column of oil 140 feet into the air and flowing oil at a rate of 100,000 barrels a day, one of the world's largest oil fields.

Early oil explorers noticed that oil pools often lined up along parallel trends, and "trendology" became a method of oil exploring. They walked along creek beds looking for oil and gas seeps and examining the trends of rock formations, a method dubbed "creekology." Canadian geologists developed the "anticlinal theory," which held that oil was trapped in dome-like structures, or anticlines. In 1848, Sir William Logan, director of the Geological Survey of Canada, noted that the oil seeps on the GaspÈ Peninsula were located on anticlines. Thirteen years later T. Sterry Hunt, also with the GSC, concluded that the conditions necessary for an accumulation of oil included a source bed for the oil, a structure, or anticline, and an impervious rock-cap. Trendology, creekology, and the anticline theory dominated oil exploration for decades, and produced some of the world's largest oil fields.

The same practices were used in Canada, but yielded only sparse and scattered results. The trouble with these methods was the one thing that they all had in common: they relied on surface observations to point the way to oil, and this just didn't work in most of Western Canada. With some notable exceptions, most of the big oil and gas fields in Canada have not been found beneath seepages of oil or gas or structures that are visible from the surface. They have been more commonly found under flat prairie land, safely hidden until better exploration tools and methods were developed, or more recently under waters of the Atlantic and Arctic oceans.

The first oil company, the first oil well

History has given “Colonel” Edwin L. Drake two bogus titles: his military title and his title as the father of the oil industry. When the former railway conductor arrived at Titusville in 1857 to seek oil production at the site of an oil seepage, mail forwarded by his financial associates was awaiting his arrival. To impress the local citizenry, the mail had been addressed to Colonel Drake, and the title stuck for the rest of his life.

One hundred and fifty miles northeast of Titusville, on the other side of Lake Erie, the “gum beds” of Enniskillen township had already given rise to the world’s first incorporated oil company, and an integrated operation which embraced crude oil production, refining, and substantial marketing of illuminating oil, the industry’s principal production for half a century.

But no single, simple, isolated incident at a certain time and place can be so conveniently marked as the start of the oil industry. To find the real start of the oil industry is like tracing the roots of a giant oak tree to find where the acorn had fallen. And in this case, there was no single acorn. It was instead, as are most really important developments, the culmination of the efforts of many people, in many places, over many years. It included the work of men like Abraham Gesner in establishing the coal oil industry with a new standard of light for the world and a ready market for the later production of crude oil; the salt drillers of West Virginia, Ohio, and Pennsylvania, who showed how wells could be drilled to a depth of 6,500 feet; men like Samuel Kier, with his patented Rock Oil Medicine, who tapped the oil which had contaminated good salt water wells; chemists who analyzed the rock oil and prophetically indicated some of its potential commercial applications; the small band of enterprising men who had established the petroleum operations of Enniskillen township.

Drake’s well marked neither the origin nor the cause of the oil industry. Rather, it was a catalyst which helped accelerate events already set in motion.

What documentation is available on the work at Enniskillen, however, is enough to sketch a fascinating account of the initial development of the petroleum industry in North America.

Early settlers who carved out homesteads from the hardwood forests that covered what is now the southwest finger of Ontario between lakes Erie and Huron, avoided the tiny township of Enniskillen. Landlocked midway between the two lakes, Enniskillen was a flat, featureless land with an almost impenetrable forest of oak, walnut, elm and black ash, dissected by two small and sluggish streams, Bear Creek and Black Creek. The soil cover was underlain by an impervious layer of blue clay.

The flat terrain and a tangle of fallen trees retarded drainage, so that a good rain turned much of the township into a quagmire. It was known as the black swamp. Worst of all were the two gum beds of Enniskillen, composed of a black, tarry substance varying from a few inches to a few feet in thickness, covering several acres of land.

The township covers 86,800 acres. The assessment roll of 1847 showed 396 1/2 acres wre under cultivation by 37 settlers who owned 34 cows and 16 hogs. Enniskillen boasted a greater population of wild turkeys than people.

There were stories that the Indians and the first settlers had obtained from the gum beds small quantities of oil which were used for medicinal purposes. Charles Robb, a Montreal mining engineer, in a paper delivered in 1861, reported that at Enniskillen, “deers’ horns, and pieces of timber bearing the marks of the axe, had been dug up from considerable depths below the surface, in what appear to have been old wells.”1

A chemist with the Geological Survey of Canada, T. Sterry Hunt was first to point out the commercial possibilities of the gum. Hunt analyzed some samples, and in a report published in 1850 noted,

> Its consistency is somewhat like the variety known under the name of mineral rubber. The use of this material in England and the continent to build roads, to pave [seal] the bottom of ships, to manufacture gas for lighting, for which it is eminently suited, is sufficient to attach considerable importance to the deposits that are in this country. A careful examination of the locality will be made, having regard to its extent during the next summer. The samples I am holding contain 78 to 81 percent of this combustible and volatile material.

Hunt reported that the gum bed deposit from which the samples were taken was “on the 19th lot of the 6th or 7th row of the Enniskillen Township in Upper Canada.” This area was later known as the east gum bed.2

The Tripp brothers — Henry who lived in Woodstock and Charles Nelson, foreman of a stove foundry in Bath — established the world’s first incorporated oil company in an unsuccessful attempt to develop production from this bitumen deposit. They may have been attracted by Hunt’s report, or perhaps by a friendly word of advice from Alexander Murray, who farmed near Woodstock and worked part-time as a geologist for the Geological Survey.

When Murray conducted a field study of the gum beds the year after Hunt's report was published, he found that the Tripps had probably preceded him to the site. Describing the west gum bed (16th lot, second concession) as a deposit "of nearly pure bitumen" covering half an acre with a maximum thickness of two feet, Murray said it was "underlaid by a very white clay, which I was informed had been bored through in one part for thirty feet."3

Unsuccessful though it was, this could represent the first known attempt to drill for oil in North America, nearly a decade before the completion of the Drake well.

The Tripp brothers set out with high hopes to develop these bituminous deposits. In 1852, according to an early atlas of Lambton County, they "erected buildings and machinery for the manufacture of asphalt, which enterprise did not succeed." That year they also petitioned the Legislative Council of Canada West for incorporation of a company, but did not obtain a charter until December 18, 1854, after they had re-submitted their petition several times. Not all their hopes were pinned on the gum beds, for their final petition to the Legislative Council claimed that Charles Tripp was the "owner in fee of two large asphalt beds in the Western District, one oil and two salt springs in the said district, also one lead vein in the county of Prince Edward, land in the township of Bedford, land in Belmont, lead and copper on Otanaka, and has mining rights, leases and privileges in various other portions of this province."4

The charter for the International Mining and Manufacturing Company empowered the firm to "erect works for the purpose of making oils, paints, burning fluids, varnishes and other things of the like from their properties in Enniskillen." Charles Tripp was president and there were six other directors, including four Canadians (including brother Henry) and two Americans from New York. Each director subscribed to 250 shares with a total par value of £1,250, and total authorized capital was £60,000 — an enormous sum for that day, and indicative of the magnitude of the work envisioned.

It was the first oil company ever incorporated. Less than two weeks after the International Mining and Manufacturing Company received its charter a group of U.S. entrepreneurs filed at Albany, New York, for a certificate of incorporation of the Pennsylvania Rock Oil Company, organized to develop the oil seepage at Titusville.

Tripp and his associates had not been standing idle for three years awaiting the incorporation of their company. They had purchased extensive holdings covering the gum beds at Enniskillen. They dug the surface deposits of bitumen, boiled it in open cast-iron vessels, venting the lighter products into the atmosphere, and attempted to produce

asphalt for paving roads and sealing the hulls of ships. Tripp sent a large sample of the gu beds for analysis to Thomas Antisell of New York, a consulting and analytical chemist who was one of the experts in the new coal oil refining business. Another sample went to the Hamilton Gas Company for testing in its retorts.

Antisell, in a report to Tripp dated February 19, 1853, described the samples as "a very valuable variety of bitumen suitable for the manufacture of varnishes, naphtha liquids for use as solvents, burning fluids and gas for illuminating purposes." According to Antisell, "the manufacture of volatile liquids and illuminating gases appears to be its most appropriate use." Two years later the Hamilton Gas Company reported that a sample of 1,450 pounds of Tripp's bitumen produced 4,600 cubic feet of gas in three hours, and that this gas gave 10 to 15 percent more illumination than the gas which the firm manufactured from coal.

Despite these reports, Tripp appeared to continue to concentrate his efforts on the production of asphalt, although some lamp fuel may also have been produced. A sample of the International Mining and Manufacturing Company's asphalt was included in Canada's exhibits at the Universal Exhibition at Paris in 1855, and won an honourable mention.

Tripp's efforts were marked by a singular lack of success. Part of his financial trouble may have stemmed from his decision to concentrate on the production of asphalt rather than the more valuable lamp fuel. It may have been that he lacked knowledge, or more likely capital, to tackle the distillation of the bitumen into its more volatile components.

Transportation was another hurdle — it was 20 miles through dense forest and a quagmire trail from the site of his diggings to water transportation at Sarnia, and the cost of hauling out his asphalt by horse and wagon must have been just about as great as the value of the product. Even with the reports of Antisell and the Hamilton Gas Company, attempts at raising public financing for the International Mining and Manufacturing Company met with little response. By 1856, deeply in debt, Tripp was forced to start selling his gum bed properties.

J.M. Williams: the first oil producer, refiner, and marketer

Enter James Miller Williams, a dynamic 39-year-old carriage maker from Hamilton, who succeeded where Tripp had failed. Williams was already a successful businessman when he began developing the first-ever integrated oil business.

Born of Welsh parents in Camden, New Jersey, Williams left school early to apprentice as a carriage maker, moving with his family to

London, then no more than a mere village in Upper Canada, when he was 22. Within two years he had married and was a partner in a prosperous carriage-making business. He later sold out and moved to Hamilton, again entering the carriage-making business. His wagons were the Cadillacs of the carriage trade; one was described by the Hamilton Spectator as "a splendid new Omnibus . . . surpassing in size and elegance anything of the kind ever before attempted in this country." Before long, Williams had sold out once more and turned to the manufacture of railway cars. He operated plants in Hamilton, Niagara Falls and Brantford. When the railways began making their own rolling stock, he sold out once more, in 1856, and set out to do his thing in the oil business.

Among the numerous debts accumulated by Tripp about this time, according to one widely quoted account, was a sum due to Williams for the purchase of a wagon. To settle the account, according to the story, Tripp offered Williams some of his oil lands. Never one to do anything by halves, Williams decided to buy out Tripp's entire holdings, paid £2,000 for 600 acres of potential oil land in Enniskillen, including the two gum beds, and hired Tripp to help in the undertaking.

Williams' operations at Enniskillen were in marked contrast to Tripp's ill-fated endeavours. Where Tripp simply boiled the bitumen to produce asphalt, Williams appears to have set out from the start to produce a burning oil for lamp fuel by distilling bitumen. Where Tripp essentially mined the more or less solid bitumen from the gum beds, Williams was soon pumping crude oil from a reservoir beneath the gum beds.

Williams started his operations at Enniskillen in 1857, according to reports by Charles Robb and by Sterry Hunt. Wrote Robb in 1861: "Ultimately the whole adventure devolved upon Mr. Williams, to whom alone is due the merit of developing this branch of industry in Canada, as well as of pointing out the road to success in the same direction in the United States."5

On the south bank of Black Creek in 1857, Williams established what was probably the world's first refinery to produce fuel from petroleum, as opposed to the coal oil refineries that produced kerosene from coal. Williams' plant featured a simple retort in which bitumen was distilled into an iridescent liquid, undoubtedly kerosene, which was sold as lamp oil. The following year Williams moved his refining operations to Hamilton where he established larger, more sophisticated facilities.

While Williams began producing fuel by distilling the bitumen of the gum beds, he might have started producing crude from beneath the gum beds as early as 1857. Sterry Hunt reported that in 1857 "Mr. W.M. Williams of Hamilton, with some associates undertook the distillation of

this tarry bitumen, when they soon found that by sinking wells in the clay beneath, it was possible to obtain great quantities of the material in a fluid state." When Hunt visited the site in December 1860, he found that "Nearly 100 wells had been sunk."6

Robb also noted that Williams had started digging the bitumen in 1857, "using it as a substitute for coal in the manufacture of such oils," but "soon discovered, however, on penetrating below the asphalt, that the material could be obtained in large quantities in the fluid state, and consequently much nearer the condition required in the manufacture."7

These two reports imply that Williams had producing oil wells at the gum beds as early as 1857, although there is no conclusive proof of that. It is known, however, that 12 miles southwest of the gum bed, at the site of an oil seepage on the banks of the Thames River near Bothwell, Williams and Tripp did attempt to bring in an oil well in 1857, although that effort was not successful. They first dug to a depth of 27 feet when the hole filled with oil and water. In an effort to reach the "pool of oil" Williams and Tripp tried to drive an iron pipe farther down into the hole. After the pipe had been driven down a "considerable distance" it broke, and the well was abandoned.

One widely quoted report is that Williams and Tripp dug their first successful well that same year on the west gum bed — on lot 16, concession 2, the site described in the GSC report six years earlier by Alexander Murray who said it had even then been "bored" through for 30 feet, probably by Tripp. This time, Tripp and Williams are reported to have dug to a depth of 46 feet where they later drilled an additional 100 feet through rock, finding oil in greater volume. The Toronto Globe on September 6, 1861, reported that this well was producing an average of 60 barrels of oil a day, and had been in operation for two years.

Another earlier report by Thomas A. Gale dated the start of production from Williams' well as 1858. In June 1860, Gale wrote,

> Williams and Company's well is 49 feet deep, seven by nine feet square, cribbed with small logs and does not extend to the rock; the oil rises within 10 feet of the well which contains 13,724 gallons or 343 barrels of oil, and has been in operation for two years. The largest amount taken from the well up to the present time was 1,500 gallons or 37 barrels (with hand pump) in 10 hours which reduced the depth of the well three feet.8

The Sarnia Observer, on August 26, 1858, reported that "two weeks ago we noticed the discovery, in the Township of Enniskillen, of an abundant supply of mineral oil." The Observer added that when burned the oil

emitted, “on account of the impurities, a dense black smoke,” but on purification should make “a splendid lamp oil.” The produced oil had been “barreled up and sent to Hamilton to be prepared there,” where Williams had set up his refining facilities after moving them from Oil Springs.

By September 23, 1859, just 27 days after the completion of Drake’s well, Williams’ refined kerosene seemed already well established on the market — well enough established to bring the following comments and price complaint from the Sarnia Observer:

> Enniskillen oil — this most superior illuminating oil, can now be had from Mr. W.B. Clark, the agent for Sarnia, at $1.25 per gallon. The article, we have no hesitation in saying, after having given both a fair trial, is superior to the celebrated Albertine oil, being more free of smell, while its illuminating properties are equal if not superior to the latter in all respects. No one who gives it a trial, would ever think of returning to the use of candles, except for transient purposes, the light from the oil being much clearer, while the annoyance of grease from indifferent candles, with which every one is familiar, is altogether avoided. We see the oil is advertised in London at $1 per gallon; if it is really sold there at that price, Mr. Clark ought to obtain his supply from the company on as advantageous terms. The article, it is true, is cheap at $1.25; still there should be little, if any difference between the price here and in London, except the extra freight from Hamilton, whither, we understand, the raw material is sent for the purpose of purification.

Despite the glowing account of the Sarnia Observer, Williams apparently had trouble for several years in removing the obnoxious odour from the sulphurous crude of Oil Springs. His success in overcoming this problem was finally proclaimed in an advertisement on July 4, 1860, in the Hamilton Spectator:

> Those who have any knowledge of the coal oil business are well aware that not a barrel of any of these oils has been manufactured either in Canada or the United States without great difficulties having been experienced and large amounts having been expended in order to overcome the offensive odour common to all oils. The odour has prejudiced many against them, and has hitherto prevented us from bringing out oils before the public. But 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 this disagreeable odour.

The ad offered for sale illuminating oil at a price of 70 cents per gallon (a sharp drop from a year earlier), machinery oil at 60 cents per gallon, crude oil at 25 cents in quantities of 1,000 to 4,000 gallons and 16 cents in quantities of 4,000 to 100,000 gallons.

The volume of production at Oil Springs was held back by the task of moving it to market through the black swamp of Enniskillen. The Great Western Railway by this time had been completed as far as Sarnia, and it was a 12-mile haul from Oil Springs to the railway station at Wyoming. Here the oil was worth 13 cents per gallon, or more than $5 per barrel. cost of hauling the oil by wagon to Wyoming was four to six cents per gallon — a third to one half of the sales price.

In winter, when the ground was frozen and covered with a blanket of snow, a team of horses could haul as many as 16 barrels of oil, more than two tons, over the road to Wyoming. Spring and summer rains quickly changed that, and a team of horses was fortunate to haul out by wagon one barrel at a time. Potholes on the road, noted the Toronto Globe, were “large enough for horse and wagon to swim in.”9

Williams at first operated his oil interests under the name of J.M. Williams & Co. In November 1860 he incorporated the Canadian Oil Company, into which he put his then-substantial oil interests. The Canadian Oil Company entered an exhibit at the 1862 International Exhibition in London, England, winning one gold medal as the first to commercially produce crude oil, and another gold medal as the first to refine oils in Canada. The company called its kerosene Victoria Oil, and it was successfully sold in Europe, South America, and China.

By 1871, however, the Canadian Oil Company was defunct and Williams was president of Canadian Carbon Oil Co., an amalgam of several leading Ontario refiners. By 1880 competition from American oil was driving Canadian oil men to the wall and Williams appears to have disposed of his oil interests and turned his energies in yet another direction. J.M. Williams and Co. became a stamping works, one of the first in Canada to make pressed tinware.

His record as a Liberal member of the Ontario legislature for 13 years — he was elected as Hamilton’s first representative following the confederation of Canada in 1867 — shows that he was a man of few words. His speeches were rare, brief, and to the point. He was a doer, not a talker. A staunch Presbyterian, he was one of the leaders of his church. Also, for several sessions before he entered provincial politics, he served on the Hamilton city council. He was a director of the Mutual Life

Association of Canada, the Victoria Mutual Fire Insurance Co., the Provident & Loan Society of Hamilton, the Hamilton & Lake Erie Railway, and the Hamilton & Northwestern Railway. After retiring from the Ontario Legislature he was appointed registrar of Wentworth county in 1879, a largely honorary position which he held until his death at age 72 in 1890.

His obituary in the Hamilton Spectator described him as "a shrewd, sound, practical and experienced businessman whose services to his city and province were of the utmost value and who was never absent from the post of duty." The Toronto Mail added that "he never drilled a gusher or won or lost a spectacular fortune, but oil men said he was the one man who left the first Oil Springs boom with money in his pocket."

That is probably just about as complete a description of Williams as has been left behind. For all his accomplishment, his position as a leading businessman of the day, a short career as a successful provincial politician, and his importance to the petroleum industry, he remains an obscure personality. He apparently left behind nothing in the way of autobiography, journals or reminiscences, and even photographs of him are rare.

Of the enterprising Charles Nelson Tripp, even less is known. He had been a foreman at a stove foundry in Bath, then in Canada West, and in 1850 had sold his employer a patent application on a stove front, two years before he first applied for incorporation of the International Mining and Manufacturing Co. After the sale of his oil interests he worked for Williams but a brief period, and died in New Orleans in 1866, described in his obituary as "the original oil man of Canada

The Gesner connection

Behind Williams' success in refining kerosene from bitumen and then crude oil may have been the guiding hand of Abraham Gesner. Historians have not been able to find the documentation which would establish Gesner as the expert adviser to whom Williams turned for technical direction and guidance, but the circumstantial evidence strongly points in this direction. Williams almost certainly had someone to show him how to refine his Enniskillen oil, and a highly successful businessman of his calibre could be expected to turn to the most expert advice available. No one was more expert than Gesner, and he was available. After setting up the coal oil plant for the North American Kerosene Company and losing control of his patents, Gesner left the company in 1857, the year Williams started in the oil business. Gesner not only knew about the Enniskillen oil; he was also familiar with problems involved in refining this particular crude. In his Practical

Treatise on Coal Petroleum and Other Distilled Oils, dated November 1860, Gesner wrote of the Enniskillen oil: “It differs very essentially from the bitumens of the West Indies and the oils require careful purification.”

Gesner probably knew about the requirements for “careful purification” of this oil from having designed Williams’ refining operations, or at least assisted. A description of Williams’ refining operations by Sterry Hunt in mid-1861 — by which time operations had been moved from Oil Springs to Hamilton — disclosed what was for that day a sophisticated plant which could have been designed only by one of the very few experts in the field. The plant employed 16 men and refined about 120 barrels of oil per week, according to the Hamilton City Directory. “The process of refining,” wrote Hunt, “consists in rectifying by repeated distillations, by which the oil is separated into a heavier part employed for lubricating machinery, and a lighter oil, which after being purified and deodorized by a peculiar treatment with sulphuric acid, is fit for burning in lamps.”10 Gesner’s process used at the plant of North American Kerosene Company also used repeated distillation for purification and deodorization of the kerosene by treatment with sulphuric acid and calcinated lime.

That Gesner was in Hamilton early in 1861 is established by an interview with him published March 11 that year by the Hamilton Spectator. It seems incredible that he would be in Hamilton without consulting with Williams about Williams’ refinery operations. That is very likely why he was in Hamilton, and probably not for the first time.

While the petroleum industry was being developed in Canada, similar events were rushing ahead in the United States — about one step behind at each stage. The story of Drake’s well has been told so often that it is here repeated in brief only, to compare with the time of events in Canada.

It was an oil spring on the Titusville, Pennsylvania property of the lumber firm of Brewer, Watson & Company which set in motion in 1851 a long chain of events leading to the drilling of the Drake well eight years later. Dr. Francis Beattie Brewer, abandoning his medical profession to join his father’s business was highly intrigued with this oil spring, and the reputed medicinal value of its product, as well as other possible uses. Brewer had a series of shallow trenches dug to collect the oil, which was used as a lubricant by the lumber mill, and also burned to illuminate open areas of the mill where the belching black smoke did not matter.

A sample of the oil left at Yale University by Brewer came to the attention of a young New York stock promoter, George H. Bissell, who thought he saw an opportunity for another profitable promotion. Obtaining an agreement to purchase the oil rights at the Titusville

property for $5,000, Bissell and his associates filed a certificate of incorporation on December 30, 1854, for the Pennsylvania Rock Oil Company of New York. It was the first incorporated U.S. oil company.

Bissell and his partners ordered an analysis of the oil from Benjamin Silliman, Jr., head of the chemistry department at Yale University. Taking more than a year to prepare his report, Silliman would not release it until Bissell had managed to scrape up the money to pay the fee, $526.08. The report was well worth the cost. It pointed out a number of potential commercial applications, but the most important was that 50 percent of the oil could be distilled into a satisfactory illuminant for camphene lamps. The Silliman study has been described as “perhaps the most epochal report in petroleum history,”11 but its conclusion that Titusville oil could be distilled into a lamp fuel came more than two years after chemist Thomas Antisell had made a similar finding for Charles Tripp with respect to the bitumen deposit at Enniskillen.

Despite the encouragement of the Silliman report it was difficult to find investors willing to put their money into the Pennsylvania Rock Oil Company. (Dr. Brewer was warned by his banker father that “you are associated with a set of sharpers, and if they have not already ruined you, they will do so if you are foolish enough to let them do it.”) Control of the dormant company was acquired by New Haven banker James Townsend, who formed a new oil company, the Seneca Oil Company, on March 23, 1858. The new firm leased the oil property from the Pennsylvania Rock Oil Company for a royalty of 12 cents per gallon of oil produced.

Townsend’s next task was to hire someone who would set about the task of developing the property. Edwin L. Drake, then 38, got the $1,000-a-year job because he was available, and because, as a former railway conductor, he had access to a free railway pass to get to Titusville. Other than this, Drake appeared to have few qualifications and no experience to bring to the task at hand.

It is not known whether it was Bissell, Townsend, or Drake who first conceived of the idea of drilling a hole, in the manner of the salt water well drillers, in order to increase the production of oil from the seepage at Titusville. All three laid claim to having first thought of the idea.

“Colonel” Drake arrived at Titusville to start the operation in May 1858. It was 15 months later before Drake and his driller, “Uncle” Billy Smith, found oil at a depth of 69 ½ feet, pumping oil from eight to 10 barrels a day. It was Sunday, August 28, 1859.

Potential commercial value of crude oil had by this time become well established and recognized. As a result, Drake’s discovery triggered an immediate boom that rivalled the California gold strike a decade earlier.

Within weeks speculators had paid probably more than a million dollars for oil leases purchased from farmers along creek beds in Pennsylvania. Within 15 months of Drake's discovery, according to one report, there were 74 producing wells in Pennsylvania turning out oil at a rate of nearly 1,200 barrels a day, and several times as many dry holes had been drilled.

Drake left the oil regions four years after his discovery, a comparatively affluent man with savings of some $20,000, a substantial sum for those days. But the money did not last. He became a partner of a Wall Street broker in oil stocks, and by 1866 had dissipated his savings in speculations. He spent the rest of his life in ill health, poverty, and obscurity. He was awarded an annual pension of $1,500 by the State of Pennsylvania in 1873, and he died in 1880.

Fame and fortune were more fleeting at the site of Canada's first oil production. Initially known as the gum beds of Enniskillen, it was later called the Enniskillen Oil Springs, finally became the boom town of Oil Springs.

A log cabin, some machinery and a few holes in the ground were about all that marked the future site of Oil Springs when Williams began his oil operations in 1857. At first a few others followed Williams' footsteps to dig oil wells along the banks of Black Creek. Following Drake's discovery, Americans arrived in great numbers, seeking new areas of opportunity.

Williams and three others laid out the village of Oil Springs in 1860. By mid-1861 Oil Springs boasted a population of 1,600, an overcrowded hotel, several small stores and close to 100 producing wells with 300 more being drilled along the banks of Black Creek.

A reporter for the Toronto Globe, with tongue in cheek, noted that the name "Victoria" had been proposed for the new village. But the Americans, "having profound respect for Her Majesty, think the honour would be too great for them to bear, and are therefore unanimous for Oil Springs."12

The village's initial water well had been contaminated by oil. But near the principal hotel ran "a small sluggish flowing stream. In it the diggers, covered with oil, washed their dirty selves after the day's work; swilled the mud off their boots, and quenched the thirst of their horses. From this ditch also was regularly procured the water of which the tea and coffee were made, and in which the fat salt pork, the staple article of food for long months, was boiled."

Beds were in such shortage that hotel guests who retired early were awakened at midnight "so that other gentlemen might take a sleep." The Globe noted that "undressing was not considered strictly requisite," but

one American “rather overdid things when he went to bed in his boots.” For a frontier boom town, things were quiet, “no rows having taken place; knifings and shootings being entirely unknown.”13

Wells were dug and cribbed to about 50 feet from which depth some produced; others were bored for another 100 feet or more. Contractors charged $2 to $4 a foot to sink a well, depending on the depth, and the average cost of a completed oil well was reported to be in the order of $300. Four-man crews bored holes with the spring pole drilling method. A sharpened iron bit, weighing 300 to 400 pounds, was suspended downhole by cable from the thick ash spring pole. Drillers stood on a small platform attached by rope to the end of the spring pole. With the shifting weight of the drillers on the platform, the pole sprang up and down a foot or so, raising and dropping the heavy bit which slowly banged its way through soil, clay or rock.

The greatest gusher the world had yet seen was drilled at Oil Springs in 1862 by Hugh Nixon Shaw, an Irishman who had operated a general store at Cooksville before drilling for oil, and about whom so many conflicting stories have been recorded

After an unsuccessful partnership venture at Oil Springs, Shaw set out on his own to drill on his one-acre plot, backed by $50 in working capital. Starting in July 1861 and working by himself, it took Shaw more than six months to complete his well. Shaw’s $50 capital was exhausted before that, and so was his credit within a 20-mile radius of Oil Springs, but he stuck to his task. He dug his well four by five feet, through 50 feet of clay, then with his spring pole bored through another 158 feet.

A broke, tired, and discouraged 50-year-old man, Shaw by the end of that year faced his drilling task each day on a “just one more day” basis. The final day was January 16, 1862. “Today he has the prospect of being the wealthiest man in Canada,” wrote the correspondent for the Toronto Globe.14

The oil rushed up Shaw’s three-inch hole, filled the four-by-five-foot well dug through 50 feet of clay, and overflowed at the surface, a great, black, bubbling and gurgling spring of oil.

To bring the well under control, Shaw first lowered shot, a black plume of oil more than 20 feet high, flowing at a rate greater than 2,000 barrels a day and covering the ground for acres around.

A second pipe, three-quarters of an inch in diameter and also wrapped with flax seed, was lowered down inside 31“I timed the filling of these barrels,” wrote the Globe reporter, “and found that in one minute and forty-five seconds each barrel was filled. . . . The tanks are always overflowing, although they are constantly drawing it off into barrels.”1

A writer for the Christian Guardian, London (Ontario) reported that "all the wells of Enniskillen are overshadowed by the wonderful well of Mr. Shaw."

> This gentleman, everyone calls him a gentleman now, though many failed to discover the attributes of the gentleman, though really they were there, until Providence rewarded his indomitable energy with a fortune no one could tell the full extent of — this gentleman, I say, had commenced to sink a well in another quarter, and spent a good deal of time and money, fruitlessly.15Shaw's bags of flax seed managed to tame the well for no more than a few days. "On Friday last, another freak was played," reported the Christian Guardian:
>
> So tremendous was the force beneath that the sandbag was driven upward into the air, and a great column of oil, some four inches in diameter, and 20 feet in height, played away for nearly three days and nights, wasting an even larger quantity of oil than on the first occasion. Many thousands of barrels of oil have flowed over the adjoining lands, the road and the adjacent creek. I measured the oil in the creek and found that it was from three to four inches deep on the ice of the creek. This continued for a long distance down the creek.

Another 30 gushers were drilled that year within a square-mile area surrounding Shaw's discovery. At least half a dozen of them flowed at even greater rates — one at 7,500 barrels a day. Four hundred teams of horses hauled the oil to the railway at Wyoming, over a new oak-planked road. There were 10 refineries operating at Oil Springs, plus five at Toronto, three at Wyoming, two each at Sarnia, London and Hamilton, and one each at Petrolia, Ingersoll, Woodstock, Port Credit, Brantford, and Bothwell. Use of kerosene for lighting had become general throughout Ontario by 1863, and demand was growing rapidly.

"The great flowing wells of Oil Springs," as they were called, typified conditions during the first two decades of the oil industry in both Canada and the United States: tremendous waste, alternating oil shortages and glutted markets, and wildly gyrating prices. From $4 to $6 a barrel in 1861, the price of oil at Oil Springs fell to $2 at the beginning of 1873 and 40 cents by the end of the year. (Some reports have suggested a figure as low as 10 cents.)

"There is no quarter of the world where the production has attained such prodigious dimensions as in 1862 upon Oil Creek, in the township

of Enniskillen, Ontario," professor Alexander Winchell of the University of Michigan reported. The waste production of oil, he claimed, "was the mere pastime of full-grown boys. It floated on the water of Black Creek to the depth of six inches, and formed a film upon the surface of Lake St. Clair. At length the stream of oil became ignited, and the column of flame raged down the windings of the creek in a style of such fearful grandeur as to admonish the Canadian squatter of the danger, no less than the inutility and wastefulness of his oleaginous pastimes." Winchell estimated the amount of oil spilled down Black Creek at more than five million barrels — probably an over-estimate, but still enough to represent "a national fortune, totally wasted."16

Spectacular, if somewhat brief, was the oil career of Hugh Nixon Shaw. He was probably the first oil man who drowned in his own oil; on February 11, 1863, little more than a year after he had completed the world's largest oil gusher of that era. At the inquest which followed, an unnamed witness testified about what happened:

> Deceased was lowered into the well by myself and Mr. Stewart, to a depth of about fifteen feet; after deceased had taken hold of the pipe, he asked to be hauled up; witness and Mr. Stewart commenced to wind him up by the windlass; witness thinks deceased called the second time to be hauled up, but is not sure. Heard him drawing several long breaths, or breathing heavily; at that instant he fell back into the oil and disappeared.17

"Mr. Shaw had long been in the enjoyment of religion," added an obituary in the Cooksville paper.

Even briefer than Shaw's oil career were the spectacular performances of the great gushers of Oil Springs. Wells that at first flowed thousands of barrels a day, within a few months had to be pumped, yielding oil at rates of five to 20 barrels per day. With the decline in production and continued growth in demand, the crude prices at Oil Springs were gradually restored, to $4 per barrel in 1864 and more than $11 per barrel by late 1865.

With the return of better prices, the boom at Oil Springs was on again. More wells were drilled, and if there were no more gushers, there were at least a lot of profitable pumpers. The jerker rod system of oil well pumping was developed for the Oil Springs wells. A single steam engine, fired by wood or by gas from the oil wells, slowly rotated huge, horizontal iron wheels a few degrees back and forth.

Iron rods, up to several hundred feet in length, fanned out like spokes from the central wheel to connect with the pumping wells, to be jerked

back and forth along the ground with the rotation of the bottom wheel, and pumped steady streams of oil. One hundred or more wells could be connected by a single jerker system; several thousand wells in the field produced a modest but steady flow of oil.

Oil Springs reached its apex in 1866. With a population of more than 4,000, it seemed far different than the collection of shacks along a muddy street and beside an oil-choked stream that the Globe had described just two years earlier. There were now nine hotels, a dozen general stores, as many bars, a weekly newspaper (the Oil Springs Chronicle, Canada's first oil publication), two banks and a board of trade. The main street was planked for a mile and a half with a double width of white oak, proudly proclaimed the finest paved street in Canada. Horse-drawn buses ran the length of the town at five-minute intervals. There was a stage service four times a day over a 20-mile planked road to Sarnia. Oil Springs' largest edifice was a 108-room hotel, just completed by a Chicago firm and said to be the largest frame-structure building in Canada. At night, Oil Springs was a blazing marvel with three miles of kerosene lamps set on ornamental posts along both sides of the main street.

It took Oil Springs less than a year to hit the bottom. Two things in 1866 brought a sudden halt to the town's boom. There was the development of the larger field at Petrolia, eight miles to the northwest. Oil had been produced in small quantity at Petrolia for half a dozen years, but in 1866 drillers started bringing in the flowing wells. At 100 to about 500 barrels a day the Petrolia gushers were not as big as the first ones at Oil Springs, but there were more of them, and it seemed that they would have greater staying power. Eventually the field at Petrolia embraced some 20 square miles. The one at Oil Springs covered only two square miles. Just as at Oil Springs four years earlier, the new wells of Petrolia brought a glut of oil and declining prices, dropping in two years from $11 to 50 cents per barrel.

The second thing to hurt Oil Springs that year was the first of the Fenian Raids against Fort Erie, by U.S. Irishmen. For a time it looked like war between Canada and the United States, and the Americans at Oil Springs figured it was time to head home. Before the end of the year, the population of Oil Springs had shrunk to 300.

While Oil Springs shrank, Petrolia prospered. In one year it grew from a collection of a dozen shacks on a tiny clearing in the forest to a boom town of 2,300 people. Eventually close to 6,000 wells were drilled in the field, and population hit more than 5,000.

An objectionable odour of the kerosene distilled from the sulphurous crudes of Petrolia and Oil Springs compounded the continual marketing

problem, while the sulphur-free “sweet” oil from Pennsylvania produced a cleaner, generally odourless, superior product. Williams, in his advertising as early as 1860, claimed that he had developed refining processes which produced a clean, odourless lamp fuel. If he had, it was a secret that other Canadian refiners lacked for years. It was not until about 1868 that Canadian refiners were able to produce a clean enough product to enable them to capture a share of the European market. And even then, the problem was not completely solved for another 20 years until Herman Frasch, working for Imperial Oil, developed a new refining process using oxides of copper, lead and iron to effectively remove the sulphur compounds.

After crude prices hit 50 cents per barrel in 1867, Petrolia producers began looking for export markets. By establishing a two-price system with lower prices for exports, Canadian producers from 1870 to 1873 were able to export 60 percent of their production to European markets. Discovery of far more prolific reserves of sweet crude in Pennsylvania and elsewhere abruptly shut off the export market, however, and from then on Canadian producers were limited to the domestic market, protected by a duty on U.S. imports. It was only a matter of time before the growing Canadian demand required far more oil than the modest production from Ontario was able to supply.

It was Canada that set the foundations for the petroleum industry, and for a very brief period it held the spotlight in the world of oil. It was soon left shamefully far behind. Starting with Williams in 1857, Ontario oil production rose to about 10,000 barrels in 1860, and less than 900,000 barrels in 1894. By contrast, U.S. oil production starting with Drake in 1859 skyrocketed to somewhere between 250,000 and 500,000 barrels the following year, more than two million barrels in 1861, and 11 million barrels by 1874.

Perhaps the most amazing thing about Ontario’s oil and gas fields is that they didn’t hit record production until 2001 — 143 years after Miller’s discovery well at Oil Springs. By the start of the 21st century, oil production was many times that of the 1860s and ‘70s. From the 1894 peak, Ontario oil production declined by about 80 percent by the 1920s. But a revival began in the ‘50s, boosted by development of reserves under the waters of Lake Erie that separate the old oil provinces of Ontario and Pennsylvania, by new, enhanced recovery methods that squeeze more oil from the rocks, and by the discovery of tiny new oil and gas pools.

Ontario’s production of 1.6 million barrels of oil in 2001 was nearly double the earlier 1894 peak. Natural gas production was equivalent to almost another million barrels. The combined value of the oil and gas

output was $130 million. But as impressive as these volumes might seem, they were less than half of one percent of Canada's oil and gas consumption.18

Ontario's oil and gas fields might be relatively small, but after yielding 82 million barrels of oil and an estimated 1.2 trillion cubic feet of natural gas, they were still a significant resource in the early years of the 21st century. The true importance of Ontario's oil development is not the volume of oil and gas produced. It is the fact that this is where it all began.

Chapter 3
The Quest in the West: Two Centuries of Oil Teasers and Gassers

It can be seen that the existence of an oil and gas belt of great promise has been proven across the province of Alberta for a distance of hundreds of miles, and that it extends beyond Alberta to the Arctic Ocean is indicated by the known seepages and by the geological conditions. That this oil and gas belt, almost 2,000 miles long in Canada and about 200 miles wide, contains for the future enormous reserves of petroleum is my firm conviction.

— Eugene Coste (1859-1940), geologist and founder of Canada's first two natural gas utility firms, in Ontario and Alberta, circa 1915.1

Oil seepages, geological conditions, and natural gas discoveries tantalized and teased early explorers, geologists, wildcatters, and investors for two centuries before Canada's first major oil and gas field was discovered in the foothills of the Rocky Mountains, 30 miles southwest of Calgary.

Alberta's first reported show of oil was the bitumen impregnated in sand along the banks of the Athabasca River in what was then the vast Rupert's Land domain of the Hudson's Bay Company. Wa-pa-su, a Cree Indian working for the company, in 1719 brought to Hudson's Bay trader Henry Kelsey at Fort York, a lump of the oil-saturated sand that Kelsey described as "that Gum or Pitch that flows out of the Banks of that River."2

More traders, explorers, and geologists stopped to examine the outcroppings of the world's biggest storehouse of petroleum energy. On the first leg of his journey to the Arctic Ocean (and five years before his even more historic first overland crossing of North America to the Pacific Ocean), Alexander Mackenzie poked a pole in the bitumen in 1789 and recorded this: "About twenty-four miles from the Fork [of the Athabasca and Clearwater Rivers] are some bituminous fountains, into which a pole

of twenty feet long may be inserted without the least resistance. The bitumen is in a fluid state, and when mixed with gum or a resinous substance collected from the spruce fir, serves to gum the canoes."3

John Richardson, English physician, naturalist and Arctic explorer, in company with John Franklin of the later ill-fated Franklin expedition in search of the Northwest Passage, followed Mackenzie's footsteps overland three decades later, examined the bitumen "about 19 miles below Fort McMurray," noted outcrops of bitumen along the Slave and Mackenzie rivers, and burning oil shale on the cliffs at Cape Bathurst. "The air was hot from the burning shale and from it alum had been formed," he wrote.

The first detailed examination of the oil sands came from the geologists of the Geological Survey of Canada. When Canada acquired Rupert's Land in 1870, GSC geologists were soon in the field, exploring, mapping, assessing, and describing all the natural resources, from birds to bitumen, in a region the size of Western Europe. One of those geologists, Robert Bell, calculated that the Athabasca bitumen reserves were so large that "an outlet to foreign markets might be found" by building a pipeline to Hudson Bay and further shipment "by steamers."4

The geologists thought that the tar-like bitumen exposed at the surface was the residue left from the evaporation of liquid crude oil. They thought that not all the liquid oil had been evaporated, and that drilling where the overburden was thicker might produce flowing oil. To test the theory, the GSC moved in equipment from Ontario and in four years, 1893-1897, drilled a pair of wells beside the Athabasca River, about 150 miles southwest of where the bitumen was exposed. The first well found some heavy oil, too heavy and viscous to flow or be produced by methods then in use.

At the second well, about 60 miles northeast of the first, at Pelican Rapids, a flow of natural gas erupted with a roar "that could be heard for three miles or more," driller A.W. Fraser later wrote. So great was the flow "that a cannon ball could not have been dropped down the pipe," while "iron pyrites about the size of walnuts came out like bullets from a rifle."5 The gas continued to roar at an estimated rate of 8.5 million cubic feet per day for 21 years, wasting a volume of energy that would have been worth nearly a quarter of a billion dollars at 2004 natural gas prices, before the wild well could be shut in.

Although not recognized as such at the time, these two wildcat wells appear to have discovered what later became Alberta's very large and valuable reserves of heavy, viscous oil — a cousin of the more solid bitumen — as well as an area of major gas resources.

Aside from the Athabasca oil sands, Alberta's most notable pre-Turner Valley oil find was in what is now Waterton Lakes National Park, tucked

in the Rocky Mountains in the southwest corner of the province, where the 20th century brought in a mini-oil boom.

John George (Kootenai) Brown, prospector, buffalo hunter, whisky trader, guide, and packer for the Royal Northwest Mounted Police, claimed in a sworn affidavit that renowned GSC geologist and later director George Dawson had asked him if he had seen any oil seepages in the area. He hadn't, but later an Indian guide led him to an oil spring at Cameron Creek. His friend William Aldrich, in 1899 obtained the first petroleum rights issued by the federal government in Alberta, built a cabin at the site, and, according to Brown "found that by digging away a few feet of earth in certain places that considerable oil would ooze out of the saturated gravel beds, so he made a wooden pump with which he pumped out gallon after gallon and carried it out in tin cans strapped to the back of a cayuse, which he would sell to the farmers for lubricating purposes. He actually made his living for years selling this oil at $1 per gallon."6

Pioneer land surveyor Allan Patrick, who also laid claim to finding the oil seepage, Okotoks rancher John Lineham, and Arthur Sifton, later Alberta premier, formed Rocky Mountain Development Company Limited hoping to find an oil field at the site of the seepage. The first well, pounded by cable tools to a depth of 1,485 feet, found oil and reportedly either flowed or pumped a total of 8,000 gallons.7 A tent and log-cabin community grandly named Oil City sprang up almost immediately, and another dozen wells drilled nearby to depths of 420 to 2,500 feet during a 20-year period failed to find anything more than traces of oil.8

Largely as a result of Kootenai Brown's efforts, a national park was established at Waterton in 1914, later expanded, and any oil development operations subsequently prohibited.

Drilling conditions are difficult at Waterton. The surface rocks are Precambrian, granite that must have seemed almost as hard as steel to early drillers, thrust on top of younger, possibly oil-bearing rocks, when colliding continents pushed up the Rocky Mountains eons ago. The successive rock layers are folded, faulted, twisted, and slanted, causing drill pipe and drilling bits to twist off and break, become stuck and often unrecoverable hundreds of feet downhole. Thus Oil City wells never reached planned depths. Perhaps if more modern and powerful equipment had been available to drill much deeper, they might have discovered beneath the oil seepage at Cameron Creek a big oilfield. Or not.

It's a gasser

While Alberta's early oil hopes were frustrated, large supplies of natural gas were found and put to good use, even if they didn't yield the big bonanzas that speculators hoped for.

Principal pioneer gas developers were Eugene Marius Coste and Archibald Wayne Dingman.

Eugene Coste was the son of Napoleon Alexandre Coste, a Frenchman from a well-to-do Marseilles family who was educated as an engineer but somehow, in his late teens, wound up as a deck hand on a Great Lakes schooner until he jumped ship and swam ashore near Amherstburg, Ontario. There he found shelter with a French-Canadian farm family. Napoleon became a school teacher and a local politician, married the farmer's daughter and in 1863, at the age of 28 and with a family of four children, returned to Marseilles. Napoleon worked as a subcontractor on construction of the Suez Canal, and in 1869 piloted the first ship through the big ditch, while Eugene, his two brothers and one sister, were educated in France.

Eugene in 1876 received a bachelor of science degree from the Academie de Paris, spent another three years at the Ecole Polytechnique, and in 1883 graduated from the Ecole National Superieure des Mines as a mining engineer. Napoleon brought his family back to Canada in 1882, to Amherstburg, where he had first jumped ship. He went back into politics, setting up his son Denis as publisher and editor of an unsuccessful weekly newspaper. Eugene joined the Geological Survey of Canada, but left after five years to explore for oil and gas on his own, convinced that oil originated from "volcanic" or Precambrian rocks.

Eugene clung tenaciously all his life to a still-controversial theory about the volcanic origin of petroleum and natural gas, but that did not stop him from making the discoveries that laid the foundation for Ontario's natural gas industry. In 1888, with backing from his father, he drilled Ontario's first big gas discovery in Essex county on the shores of Lake Erie, completing the well with an open flow potential of 10 million cubic feet of gas daily. The following year, with his brother Denis, he drilled a second wildcat 140 miles away, discovering more gas in the Niagara Falls area. The Essex field was rapidly exploited, supplying gas markets in southern Ontario and exporting to Detroit. Within 12 years its reserves were depleted, but meantime dozens of other small gas fields had been opened up and a host of companies were aggressively competing for gas supplies and franchise markets. The Coste interests organized the Volcanic Oil and Gas Co. in 1906, and in 1911 it was the senior company of several firms that merged to form Union Gas Company of Canada Ltd., the utility that supplied natural gas throughout southwestern Ontario.

Dingman had been in the oil business — as well as the soap, bicycle, and electric street light businesses — for several years before he moved West, first to Edmonton in 1902 and shortly thereafter to Calgary. Born in Greenbush, Prince Edward County, Ontario in 1849, he worked for the Scarborough Electric Railway where he was the first to install electric street lights in Toronto; was a partner in a firm manufacturing coaster brakes for bicycles; later a partner in the firm of Pugsley, Dingman and Co., which manufactured Comfort soap in Toronto. He had "explored for oil and gas" in Pennsylvania from 1879 to 1883, and "we were boring for oil when we first struck gas," he later told a Royal Commission studying Ontario's mineral resources. Painting a glowing picture of petroleum prospects, he told the commissioners that there were "many anticlinal ridges between Ontario and Quebec" with striking similarities to those that had yielded substantial oil and gas pools in Indiana and Ohio. "Where these are found under similar circumstances, there is almost sure to be oil or gas," he confidently predicted. While still in the soap business, he said he was also "engaged in organizing a company to make a series of tests for oil and gas at certain points east of Toronto."9 Nothing was apparently found at those certain points, and after the Comfort Soap plant burned down in 1890, Dingman headed West.

It was the accidental discovery of natural gas by the Canadian Pacific Railway while drilling for water at Langevin (later named Alderson) west of Medicine Hat in 1893 that brought Coste West. Alberta's first gas discovery exploded in a great ball of fire that consumed the drilling rig and wooden derrick. In 1900, this time drilling for coal at Medicine Hat, the railway struck gas again. Civic-minded leaders talked the CPR into lending them the use of a drilling outfit, drilled deeper, found an enormous gas reservoir, organized a municipally owned utility, and supplied Medicine Hat and nearby Redcliff with very low-cost fuel, causing Rudyard Kipling to famously call Medicine Hat "the city with all hell for a basement."

Seeing an opportunity to develop a resource and generate profits, much of it from lands it owned, the CPR hired Coste in 1906 to come West and guide the search for more gas finds. He was amazingly successful, bringing in gas finds at Brooks, Bassano, Dunsmore, and in 1909, Bow Island, southwest of Medicine Hat.

While Coste was busy finding gas for the CPR, Dingman was busy finding gas for Calgary. The city was already supplied with coal-manufactured gas by the, which at its peak had 30 miles of pipeline serving 2,250 customers in the city.10 But natural gas would be much cheaper, and Dingman in 1905 organized the Calgary Natural Gas Company to find some. Two wells were drilled. The first, on the Sarcee

Indian reserve west of Calgary, was completed at 3,400 feet in 1908, the deepest in Western Canada to that date, but failed to find gas. The second well found a small amount of gas on the estate of Col. James Walker within the Calgary city limits in 1909, providing a modest gas supply for nearly 40 years, initially for street lighting and for the nearby Calgary Brewery.

Thus by 1910 Calgary had a supply of manufactured gas that was too costly and a supply of natural gas that was too small; the CPR, far to the south at Bow Island, had a supply of natural gas for which it had no market; and Eugene Coste had a solution. He would buy the natural gas franchise held by Dingman's company (which he did for $200,000 in bonds and $300,000 in common shares of a new company11), then build a 162-mile pipeline to connect Bow Island to the cities of Lethbridge and Calgary.

Coste arranged a lease with the CPR for the Bow Island gas and organized the Prairie Natural Gas Company, with initial financing from such people as Clifford Sifton, former minister of the interior, and William Mackenzie, president of Canadian Northern Railway, then building a second transcontinental railway across the prairies. Coste went to England in search of more money. "However, the English people had never seen the prairie, and had never heard of natural gas, with the result that Mr. Coste came back empty-handed," a company history reports. "He then changed the name of the company to the Canadian Western Natural Gas, Light, Heat and Power Company Limited, and returned overseas, where he had no difficulty in obtaining funds for a company described in terms which those people understood."12

The 16-inch-diameter pipeline was built in 16 days, and "on the night of July 17 [1912] 12,000 Calgarians lined Scotsman's Hill to watch the inaugural flare."13

Landlords

Numerous indications of oil had been found, large supplies of natural gas had been discovered and brought to market, and only one other factor remained to set the stage for Alberta's first commercial oil discovery in the foothills of the Rocky Mountains. The primary ownership of the oil, gas and other minerals under the soil of three prairie provinces, and the manner in which they were made available for exploration and development was a contentious issue for a long time.

When Canada acquired Rupert's Land in 1870, a few landlords, in effect, became the owners of all the vast new North-West Territories. Foremost, of course, was the Dominion of Canada. The Hudson's Bay Company, as part **END PAGE 62 START 63** of the sales agreement,

retained title to some 7.5 million acres, five percent of its former property. The Bay generally retained section eight and three-quarters of section 26 of each unoccupied township south of the North Saskatchewan River between Winnipeg and the Rocky Mountains, and all of each section 26 in each fifth township. A small portion of its retained holdings under this formula were north of the North Saskatchewan River. A township is divided into a grid composed of 36 mile-square sections, and each square mile or section contains 640 acres.

Twenty-five million acres of checkerboard lands in Canada's new domain were allotted to the CPR as part of its subsidy for undertaking to build the transcontinental railway. Other railway land grants would also be made in the West, most notably to prospective petroleum areas, including some 1.3 million acres to the Calgary and Edmonton Railway Co. for construction of a line from Edmonton to Fort MacLeod near the U.S. border.

At first, homesteaders and others who obtained land in this new part of Canada, obtained title to both the land and all the minerals that might lie on or under it. That was suddenly changed 12 years later, on October 31, 1887, after which the government retained "all mines and minerals which [might] be found to exist upon or under lands" throughout most of the West. In essence, it had just kept for itself ownership of most of the oil and gas that might be found west of Ontario to the Rocky Mountains and from the U.S. border to the Arctic Ocean.14

It remained a great point of contention that the Government of Canada continued to own, lease, and generally control the oil and gas resources of Western Canada until 1930 when these mineral rights were assigned to the provinces of Alberta and Saskatchewan.

The CPR and the Hudson's Bay were quick to see the wisdom, and the potential profit of Ottawa's move. They, too, reserved for themselves the minerals under land they sold to settlers, so that they could either explore for and develop oil and gas or let others do it under lease agreements.

Thus John Doe, who homesteaded on a quarter section in early 1887, owned any oil or gas that could be found under his property, while Henry Doe, who homesteaded in 1888, didn't.

Lands under which minerals or petroleum are owned by the owner of the surface land, are generally referred to as freehold properties. They comprise about half the prospective petroleum region of Saskatchewan, but only about one-fifth of Alberta.

For 40 years after it acquired Rupert's Land, Ottawa was prepared to sell parcels of oil and gas rights, under certain conditions, to those prepared to explore for and develop petroleum resources. There were few

takers. By 1910, only 16,028 acres of Ottawa's oil properties had been sold, at the Oil City play in the Waterton Lakes area, in the Bow Island gas field, and where the bitumen deposits had been found at Athabasca.15

Under the new rules that came into effect, Ottawa leased, rather than sold, petroleum rights in blocks up to 1,920 acres, with a rental fee of 25 cents per acre in the first year and 50 cents per acre each year thereafter, with no royalty applied to any oil production until 1930. Leaseholders had to start drilling within 15 months, but exploration expenditures could reduce the annual rent, which was payable in advance.

The cost of holding oil and gas properties under these rules would soon continually press to the edge of bankruptcy the man who made Alberta's first commercial oil discovery at Turner Valley.

Chapter 44
Turner Valley and the $50-Billion Blowout

The trouble with this oil situation at this formulative stage is that you are never sure whether the man you meet on the street is a multi-millionaire, or just an ordinary, common millionaire.— Bob Edwards, Calgary Eye Opener.

Anyone visiting Calgary in mid-May of 1914 would have concluded, according to the Calgary News Telegram, that the city "had a population of 80,000 people, mostly lunatics." This Stampede town "never saw such a Saturday night," observed the Calgary Albertan. "It was the wildest, most delirious, most uproarious, most exciting time that had ever entered into human imagination to conceive."

The cause of all the excitement was oil. For more than a year, an oil fever had gripped Calgarians as they followed the plodding progress of a drilling rig nestled in the foothills of nearby Turner Valley, its timbers shaking and its boiler hissing steam while the steel bit banged and clunked its way through hundreds of feet of rock. In late September and early October the well had encountered at a shallow depth a flow of natural gas that bore with it a spray of light gravity oil, variously described as condensate, naphtha, natural gasoline, or pentanes plus, and hereafter referred to as naphtha.

For months the newspapers had been full of conflicting reports as to whether or not a commercial discovery had been made. Stockbrokers' offices displayed samples of the oil to convince Calgarians that it really

did exist. So volatile was the naphtha, that it was pumped into the tanks of cars that brought visitors to the well site, and the cars actually ran on this fuel. “Experts” had been freely predicting that “Calgary will soon be in the throes of one of the greatest oil excitements ever known.” Hundreds of thousands of acres of oil leases had been filed with the federal government, and the value of these leases was skyrocketing. There were riots in the Dominion Land Office as eager speculators lined up to file on anything available — even the municipal Bowness Park. Dozens of new oil companies had been formed, hopeful to drill on those leases, and shares were sold in the hundreds of thousands to Calgarians thirsting to get in on the ground floor and eager to part with their savings.

“Many Calgarians are suffering from a mild form of insanity,” said the News Telegram in October, while the Albertan concluded simply that “the city is oil mad.”

But the excitement was nothing compared with what happened after word reached Calgary on the night of Thursday, May 14, 1914, that this time the Dingman well had hit it for certain: oil.

“If the city was oil crazy on Friday,” said the Albertan, “on Saturday it was demented.” The Herald noted that the stock promoters had “struck a financial gusher,” which made the discovery well “look like a lawn sprinkler.”

> All day and all night the crowds fought and struggled for precedence in the offices of the most prominent oil companies, and clamored for shares and yet more shares. Relays of policemen barely kept a clear passageway and there was never a moment when the would-be purchasers were not lined up three deep in front of the counters, buying, buying, buying.

Within a few months Calgarians woke up from that monumental speculative spree with such a hangover that more than half a century later the city still remembers the event as the wildest boom that ever hit the West. More than 500 companies had been formed within a few months, holding half a million acres of oil leases and with authorized capital totalling an estimated $400 million. Less than 50 companies actually started drilling, and few of those found any oil. Calgarians, wiped clean of more than a million dollars of savings, were left holding thousands of share certificates worth less than wallpaper. Several homes, and the lobby of one hotel, actually were wallpapered with share certificates.

During the next 10 years the new Turner Valley field produced only 65,945 barrels of oil, an average rate of less than 20 barrels a day, together with some natural gas, most of which was flared. Only six wells had been successfully completed. Seldom had there been so much excitement generated over such little oil.

But still it rates as a milestone. It was the nation's first commercial oil discovery in half a century, and the first ever in Western Canada. Beneath the shallow oil- and gas-bearing sands discovered at Turner Valley in 1914 lay deeper porous rocks containing immense petroleum reserves that would be discovered only in stages during the next 22 years. Calgarians did recover from the hangover of Alberta's first oil boom and came back a little wiser and somewhat more successfully — to share in other Alberta oil booms.

The wildcatter from the Haliburtons

The Turner Valley discovery well was generally called Dingman No. 1 but the man for whom credit is most due was William Stewart Herron. Herron and Dingman were partners of sorts, but the relationship was often strained, as were Herron's relationships with many of Calgary's business leaders. A short, slight man, Herron channelled the energy of a steam engine and the resilience of an incurable optimist into a habitual 16-hour work day. Largely self-taught but widely read, he was intelligent, ambitious, and craved wealth and social acceptance but was not particularly endowed with social graces. He was resentful of injustices, real or imagined, envious and jealous of the esteem in which his contemporaries were held and to which he felt entitled. In short, he was a dour Scot.

He was the third William Stewart Herron in a family of Scottish Canadian lumbermen, and would make his mark as a lumberman, prospector, wagon-road and railway-bed builder, rancher, speculator, self-taught geologist, financier, and wildcatter.

Known by his middle name, he was born in the tiny village of Gallert in the Haliburton Highlands of Upper Canada. One of 13 children, he left home to earn his living from age 14, working as a "cookie" in a lumber camp, and climbing up the ladder to Bull Cook, the boss of the cookhouse. Determined to build on the limited education received at school, he was a voracious reader of every book he could lay his hands on, from poetry to logging and mining.

In the cookhouse he met, fell in love with, and married another cookie, Ella McKinnon. Burning to make or find his fortune, Herron left the cookhouse to strike out on his own, hauling logs by wagon and sleigh, building **END PAGE 67 START 68** wagon roads and railway beds,

prospecting, speculating in staking and selling prospective mineral properties.

In quick succession, Ella gave birth to three daughters (Irene, Laura, and Mabel) but became seriously ill, bedridden, and died in 1900. With railway construction ended and the Haliburtons pretty much logged off, Herron left his daughters in the care of his brothers and sisters and set off to look for fortune elsewhere, studying the booming oil fields of southwestern Ontario and Pennsylvania and finally, southern Alberta, where his arrival has been recorded by biographer Frank Dabbs:

On a warm summer afternoon in 1903, a strongly-built and strikingly handsome widower of 33 years of age, medium height and determined visage, travelled north by horseback on the long trail from Fort Benton [Montana], and topping the ridge above Sheep Creek, caught his first sight of the scattered wooden homes and barns of the unincorporated hamlet of Okotoks.1

After buying his first quarter section of Alberta land, Herron returned to the Haliburtons to marry a young widow, Edith Isobelle Johnson, and to pack up horses and ranching and construction equipment for an extended 3,000-mile winter train journey. They arrived at Okotoks in the spring, 1905, the year that Alberta became a province. Five months later, Edith gave birth to a son, the first birth registered in the new province. Herron turned a profit on his quarter section (the first of numerous real estate rewards) and bought six more quarter sections (960 acres).

Herron was soon back in business, ranching, breaking wild horses for other ranchers (he got to keep one for every three he broke in), road building, hauling coal to Okotoks from a nearby mine, and revamping the ailing logging and lumbering operations of wealthy ranch neighbours William Livingston and Joe Pugh (his bonus was one quarter of whatever increase in production he could achieve).

The legend is that while waiting for his wagon to be loaded with coal from a mine in the foothills west of Okotoks one fine spring day in 1911, Herron decided to wander up Sheep Creek to inspect a gas seepage that he had heard rumours about, and after finding the seepage recognized in the hills above the features of an anticline that might house a treasure of crude oil.

Herron's approach to the gas seepage may well have been far less casual than that: he may have deliberately set out to see about looking for oil, armed with knowledge of the anticline at Sheep Creek, its implications for oil, and with enough capital to get started.

On his visits to the oil fields in Ontario and Pennsylvania, he had "read everything he could about the production of oil and the geology relative to its formation and accumulation," according to historian David Breen.2 That being the case, he most certainly had read the reports and articles by Sterry Hunt of the Geological Survey on the features of anticlines as the habitat for oil. (Hunt was partly right: anticlines are a good habitat for oil, but not the only one, as was first thought.)

He may well have read a description of the Sheep Creek anticline by George Dawson and R.G. McConnell of the GSC, published three decades earlier: "On Sheep Creek the disturbed rocks are about twenty-five miles [wide], and are remarkable for the large proportion of shales which they contain. These shales first appear about ten miles west of the 5th principal meridian, forming a sharp anticlinal, the dip at both edges being 50∫."3

Dawson and McConnell didn't mention the gas seepage in their report; presumably they didn't know about it. But their description of the anticline would have been enough to pique Herron's interest.

Finally, before he reportedly visited the gas seepage for the first time, Herron appears to have acquired enough capital to lock up the rights to any promising oil prospects. This was important to him. He had, rightly or wrongly, felt cheated by fast dealers out of silver claims he had prospected in the Cobalt area of Ontario. He was determined that wouldn't happen again, and that assurance required money. In 1910, he sold his farm at Okotoks, speculated in Calgary's booming real estate market, with a relatively quick flip that reportedly fetched $48,000 for property he purchased for $20,000. He is also said to have profited from ranch property he bought west of Calgary for $15 an acre in 1910, a dry year when poor crops brought low land prices, but sold the following two years when land prices rebounded with the return of better growing seasons.

With his knowledge about anticlines as a habitat for oil, possibly with a knowledge of the Sheep Creek anticline from the Dawson and McConnell report, and some capital, Herron now seemed equipped to start looking for oil.

At the site of the Sheep Creek seepages, Herron is reported to have found a pool of bubbling mud with a slick of oil that burned at the touch of a match. He soon returned for a more thorough examination, loading his wagon with his wife's wash boiler, "a wooden whisky barrel, a spade, a pair of vinegar jars, a cube of paraffin, a length of rubber hose and a Bunsen burner," as well as enough provisions to camp out for a few days near the oil deep. Dabbs describes how Herron examined the seepage:

> He took his spade and began to dig into the muddy pottage, down through the loam and clay. . . . About a yard deep into the clay, his spade clanked against rock. He opened up a small pit around the place where the gas escaped through the friable, shaley rock, brittle and stained by hydrocarbon.
>
> When he deemed the pit to be adequately dug, he took up the whisky barrel; he had cut one end off and bored a hole . . . for the hose in the other. He turned the barrel open side down on the shale on the spot he judged to have the maximum flow of gas. He packed a wet, oily mixture of loam and clay back down into the hole around the barrel. Then he inserted the hose through the hole and sealed it in with paraffin that he'd melted in a pail over his camp fire.

Down at the creek he filled Edith's tub and the vinegar jars with water. He returned to the barrel embedded in the mud, set down the wash tub and plunged the hose into the water.4 Eventually a small but steady stream of gas flowed through the hose and bubbled up the through the water. He connected the hose to the Bunsen burner. "With a faint 'pouf,' a blue flame flared up from the burner tip."

It took several days for Herron to fill the two vinegar jars with the gas, seal them with wax and paper, and ship them off for analysis by the Universities of Pennsylvania and California. "Within a few weeks, the American reports came back: the methane was a high-energy form of petroleum, rich in naphtha and propane."

Herron was not the only one interested in the oil and gas at Turner Valley in 1911, nor was he the first to start drilling on the anticline. About the time that Herron is reported to have started examining the Sheep Creek gas seepage, Calgary Mayor J.W. Mitchell and other city officials pounded in a stake at the site, proclaiming: "Staked for gas and petroleum production by the City of Calgary, June 12, 1911. J.W. Mitchell, Mayor."5 Located 30 miles southwest of Calgary, the civic officials hoped that Turner Valley might duplicate Medicine Hat's experience with the economic stimulation of a large, low-cost supply of natural gas. But staking a claim was not enough, and somehow the city officials failed either to file for any government leases with the Department of the Interior or to negotiate any leases with owners of freehold property. Two months and two days after Mayor Mitchell pounded in his stake, Herron had purchased 720 acres of land and petroleum rights that surrounded the seepage from farmer Michael Stoos for $18,000. Later, he purchased an adjoining 480 acres, from rancher William Livingston and real estate dealer and oil promoter William

McLeod for $15,000; took out eight leases covering 4,320 acres from the Department of the Interior, and purchased more freehold properties. His holdings, spread along six miles of the anticline where he thought oil dwelt, reached nearly 7,000 acres.

Having spent his money to acquire holdings where he was convinced there was oil, Herron now needed money to drill. He sought to interest California oil man Ira Segur, but was unable to make a deal. Segur instead made a deal with John McDougall to form McDougall-Segur Oil Company, which began drilling in 1912 at a site eight miles northwest of the first well that would be drilled on Herron's property. McDougall-Segur No. 1 completed drilling in 1914 at a depth of 3,620 feet without finding any oil or gas, and was abandoned.6 If McDougall-Segur had had enough money and a powerful enough drilling rig to drill about twice as deep, it would have discovered the main, giant oil and gas reservoir at Turner Valley, which remained hidden for another decade.

The money Herron needed to get drilling started on his leases was lined up by Archibald Dingman. On July 1, 1912, Herron granted Dingman an option to acquire 55 percent interest in 3,940 acres of leases for $22,000 and a commitment to spend a minimum $50,000 in development work, i.e., to drill a well. Fifteen days later the option was exercised by a syndicate put together by Dingman. Members of the syndicate, soon organized as Calgary Petroleum Products Ltd., were A.E. Cross, whose Calgary Brewing and Malting plant had already been supplied with gas by Dingman's Calgary Natural Gas Company; R.B. Bennett, lawyer and later Canada's 11th prime minister; lawyer and future senator James Lougheed, grandfather of Alberta's premier during the 1970s, Peter Lougheed; real estate promoters Thomas J.S. Kinner and A. Judson Sayer; surveyor and engineer William Pearce; and businessman Isaac Kerr. Sayer was president of Calgary Petroleum Products while Dingman was named managing director and treasurer.

With the deal signed on July 15 came an added provision that was not contemplated in the option of July 1, a second agreement imposed on a reluctant Herron. This was not an agreement between Herron and the syndicate or company, but between Herron and Dingman. In return "for his services in forming a Syndicate or company," the agreement gave Dingman a 20-percent interest in the 3,940-acre spread of leases, reducing Herron's stake from 45 percent to 25 percent. Herron's stake as a shareholder in Calgary Petroleum Products was also similarly reduced to 25 percent, in favour of Dingman.

Herron was a tough negotiator, too tough, apparently, to strike a deal with Ira Segur, and perhaps too tough for the initial option deal with Dingman to stand unchanged.

Herron's relations with Dingman were now soured, and would become increasingly strained in controversy about some of the leases Calgary Petroleum Products had acquired. Nor did it help that the first well drilled by the company was most commonly known not as Calgary Petroleum Products Well No. 1 but more popularly as Dingman No. 1. The media attention focused on Archibald Dingman while Herron stood unhappily in the shade.

Strained relations or not, work was soon underway. Dingman went to California to buy a cable tool drilling rig; Herron went to the hills to cut and haul timber for building the derrick. Herron picked the site for the wildcat test, supervised the shipment of the drilling rig to Okotoks, and hauled it to the site with his horses and wagons.

On January 25, 1913, Calgary Petroleum Products Well No. 1 started drilling — spudded in, in oil industry terms — and the heavy steel bit started pounding its way slowly through the rock.

From the start the hole generated a frenzy of excitement. At 467 feet it entered a series of thin sands that yielded small volumes of natural gas with vapours of naphtha — enough gas at least to fuel the rig's boiler, and enough naphtha to fuel the speculative spree.

A stampede for oil shares

Almost daily, melodramatic reports in the Calgary newspapers fanned the excitement. The News Telegram reported on July 13: "Oil men are generally agreed that oil will be 'struck' in this well inside of the next 30 days." Multiplying the possible facts several fold, it reported that gas at the well was being wasted at a rate of three million cubic feet per day and added that "the company is after oil and a mere matter of one thousand or two thousand dollars worth of gas a day is not considered of sufficient importance to bother with by the future Calgary oil kings."

By October 9, the Herald reported that "a first class quality of oil has been struck at the well" and although "no gusher has yet been brought in, about one hundred gallons of high-grade oil [naphtha] was brought to the surface in a bailer, and samples are now in the city." The well by that time had reached 1,562 feet. The News Telegram on October 13 declared that reports from the well "seem to be more encouraging every day and all are of the opinion that within a short time it will be shown to the world that there exists in southern Alberta an oilfield second to none in North America."

The boom was on, and "crowds swarmed the streets Saturday, filled the hotel rotundas and the sole topic of conversation was oil, oil, oil." Big plans were afoot, according to an "oil broker from Montana," who told the News Telegram that "there is no doubt but that hundreds of companies will commence drilling operations if the flow in the Dingman well turns

out to be a permanent one." New companies were already formed to peddle stock on the basis of the leases "in the oil fields." By October 16, reported the Herald, "in the neighborhood of two dozen companies have been organized to sell stock . . . but most of them are awaiting news that a 'gusher' has been struck."

And still the well kept teasing. In November, the News Telegram reported that wet gas containing three gallons of naphtha to every 1,000 cubic feet of gas was "blowing off" at the well at a rate of three million cubic feet a day. The Albertan once more assured its readers that "it is only a matter of drilling now before a large quantity of oil is struck at the Discovery well."

Calgarians were in no mood to listen to words of caution. On November 25 the Herald published a letter from Dingman in which he protested "against some of the absolutely irresponsible and ridiculous statements" that were being published. "At the present time and under the present conditions our gas cannot be utilized for the production of gasoline, but later on, under the proper conditions and character of product, we feel confident of being able to extract what gasoline nature has left in the gas." Crude oil had not yet been discovered, but "we are all hoping, and some of us working, to determine if possible the presence of commercial oil in Alberta." On Monday morning the Albertan published this reply: "Dingman's article in the Knocker [Herald] last Saturday makes us think that when he makes his big strike he will be a regular Rockefeller and establish Sunday schools and endow churches."

Some Calgarians, at least, managed to maintain a sense of humour. "The trouble with this oil situation at this formulative stage," wrote Bob Edwards in his Calgary Eye Opener, "is that you are never sure whether the man you meet on the street is a multi-millionaire, or just an ordinary, common millionaire."

And from a reader, the Albertan published this get-rich-quick formula:

> Being readers of your valuable paper and knowing you to be fair in your criticism of new companies being organized in Alberta when the prospectus is sent you, and seeing by the Albertan that there is not going to be oil stock enough to go around to all the investors, perhaps some of those having money to invest in a profitable under-taking would be pleased to know of our company.
>
> We expect to operate a large cat ranch near Sedgewick, Alberta, where the best farming land in the province can be bought, at least the surface rights, which will be all we need, for less than the oil barons would ask for the mineral rights.

> Now to start we will collect, say, 100,000 cats, each cat will average 12 kittens a year which will mean 1,200,000 skins. The skins will sell from 10 to 15 cents for the white ones and 75 cents for the jet black ones, making an average price of 30 cents apiece, thus making our revenue about $10,000.00 a day gross. A man can skin 50 cats a day and he will charge $2.00 for his labour. It will take 100 men to operate the ranch, therefore our profit will be about $9,800 per day.
>
> We will feed the cats on rats and will start a rat ranch adjoining the cat ranch. The rats will multiply four times as fast as the cats so if we start with say 1,000,000 rats we will have four rats a day for each cat, which is plenty. We will feed the cats on the rats and in turn will feed the rats on the stripped carcasses of the cats, thus giving each rat one-fourth of a cat. It will be seen by these figures that the business will be self acting and automatic. The cats will eat the rats and the rats will eat the cats and we will get the skins.

Perhaps no one actually called the stock promoters “rats,” but they certainly managed to skin Calgarians. The method was more foolproof than a cat ranch, and even simpler. The promoter would file on a lease for mineral rights with the Calgary office of the Dominion Land Agent, paying a filing fee of $5 for each lease and a first-year rental of 25 cents per acre. A one-section lease (640 acres) could thus be picked up for $165, a quarter-section lease for $45. The promoter would then organize a company to which he would sell his leases for cash and/or stock at a price which in November 1913, according to the Herald, “usually runs from $10 to more than $25 per acre,” or from 40 to 100 times the initial cost. Shares would then be offered to the public.

The Magnet Oil Company, Ltd., according to its prospectus dated June 17, 1914, issued shares with a par value of $350,000 to one Frank Frankel for 8,840 acres of leases that had cost $2,215 to acquire by filing. “Undoubtedly large bodies of oil will be found on the holdings of this company,” consulting geologist G.F. Hayes advised in the prospectus. “After looking over your holdings I must say that you have a very strong proposition to put before the public.” The prospectus noted that “fortunes made in oil by comparatively poor people in the oil fields of Ohio, Oklahoma, Texas, California, and Calgary have been numerous,” pointing out that “$25.00 invested in the stock of the Home Oil Company returned $105.00.” Rex Oil Company contracted to pay $15,000 in cash and $50,000 in stock for its sole lease holdings of 960 acres acquired for $290, boasting that “there is probably no industry in the world which yields such enormous profits as money invested in oil,” and adding that

"the element of chance is practically eliminated." Chance, in fact, was totally eliminated; since it never drilled, the company had no chance of finding oil.

In a series of articles in November on "The Flotation of Oil Companies," the Herald attempted to dampen the speculative fever in an exposé of the promoters' methods and profits:

> One has only to take a stroll through the business section of the city at the present time to observe the traps being laid for the unwary by the numerous oil concerns that have sprung up like a crop of overnight mushrooms.
>
> One thing that strikes a person in viewing these displays is the inevitable sample of oil from the Dingman well. Some of these samples are of a dark brown color, strangely like linseed oil; others are of a light shade, similar to sewing machine lubricant; others still are difficult to see clearly because of the stains smeared on the outside of the bottles. One can only conclude that 'age cannot wither nor custom stale the infinite variety' of the product of the Dingman well.
>
> A lot of the money that will be lost in oil stocks will go right out of Calgary into the pockets of men who know how to float oil companies and get the public crazy about the 'profits' so vividly portrayed. Those who either through the press or by example or inducement are inciting the public of Calgary to gamble in oil stocks are doing a great and irreparable injury, not only to the individual affected, but to the moral tone of the city and to its public and business interests.

The Herald series, retorted the Albertan, is merely an attempt "to keep out the small investor . . . until the big profits, if there are to be big profits, are all made by the more wealthy people." It described the Herald and its series in such terms as "evil work . . . venomous hatchet . . . this disloyal alien," and concluded that "if companies will be unable to develop these areas, it will be because this unpatriotic newspaper wafted the damp breath throughout the country in its attempt to kill this promising undertaking." Investors appeared to agree with the Albertan that "for a man who can afford to take a chance with the money, it is a good speculation."

The flotation of oil companies, as the Herald described it, was only half of the action in 1913 and 1914; the other half took place in the second-floor quarters of the Dominion Land Office where speculators could file on a lease for a fee of only $5. Until the regulations were

changed on February 28, 1914, the first year's rental of 25-cents-per-acre did not have to be paid until 30 days after the lease was filed. Since quite a few of the filers did not get around to paying the 25 cents per acre rental, there was a continual supply of dropped leases available for re-filing.

Would-be leaseholders camped overnight in front of the building in order to be first in line when the office doors opened at nine in the morning. Men were hired by syndicates to hold down positions in the line, working on a rotation basis. When the front doors opened there was a wild melee as men raced, shoved and fought up the steps and along the corridor to reach the land titles office. Violence frequently broke out, office windows were smashed, and eventually the police were called to maintain order.

The leasing rush was well underway by August 2 when the Herald reported how a pair of ranchers from Cardston beat out representatives of the law firm of Lougheed, Bennett and McLaws for first place in line for filing on a lapsed 640-acre lease three miles from the Dingman well. "It was easy," reported the Herald. "The athletic countrymen, assisted by a husky 300-pound friend who is engaged in the piano moving business, repeatedly handed their opponents off the steps by their linen collars, and when they were out-numbered they occasionally managed to pick up a couple at once and deposit them carelessly over the railing of the land office stairs." The ranchers later reportedly turned down an offer of $15,000 for their leases.

On October 10, the News Telegram reported that "from Thursday afternoon until noon Friday no less than 75 oil leases were filed on, amounting to approximately 48,000 acres. "Leases which had been lapsed for some time were thrown open for filing on that Friday. One of the successful filers was a J.W. Travers, who "had two men stationed on the land office steps for two weeks. The Albertan reported that "800,000 acres of land have already been filed on, and still the craze for filing is in no way abated." In November, the Herald reported on a group of speculators who had "employed something like two dozen men, some of whom are employed regularly at $15 a week," to maintain positions on a rotational basis "on the steps of the land office throughout the 24 hours of the day . . . at night the men are permitted to rig up a cover of canvas over the steps with cushions, blankets and a coal oil stove." By December, however, "cooler weather and the recent regulations as to loitering on the land office steps has effectively put a stop to the all-night vigils in front of the door." Police replaced the shoving system among would-be filers by organizing a lottery. "Numbers are put into a hat and every filer draws one."

The events throughout 1913 and early 1914 were building up to the climax that arrived on the night of Thursday, May 14, when the word reached Calgary that Dingman's well had struck oil.

"On Friday, every available motor vehicle in Calgary was forced into service carrying hundreds of men to the foothills to the Dingman well," the Herald later reported. Enough was seen to enable the pilgrims from Calgary to return home with the most optimistic reports of the discovery and stimulated with determination to make Calgary the greatest industrial city on the map.

> Then came the wild scramble after shares of stock. New companies were organized every day. Every spare bit of space in stores and offices forming the main business streets of Calgary was hired by the selling end of some new oil company. The whole downtown district was really swathed in cotton streams bearing the names and prices of new issues of stock.
>
> The main street where the oil companies had established themselves were the scene of the wildest and most irresponsible kind of delirium. All day long men and women crowded and jostled each other in an attempt to gain entrance to the oil brokers' offices where shares might be purchased. Shares sold all the way from 10 cents to $1.25 each.
>
> In the ticket office of the railway company, an oil company had succeeded in renting a small space for stock-selling purposes. People were lined up for yards outside the door trying to get in to spend their money. One of the railway company's office inspectors from Winnipeg happened to arrive in Calgary just at the height of the excitement. The selling of railway tickets had been side-tracked entirely. Wastepaper baskets stood about the floor conspicuously filled with cheques and paper money. The entire staff was receiving money from the crazy mob which merely demanded shares and receipts for its money.
>
> The inspector soon found himself engaged in the same popular business. Afterwards he told of one old lady who had finally succeeded in getting close to the share counter eagerly demanding "some oil stock." She had one hundred dollars to invest. The inspector said he didn't know anything about the stock being sold and didn't even know the name of it. "Oh, that doesn't matter," she exclaimed, "anything will do so long as I get some stock."

Herron was among the speculators and promoters who made big profits fast that mad May. By the time the Dingman well hit its main oil sand on

May 14, shares of The Herron-Elder Gas and Oil Development Company, Limited, were being hawked at one dollar each. At the same time, Herron seems to have cleared a net profit of more than $23,900 on petroleum rights that likely cost much less than $100. The News Telegram in June reported that Herron had sold 20 acres (which subsequently proved non-productive) “for $24,000 to the Alberta Petroleum Company, which then opened an office on First Street West and started selling shares at 10 cents each.”

The big difference was that most promoters took the money and ran. Herron spent most of his profits in his long and difficult struggles to develop the Turner Valley field.

Calgary’s paper oil companies maintained their brisk sales of shares for a couple of months, but as one by one the promoters folded up their corporate tents and left with bulging pockets, Calgarians soon suspected that they had been had. By September Canada had entered the Great War and the men who had lined up to buy oil stocks were now lining up to enlist. Calgary’s oil stampede was over.

The Herron saga continued

And Herron’s problems were just starting. The biggest problem was the failure over several years to find any significant amount of oil at Turner Valley. By 1920, Calgary Petroleum Products had only two naphtha wells of its own, and a plant that stripped the liquid fuel from all six wells in the field. Field production had peaked at a mere 40 barrels a day. In spite of this, Herron was grimly determined to hang on at all costs to as much of his petroleum properties as he possibly could, convinced they would sooner or later make him wealthy. “I knew — or at least I thought I knew, which amounts to the same thing — that there was oil in the Valley,” he was later quoted as saying.

Within a year of the discovery well, Herron was behind in his lease rent payments, and would be almost continuously for the next 11 years, seeking extension after extension from the Department of the Interior, constantly in danger of losing his properties. He was forced to part with a few of his leases, and two leases were cancelled for non-payment of rent and awarded to William Livingston’s Southern Alberta Oil Company.

Herron sought to retain his leases by inducing others to drill on his properties under subleases as small as 20 acres, earning credits for exploration expenditures that could be applied against the onerous rental fees. Since no other companies could be found to do this, he organized, or helped organize, new companies to do the job: Alberta Pacific Consolidated, Prudential Oil and Gas Development Company, Sheep River Oil Company, Canadian Southern Oil and Refining, and Herron-Elder Gas and Oil Development Company. Each gave Herron a

little cash or some credits for exploration expenditures to apply against the rental fees.

But it was seldom enough. In 1919, imploring H.H. Rowatt, controller of the Department of Interior's Mining Lands and Yukon Branch, for yet another extension, Herron wrote that he had just arranged for the sale of some farm property and was offering his Calgary house for sale at one-third of what he had paid for it in the boom year of 1914.7 In 1925, in another letter to the Department, he wrote that "since I started in the field as the pioneer in July 1911 . . . I put into the field of my own money over $1,000,000."8

Herron's problems in making rental payments were likely not helped by extravagances during flush periods, when he bought the biggest house, the grandest car, the finest clothes, and hosted the most lavish entertainment he possibly could, all to impress the Calgary establishment he so wanted to become an accepted member of. But when times were tough, he and Edith resorted to running a boarding house to bring in a little money.

It was not that he was poor. He owned Herron Cartage with some 250 heavy horses and a fleet of wagons; valuable farm and ranch lands; substantial oilfield machinery, and all those petroleum leases. He had substantial assets but little money and he was so determined not to lose any of those assets that he became known to Calgary businessmen as "never-sell Herron."

Disaster and salvation

What seemed like a disaster in 1920 turned out in the end to be the salvation of Herron and the shareholders of Calgary Petroleum Products. The company was drilling what it hoped would be its third producing well, when its processing plant was destroyed by fire. Lacking funds to rebuild the $50,000 plant, company directors made a deal with Imperial Oil. Royalite was the trade name for kerosene sold by Imperial, and Royalite Oil Company was the name given to a new outfit that acquired Calgary Petroleum Products. Three-quarters of Royalite's shares were owned by Imperial Oil, while the former owners of Calgary Petroleum Products received the other quarter.

Royalite built a new and improved scrubbing plant, and by 1924 Turner Valley was supplying gas to Calgary, supplementing the declining production from Bow Valley. The three Calgary Petroleum Products wells were renamed Royalite numbers 1, 2, and 3, and drilling, conducted by Imperial, started on Royalite No. 4. Half a mile south of this, McLeod Oil Company was drilling its first well on a 20-acre sublease from Herron, adjacent to other Herron leases. Each well would come in with a roar in

1924, flowing gas and oil at rates far greater than anything yet seen in Alberta, marking the second dramatic event in the prolonged development of the Turner Valley field.

The first to hit the deeper limestone reservoir that would make Turner Valley the biggest oilfield in what was then the British Empire, was RoyaliteNo. 4, on November 24, at a depth of 3,740 feet. When the drill bit punched into the Mississippian limestone, it released the rotten-egg stink of sour gas — gas laced with deadly hydrogen sulphide, and naphtha — gas under such great pressure that it pushed a mile of steel pipe some 130 feet into the air, to the top of the drilling derrick; gas that exploded into a great ball of fire that demolished the rig.

What happened was described two years later by Imperial Oil geologist Neil McQueen:

> We struck a flow of 20,000,000 [cubic] feet [per day] of wet gas under a tremendous pressure. It blew the string of cable tools up the hole, stuck them there, and shut off the gas. The hole was filled with water and the job of fishing out the lost string [of drill pipe and drilling bit] was commenced. As soon as the drillers were able to get a grip of the lost string, the gas was released, with the result that we had two string of tools in the hole instead of one, and those two string are still in there. It was then decided to try and close this well, and conserve the gas for the ready market we had in Calgary. 3,450 feet of 6-1/4-inch [steel] casing was anchored to 3,050 feet of 8-1/4-inch casing. A high-pressure valve was put on the 6-1/4-inch casing and the gate was closed. The pressure gauge showed a rise of 200 pounds [per square inch] per minute for three minutes and 100 pounds per minute for the next six minutes.
>
> At this point, when the gauge showed 1,200 pounds pressure, everyone became a bit uneasy and they left the derrick. They stayed away about 20 minutes and were just starting back to see what the gauge read, when the 6- and 8-inch casing, tied together, started to climb the derrick. These two strings of pipe rose to the top of the derrick and when they reached that point the pressure was released and the casing settled back in the hole.

Extinguishing the fire that had ignited like an explosion was a long and arduous job. When the fires had been extinguished, leaking gas sealed off with cement and 15-1/2-inch-diamater steel pipe telescoped down to six-inch, and production valves installed, Royalite No. 4 produced naphtha stripped from the gas which flowed at a rate of 20 million cubic feet per day for many years. “A part of this gas has been

supplied to the Calgary market," McQueen reported, "and the rest has been burned due mainly to the fact that we are afraid to hold a back pressure of more than 500 pounds on the well."9

The excess gas was piped to a nearby coulee, where it burned in a flare pit so violently that the ground shook while the coulee was dubbed "hell's half acre." By the time Royalite No. 4 was exhausted and abandoned, it had produced 911,313 barrels of naphtha.

Two months after Royalite, the McLeod No. 1 well punched into the same reservoir, yielding naphtha at an initial rate of 141 barrels a day,10 virtually confirming the presence of great petroleum wealth under the leases that Herron had so tenaciously hung on to for 13 years.

While the Royalite No. 4 and McLeod No. 1 wells strongly indicated the presence of petroleum wealth under his remaining leases, Herron's struggles were still not quite over. He was, yet again, behind in his lease rental payments, and the often-bitten Calgary oil investors were becoming more cautious about investing in new promotions. It was more than a year after the Royalite discovery before he was able to launch his latest, and only really successful oil venture, Okalta Oils Ltd., on March 8, 1926. With backing by Calgary businessmen, Okalta acquired Herron's remaining 10 leases covering 3,940 acres for $40,000 dollars and a block of stock that made him the major shareholder. The company was endowed with working funds of $135,000. Herron was at first vice-president, later president, but from the start it was really his company.

Okalta No. 1 spudded on November 11, eight months after the company's incorporation, and for two years the cable tool drilling bit pounded its slow way through the twisted rocks of the foothills, before completing on November 9, 1928 with an initial daily production capacity of 20 million cubic feet of gas and 364 barrels of oil.11 One-hundred-dollar par value Okalta preference shares that couldn't be sold for a knock-down price of $60 on November 1, closed trading at the end of the month at $367.50.12 Herron was wealthy at last, if only for a time. Okalta drilled 22 wells at Turner Valley by 1945, successfully completing 17 oil and gas producers. By 1930, Herron calculated his net worth at more than $5 million ($60 million in 2004 dollars), a true fortune in the years of the Great Depression. But Herron's and Okalta's fortunes would both continue on a rollercoaster ride.

Royalite No. 4 launched the second oil boom in Turner Valley, and in the next 12 years 114 wells were completed to extract the naphtha from the rich and prolific gas of the Mississippian. By 1932 naphtha production at Turner Valley had reached nearly 4,000 barrels per day while the residue natural gas that was left over was flared at rates of up to 600 million cubic feet per day. Orange flames licked the skies from the

giant flares. If Calgarians boasted that on a summer's evening they could sit on their front porches and read the newspapers by the light of the Turner Valley flares, they usually failed to also mention that when the wind was right they could get a whiff of the rotten stink of hydrogen sulphide. In Turner Valley, it was worse. More than a tiny trace of hydrogen sulphide is quickly fatal. At the expanded Royalite plant, the H2S was mixed with air and blown up two tall stacks to further mix with the prevailing westerly winds. Even so, it blackened paint on valley homes and risked the health of people and cattle. Not until 1952 was a plant built to remove the H2S in the form of sulphur — used mostly in making fertilizer — and by then most of the Turner Valley gas had been burned.

The third discovery and the $50-billion blowout

There was a severe penalty to pay for this second, 12-year boom at Turner Valley, a penalty that cost billions of dollars. What the drillers at Turner Valley didn't know was that in a lower part of the field from which they were producing and burning an enormous quantity of gas after stripping out the naphtha, lay an even more enormous quantity of oil. The gas that was flared so depleted the pressure in the limestone reservoir that hundreds of millions of barrels of oil from this oil layer could not be produced.

Half fill a jar with equal amounts of dark oil and water and cap it. Tilt it at a 45-degree angle. There you have a very rough representation of the main oil and gas reservoir at Turner Valley. The air at the top of the jar is the reservoir's gas cap, with the wet gas from which naphtha had been stripped for so long. Next is the layer of oil that lay unsuspected beneath the gas cap. Below that is the water table. Imagine how the gas cap is under tremendous pressure from the burden of a mile of rock — pressure that is needed to help lift the oil to the surface through pipes of steel. No pressure, and the oil can't be lifted. But flaring the gas has reduced much of the pressure.

As it was finally delineated by drilling a few hundred wells, an outline of the Turner Valley field on a map is seen as a long, narrow ribbon, with the gas cap lying along the northeast flank of the underground structure, and the oil column downdip along the southwest flank.

The unsuspected oil column was ultimately discovered by the optimism and persistence of three men: Robert A. Brown, an electrical engineer who had built hydro-electric plants in Western Canada and at the time was manager of Calgary's electric light department and electric street car system; George Melrose Bell, publisher of the Calgary Albertan newspaper; and J.W. Moyer, a Calgary lawyer.

Bell and Brown had correctly suspected that an oil column lay downdip from the gas reservoir. The theory ran contrary to accepted geological thinking of the day, which held that only a large water table lay below the gas cap on the flank of the structure. Brown and Bell envisioned the reservoir as containing gas at the crest, followed by the oil column, and then the water table, and figured that if a wall were located correctly on the structure between the gas and the water, that it would find oil. To test this theory would require the drilling of the deepest, most expensive well ever undertaken in Canada to that time.

On January 20, 1934, Bell and Brown obtained a sublease on 60 acres on the southwest flank of the field from R.W. Brown of Gleichen. Three days later they had formed Turner Valley Royalties with Bell and Brown each holding 9,500 shares and Moyer holding 998 shares.

It was the worst of all possible times to try to finance a wildcat. It was in the depth of the Depression and money was difficult to find; investors who had not lost all their money had lost all their confidence in Turner Valley promoters who had pulled too many fast deals too many times; and in any event, no one believed in their crazy geological theory.

But they were determined promoters, and if investors had lost all confidence in common stock, they had devised another way of raising money: by selling royalty interests in the proposed well. A trust deed was set up under which 70 percent of any production was to be paid to the royalty owners, and an offering was made at a rate of $1,500 for each one-percent royalty interest. It was slow selling, but enough money was raised to start drilling by April 16, 1934.

Seven times drilling was stopped when the company ran out of money. Seven times Bell and Brown went out and sold more royalties. Late in 1935, when it looked as though the well would never be finished, British American Oil advanced a loan of $30,000, Imperial Oil came through with $22,500 worth of drilling equipment in return for a 7.5-percent royalty, and Spooner Oils and Calmont Oils each contributed $7,500 for five-percent royalty interests. In the meantime, Brown had mortgaged everything he owned — his house, his insurance, his car — to help raise money for the well. Bell, too, was deeply in debt, partly to finance this and earlier unsuccessful wildcat ventures, and also because he was losing money on his newspapers. He was more than $500,000 in debt. It took $100,000 and two years to complete the well.

Bell, who had been the first president of Turner Valley Royalties, never lived to see the well completed. He died in March 1936 — three months before it struck oil.

It was on June 16, 1936 at a depth of 8,282 feet that Turner Valley Royalties No. 1 blew in with a roar which was heard throughout the valley, and soon echoed around the world.

"The strike was made late Tuesday afternoon when accumulated gas pressure forced thousands of feet of heavy rotary drilling fluid up the hole and scattered crude oil over a wide area in the vicinity of the derrick," reported the Calgary Herald the following day. "It is the first time in Canada's history that anything approaching a crude oil gusher has been struck. Turner Valley Royalties is believed by oil men to prove the existence of a huge crude oil reservoir."

Hundreds of wells were drilled to extend the oil producing area following this discovery, and Turner Valley became the largest oil field in what was then still called the British Empire, the only significant oil field in Canada for the next 11 years. During the Second World War, development was accelerated as a wartime measure when the federal government established Wartime Oils Ltd. Its job was to finance the drilling of more Turner Valley oil wells by the small, independent oil companies, under the direction of George Hume of the Geological Survey of Canada. Okalta was by far the largest beneficiary of this program, drilling 10 wells, nine of which were producers. By February 1942, production from 232 wells at Turner Valley peaked at 28,410 barrels per day.

After several years of legal and constitutional wrangling that delayed matters, and when it was more apparent just what the gas flaring was doing to the recovery of crude oil, the Alberta government in 1938 created the Petroleum and Natural Gas Conservation Board to establish and enforce conservation measures. The board was empowered to set maximum allowable production rates for every oil and gas well in Alberta, rates calculated to achieve the greatest possible recovery of oil and gas. Such waste and loss as that at Turner Valley would never again be permitted.

Seeking someone with the best possible qualifications to head the new board, Alberta Mines Minister Nathan Tanner contacted the U.S. Bureau of Mines. The Bureau's recommendation was Bill Knode, a Texan cigar chomper who would later, as a petroleum consultant in Calgary during the Second World War, insist on a contract clause that a client keep him supplied with a special brand of Cuban cigars. "I had just an eight-cubic-foot freezer," Margaret Knode later recalled. "It was clear full of boxes of cigars, never had a bit of food in it."13 Knode had been chief petroleum engineer with the Texas Railroad Commission which, despite its name, at the time had little to do with regulating railways and everything to do with regulating the state's oil and gas production. Starting in the late

1920s, Knode had worked with an association of Texas oil producers who sought to voluntarily implement conservation measures that would maximize recovery of the state's oil reserves. When that failed, the Railroad Commission in 1931 was handed the job of enforcing conservation measures, and Knode was appointed chief petroleum engineer. By 1938 he had left the Railroad Commission, established a consulting business, and — business being slow in the Depression years — was willing to take on the job in Alberta. Knode was with the Alberta board for only a few years before once more setting up a consulting practice. But he stayed in Calgary and became a Canadian citizen, one of the first of many U.S. oil men who came north and became Canadians.

With Knode as chairman, the two other first members of the board were Charles Dingman, Archibald Dingman's nephew and previous director of the petroleum and natural gas division of Alberta's Department of Lands and Mines, and F.G. Cottle, previously auditor of the Board of Public Utilities Commissioners. Alberta's new board would become a model for other jurisdictions in the development and administration of conservation measures aimed at achieving the maximum economic recovery and use of petroleum resources.

In an initial assessment, Knode calculated that Turner Valley producers were wasting an estimated $15 worth of oil for each dollar's worth produced. In 1939, he wrote,

> For each barrel of naphtha produced, 1,733 cubic feet of reservoir space is depleted, while for each barrel of crude oil produced only 36.5 cubic feet of reservoir space is depleted. If this is a measure of reservoir energy — and we believe it is — then for each barrel of naphtha reduced to possession on the surface, there have been 46 barrels of oil in the reservoir deprived of the energy. Even if only half of this oil is ultimately lost it will mean that for each $2.09 of value recovered from the naphtha production, there is being lost in the reservoir $28.98.14

Knode estimated that lack of conservation measures had wasted nearly one trillion cubic feet of natural gas, nine million barrels of naphtha, and 60 million barrels of oil. By the time the field was fully developed, it was found that the loss was actually much greater than that.

In spite of these losses, the Turner Valley field would outlive those most responsible for the discovery and development of its petroleum treasure: Herron, Dingman, Bell, Brown, even Okalta Oils.

Dingman died in March 1936, three months before Brown, Bell, and Moyer uncorked Turner Valley's main assets, the big oil column.

Herron, standing on the derrick floor of an Okalta rig drilling at Turner Valley in 1939, collapsed with a stroke and died a few weeks later, aged 69. The rollercoaster was at the bottom of one of its dips. The Great Depression had wiped out many fortunes, including, apparently, much of the $5 million Herron had boasted of in 1930. Funds for drilling were hard to find. Just weeks before his stroke, Okalta had completed only its third naphtha producer at Turner Valley (its biggest yet), and even at this well drilling had been suspended for seven months,15 presumably for lack of funds. He died, according to his son, “damn broke.”

Herron didn’t live quite long enough to see Okalta’s fortunes once more climbing the rollercoaster, buoyed by that third naphtha producer and even more by the later drilling financed by Wartime Oils. Following his death, his second son — the fourth successive William Stewart Herron — became president of the company. He had grown up in the oil business, working as roughneck, driller, and finally as Okalta’s field superintendent. Okalta expanded aggressively in the wake of the 1947 Leduc discovery. By 1952, Okalta shares were selling as high as $5 and the company had assets of more than $5 million, before the roller coaster again began to fall. There was a bitter fight for control of Okalta, and in 1954, a bitter Bill Herron was out as president, and out of the oil business. The company piled on debts so rapidly that by 1961, the directors filed a petition for bankruptcy. Control passed into other hands, and Okalta finally disappeared in 1970, submerged into Oakwood Petroleum. As an oil company, it never was particularly big or outstandingly successful, but Okalta and its founder were pioneer wildcatters.

Ninety years after the first discovery by Herron and Dingman, a few Turner Valley wells are still producing oil, the familiar rocking horses rhythmically nodding up and down as they pump oil from as much as a mile or more below the surface.

Petroleum engineers calculate that Turner Valley originally held some three trillion cubic feet of natural gas and about 1.1 billion barrels of oil. More than half the gas, an estimated 1.8 trillion cubic feet, was wasted with the giant flares that lit the foothills’ skyline. Under sound production practices, 700 million or 800 million barrels of oil might have been produced. After 90 years, less than 150 million had, much of it assisted by waterflooding, a secondary recovery method in which massive volumes of water are pumped down into the reservoir to restore some of the lost pressure. By injecting high-pressure nitrogen into the reservoir, a group of companies headed by Talisman Energy hoped to coax out another 30 million to 100 million barrels of oil, exending the life of the

field by as much as 100 years.16 But that would still leave it half a billion barrels short of what could otherwise have been produced. Including the unrecoverable oil and the flared gas, Turner Valley, at 2004 prices, was a $50-billion blowout.

Chapter 5. A Waste of Energy

Royalite's 1924 discovery of the big Mississippian gas cap at Turner Valley kicked off the era of enormous gas flaring and a recognition by federal and provincial authorities that something must be done.

When an estimated five million barrels of spilled oil floated in a six-inch layer down Black Creek in Enniskillen County, Upper Canada in the early 1860s and spread a film across Lake St. Clair, the University of Michigan's Alexander Winchell called it "a national fortune, totally wasted."1

Possibly the five million barrels was an over-estimate, but even if it was accurate, it was a tiny fraction of the billions of barrels of oil that would be lost and wasted by North America's oil industry over most of the next century.

Bitter lessons learned from decades of epic loss and ferocious struggle to establish resource-saving conservation practices in American oil fields would later be applied in Canada, first at Turner Valley. Even at Turner Valley, however, conservation was delayed for two decades by controversy and opposition, and came too late. But by the time the Leduc discovery heralded the Western Canada Sedimentary Basin as one of North America's great petroleum regions, Alberta had established perhaps the world's soundest petroleum administration and conservation regime. Except for Turner Valley and the early oil fields of Ontario, Canada has avoided the massive waste that so severely impaired oil fields throughout a vast portion of the continent, yielding maximum reward for Canadians, and especially Albertans, who are the real owners of the resources that are leased for development.

Waste came in many ways, and spillages such as that at Black Creek — while significant and dramatic — were but a small part. The drilling of tens of thousands of unnecessary oil wells wasted resources, money, and labour. But the biggest waste of all was the damage to underground oil reservoirs caused by producing oil too fast, or by reckless depletion of gas reserves to strip out condensate, as at Turner Valley.

Oil can't flow from the underground reservoirs in which it is trapped, nor can it be pumped to the surface, if there is no pressure in the reservoir. That pressure might come from a gas cap exerting downward pressure on the column of oil, or from an underlying water column

exerting upward pressure. Flowing or pumping oil too rapidly has needless adverse effects on the pressure needed to lift the oil and limits the amount that can be recovered by more gradual production.

Ignorance was part of the problem. It took decades before geologists and engineers came to understand how these petroleum reservoirs were being damaged and how sound engineering could maximize the amount of oil and gas that could be recovered.

An even greater problem was the devastating "law of capture," the judicial concept that compelled those with oil properties to drill and drain as fast as possible lest their properties be drained and robbed by nearby wells.

There were other problems, too, during the decades of waste. Parochial attitudes about natural gas also shaped public policies for decades. Gas burned day and night in the street lights of Medicine Hat, but Medicine Hatters didn't want to share any of that gas with Calgarians; Albertans later resisted sharing gas with other Canadians, and Canada was awfully cautious about sharing gas with Americans, while all the time gas was being flared and wasted. Sometimes driven by the urge to get rich quick, sometimes by a desperate need for funds, wildcatters were often happy to take a dollar today at the expense of $10 tomorrow. The desperate need for jobs during the hungry years of the Great Depression added to the pressures to keep drilling and draining, even when that meant wasteful production.

All these were among the factors that for a quarter of a century hobbled the efforts of administrators eager to apply sound conservation practices at Turner Valley and sapped the will of politicians to arm administrators with the needed policies, laws, and regulations.

It is true that it was not known until 1936 that the flares that turned night into day were slashing the amount of crude oil that could be recovered from an unsuspected part of the reservoir that lay down the flank of the structure. But the waste of gas itself was dramatically evident to everyone who lived in Turner Valley, Calgary, or the nearby countryside.

The waste at Turner Valley was, however, far from unprecedented. From the very inception of North American oil production, the struggle for conservation was pitted against a formative industry that was still wild, chaotic, extravagant, wasteful, and destructive.

The wild booms and busts

The chaos of rapid-fire, boom-bust cycles that marked oil's history for most of a century burst forth from the start, in Ontario and even more dramatically in neighbouring Pennsylvania. Wild stampedes of drillers and speculators. Flush production. Enormous waste. Quickly depleted

oil fields. Wildly gyrating prices. Instant fortunes and faster bankruptcies.

Oil sold for $50 a barrel when Williams brought in North America's first oil well in 1858. The first wells pumped enough oil to drive that down to $10 a barrel three years later. Then, a week after the start of the American Civil War, the first flowing oil well in Pennsylvania burst in at a rate of 3,000 barrels a day, exploded in a ball of fire that burned for three days and killed 19 people. In six months, the price of oil fell to 50 cents a barrel, in 12 months, to 10 cents, bouncing back to $4 in 1862 and as high as $7.25 in 1863. In Ohio, the price for sulphur-laden "skunk" oil fell to 15 cents a barrel in 1887.2

Pithole Creek, some 16 miles from Titusville, epitomized the chaos. In January 1865, oil was struck. Nine months later, Pithole Creek was producing 6,000 barrels a day and the brand new town of Pithole boasted 15,000 people. Twelve months later, the field was virtually exhausted, and thousands fled for more oily pastures. From Oil Springs to Pithole, oil fields resembled gigantic casinos. One well brought $15,000 in profit for every dollar invested. A lot in Pithole that sold for $2 million in 1865, 13 years later was auctioned for $4.37.3

No lessons seemed to be learned from Pithole 36 years later when the spectacular Spindletop discovery blew in at Beaumont, spewing oil at the fantastic rate of 75,000 barrels a day, to put Texas on the oil map. The stampede was even wilder than at Pithole. Beaumont's population exploded from 10,000 to 50,000, a town crammed with shacks, tents, bars, brothels, lawlessness and rampant murders. Land prices jumped from $10 to as much as $900,000 per acre. A reported 214 oil wells had been drilled within a matter of months on lots barely large enough to house a derrick. It was January 1901 when the discovery well blew in. Production from the new oilfield hit 17.4 million barrels the following year, less than half that the next year, and it was all downhill from there on.4 Even more rapid was the drop in oil prices, to as low as three cents a barrel, while the price for a cup of water was five cents.5 One of the few to see the folly of excess production was Anthony Lucas, the engineer-geologist most responsible for the discovery. "The cow was milked too hard," he said. "Moreover, she was not milked intelligently."6

Oklahoma, which yielded its first large oil field, the Glenn Pool, in 1905, was the first state to attempt to curb waste by controlling oil production. The state's 1915 Conservation Statute called on producers to cut back when production exceeded the demands of buyers or the capacity of pipelines to handle the oil. The call went largely unheeded.

Matters were much worse with the 1928 discovery of the Oklahoma City oil field. "Derricks, slush pits and steel and ground tanks invaded

industrial and residential areas," one account reports. "Rigs reared their crown blocks in school yards, slush pits were dug on playgrounds and storage tanks were built in alleys."7

The Oklahoma Corporate Commission sought to implement the first state-wide market prorationing scheme. Its orders were widely ignored. Production in 1929 and 1930 exceeded the limits the commission had set by some 14 million barrels.

In two crucial test cases, the state's authority to control oil production and override the law of capture was upheld by the state's Supreme Court and by a federal court. But Governor Bill Murray — "Alfalfa Bill" — still had to call in the troops in 1931 and 1932 to enforce the commission's orders. In 1933, the commission's power was further strengthened by a new statute that called for maximum production allowables for every oil well in the state, and penalties for production in excess of those allowables. It was the first enforced oilfield market prorationing with individual well quotas, and as such helped set the pattern that would govern the development of Western Canada's oil fields.

Dad Joiner's 1930 East Texas discovery brought disagreement, indecision, confusion, and riot. Within a year, there were 3,612 wells in the East Texas field, flowing wide open. Uncertainty reigned. Did the Texas Railroad Commission have lawful authority to control production? If it did, would that be good or bad? Would controls to avoid "economic waste" simply be a fig leaf for price maintenance? Were claims of "physical waste" resulting from damage to producing reservoirs fact or underground fiction? State authorities and legislators dithered. The oil flood grew.

As in Oklahoma, the troops were finally called in. Governor Ross Sterling, a founder and former chairman of Humble Oil before it was acquired by Exxon (then Standard Oil of New Jersey), sent in thousands of National Guardsmen and Texas Rangers on horseback through rain-soaked muddy fields to shut down production in East Texas in August 1931. The following year, the Texas Railroad Commission issued 19 separate prorationing orders for East Texas, each struck down by the judiciary. In November, Sterling called a special session of the legislature to pass the Market Demand Act, under which the commission was to hold public monthly hearings to determine "the reasonable market demand," which in turn would set monthly production quotas. The model that Alberta would eventually follow was being further developed.

But as in Oklahoma, the production quotas were largely ignored. After passage of the Market Demand Act, the Railroad Commission set 1933 quotas for oil production from the East Texas field at less than 137

million barrels. Actual production exceeded 172 million barrels. The extra 35 million barrels was soon known as “hot oil.”

The man who eventually led the campaign for enforced oilfield conservation practices was a self-educated grade school dropout. Despite his limited formal education, Henry Doherty had earned 140 patents for inventions and processes used in the gas, cement, chemical, coke, oil, and home heating industries, and had founded a string of gas and electric utilities. He got into the oil business when one of his wells, drilling for gas, discovered oil. That led to the establishment of Cities Service Oil Company. His insistence that flush production robbed underground reservoirs of the pressures needed to drive oil and gas to the surface were vigorously rebuffed by most of the industry.

But Doherty’s views were supported by the U.S. Bureau of Mines. In a 1919 report it claimed that, largely because of flush production, 80 percent of oil found in the United States could not be produced.

Prodded by Doherty, President Calvin Coolidge in 1924 established the Federal Oil Conservation Board, charged with assessing the size of U.S. oil reserves, the technical state of production, and the damage wrought by flush production.

The Board’s research added further credence to the claims of both Doherty and the Bureau of Mines. It was clear, however, that better production practices to end the waste would require government intervention. A few oil producers agreed; most did not, even most of the big ones. A year after the Oil Conservation Board was set up, the American Petroleum Institute presented the response of the major producers. “Waste in the production, transportation, refining and distribution of petroleum and its products is negligible,” the API declared. The independent producers were even more staunchly opposed, and promptly formed the Independent Petroleum Association of America. The only government intervention the IPAA sought was a tariff to keep out oil imported from Venezuela.8

The Depression years did nothing to curb the output of hot oil, the damage to the buried reservoirs, and the distress prices for oil. From a 1929 average of $1.43 per barrel, the price of Oklahoma oil fell to 66 cents in 1931.9

The man who rescued American producers from drowning in a flood of hot oil, who enforced market prorationing and conservation measures that eliminated much of the waste and helped restore distressed oil prices, was no friend of big business nor the oil industry. Harold L. Ickes was a crusading liberal lawyer from an impoverished Chicago family ruled by a moralistic mother so strict that even whistling on Sundays was prohibited. His heroes included two other crusaders who had

disrupted Rockefeller's empire, Ida Tarbell, the muck-raking journalist whose exposÈ brought Standard Trust's monopolistic practices to widespread light, and President Teddy Roosevelt, the "trust buster."

Ickes was both secretary of the interior and oil administrator in the first administration of Franklin Roosevelt. He was bemused at the sight of once-powerful business people humbled by the Depression and crying for help. "So many of these high and mighty," he observed, "were crawling to Washington on their hands and knees these days to beg the Government to run their businesses for them."10 He was also acutely aware of the fate of his predecessor in the Interior Department. Albert B. Fell had just recently been sent to jail for helping some oil people, in return for favours, in the celebrated Teapot Dome scandal.

So it was undoubtedly more for the sake of the economy and the Depression's unemployed that Ickes acted so quickly and decisively when Texas called for help. The Roosevelt administration had barely been in office two months when Ickes received a telegram on May 5, 1933 advising him that the price of East Texas oil had collapsed to four cents a barrel, and a second telegram the same day from the governor of Texas warning that "the situation is beyond the control of state authorities."11 Ickes responded by declaring that "the oil business has about broken down and . . . to continue to do nothing will result in the utter collapse of the industry."

The following month, on June 16, Congress passed the National Industrial Recovery Act, President Roosevelt's initiative to rescue American industry and the U.S. economy. On July 14, under the authority of the NIRA, Ickes signed an executive order intended, he wrote, to "stop the carrying into interstate or foreign commerce any petroleum, or products thereof, produced in violation of the law of the state of their origin."12

When a court case invalidated the procedures used to stop the movement of hot oil, Congress, on February 25, passed the Connolly Act, widely known as the "hot oil act." With this federal backing, the Texas Railroad Commission was at last able to effectively enforce market prorationing. Production of East Texas hot oil fell from an estimated 1933 peak of more than 35 million barrels to less than three million barrels in 1936 and none by 1939.13

The law of capture

The strongest force driving the industry's early wasteful practices was undoubtedly the so-called "law of capture." If you owned an oil well, under this principle you owned all the oil it could produce, regardless of how much of it had been drained from under the property of your

neighbour. Small wonder that wildcatters rushed to drill and drain as fast as possible, heedless of costly consequences.

Opposing the law of capture was the concept of "correlative rights," the concept that if you owned, or leased property with mineral rights, you should have the right to produce whatever oil or gas might lie under the surface of that property, and not have it drained by someone else.

But the law was reluctant to recognize correlative rights; the courts generally upheld the law of capture, and new laws that would override this to establish correlative rights and regulate oil production practices in the cause of conservation, waste avoidance, and environmental protection, were slow to come.

Robert E. Hardwicke, a Fort Worth, Texas lawyer who helped draft Texas' conservation laws, succinctly defined the law of capture in 1935. "The owner of a tract of land acquires title to the oil and gas which he produces from wells thereon, though it may be proved that part of such oil and gas migrated from adjoining lands,"14 Hardwicke wrote. More than a decade later, Hardwicke would come to Edmonton to help write new Alberta laws to overwrite the rule of capture.

As late as 1953, however, jurists continued to uphold the law of capture, in a ruling by what was then Canada's highest court of appeal, the Judicial Committee of the Privy Council in London. In the court's decision in Borys vs. Canadian Pacific Railway and Imperial Oil, Lord Porter found that there was no remedy in general law to protect owners of oil and gas rights against loss from drainage by nearby wells. "The only safeguard," Porter wrote, "is to be first to get to work, in which case those who make the recovery become owners of the material which they withdraw from any well which is situated on their property or from which they have authority to draw."15

Conservation comes to the Valley — too late

No troops were called in, but other than that the fight to bring conservation measures to Canada's first major oil and gas field faced just as much bitter opposition as in Texas and Oklahoma, and was just as prolonged.

For 25 years after the first shallow discovery well, natural gas was burned and wasted at Turner Valley after it had been stripped of naphtha, the volatile liquid that was close enough to gasoline to fuel trucks and tractors. For the first dozen years, the volume of wasted energy was relatively small and not considered serious, or even recognized as a problem. But after the volume of flared gas exploded to the equivalent of burning 25,000 tons of coal per day, after it had been labelled "by far the greatest waste of natural gas taking place on the

continent,"16 after federal and provincial authorities decided that something had to be done, bitter producer opposition, weak political will, and legal obstacles meant that there were still another 13 years of extravagant waste before it was stopped by the enforcement of sound conservation measures. By then, it was too late: the damage had been done.

But the bitter lessons of Turner Valley were learned, so that by the time the Leduc discovery gave birth to Canada's first major-scale oil production, Alberta was equipped with perhaps the world's best oil field regulation and conservation regime.

One of the earliest steps toward conservation was the 1916 appointment of Charles Ross to the position of senior mining inspector in the Calgary office of the federal government's Mining, Lands and Yukon Branch. Despite his title, Ross' main job was to inspect all the wells that had been drilled in Alberta to ensure that they had been properly completed or abandoned so as to provide adequate protection against the escape of natural gas or intrusion of surface water that could damage underground oil and gas reservoirs. Ross would be intimately involved in oil field conservation efforts for the next two decades, finally as Alberta minister of lands and mines, where he was fired for being too aggressive in his efforts to stop the waste at Turner Valley.

Ottawa strengthened its conservation power with a 1919 amendment of its Petroleum and Natural Gas Regulations, giving the minister of the interior power to "take such effective means as may appear to him to be necessary or expedient in the public interest" in the regulation of oil and gas wells. That would seem to have given Ottawa ample power to effect any scheme of oil field conservation. Unfortunately, this power was later found to exclude earlier federal leases, as well as freehold property such as that held by the CPR and early settlers, giving rise to a constitutional problem.

The staff and the work of inspectors in Ottawa's oil and gas office in Calgary increased in step with the slowly increasing pace of drilling in Alberta. Dr. Stan Slipper, later one of Alberta's most prominent petroleum consultants, was the first petroleum engineer hired by the department in 1919. Charles Dingman was added to the staff of inspectors the following year. He brought seven years of oil field experience to his new job, having started in 1913 on the rig that drilled the 1914 discovery well of his uncle and Bill Herron, and having later managed the Medicine Hat gas wells of Canada Cement Company. No one was more actively nor crucially involved throughout the next two decades in establishing conservation measures than Charles Dingman.

It was, of course, Royalite's 1924 discovery of the big Mississippian gas cap at Turner Valley that kicked off the era of enormous gas flaring and a recognition by federal and provincial authorities that something must be done. Herbert Greenfield, the homesteader turned politician, was premier following the 1921 election of the United Farmers of Alberta. Charles Stewart, the Liberal premier who had been defeated by the UFA, was now in Ottawa, minister of the interior, the man responsible for the management of the federal oil and gas resources. Eleven months after the Royalite discovery, Stewart wrote to Greenfield explaining that Ottawa could not halt the flaring from wells drilled on leases it had issued prior to 1919 nor, presumably, from wells drilled on freehold leases.17 Since there was no interprovincial nor international movement of oil or gas, the operations at Turner Valley were a provincial activity, and the power to regulate production from all the wells was thus seen to reside with Alberta.

Stewart urged Greenfield to enact conservation legislation. Greenfield obliged, with the passage of the 1926 Oil and Gas Wells Act. Alberta's first petroleum conservation legislation, intended to apply to leases not subject to federal control, provided the authority to restrict production, enforce market prorationing, and take over the operation of dangerous wells. Stewart had indicated that Ottawa would follow Alberta's lead in applying similar measures to leases under its control. But for the next five years, that meant doing nothing. No regulations were ever issued, let alone enforced, under the province's first petroleum conservation law.

Full responsibility for regulating oil and gas activity was passed to Alberta on October 1, 1930, when ownership of the mineral resources was officially transferred from the federal government. For the next five years, until it was swept from office, the UFA government under John Brownlee and then Richard Reid in the final year, wrestled with the highly inflamed conservation problems, and accomplished nothing.

The day after the transfer of resources Reid, like Greenfield a homesteader turned politician, was appointed Alberta's first minister of lands and mines, responsible for oil and gas. Reid, first elected when the UFA came to power in 1921, held a number of portfolios, and in 1934 became premier for one year when Brownlee was forced to resign over a sex scandal. After the Second World War, Reid's last job was as librarian for Canadian Utilities in Edmonton.

With the transfer of mineral resources came a transfer of personnel. Virtually all the professional staff from the Calgary office of the federal Petroleum and Natural Gas Section of the Department of the Interior moved to the new Petroleum and Natural Gas Division of the Department of Lands and Mines. There had been a change at the top, too. In a

backstairs revolt, Greenfield in 1925 had been ousted as premier, succeeded by John Brownlee, on whose lap the gas problem now rested.

Brownlee was dogged in seeking voluntary conservation that would avoid the need for compulsive legislation, but his efforts wasted years while the gas continued to burn. In February 1931 he told the legislature that, hopefully, there would be no need for legislation if producers would agree at a meeting to which he was inviting them to take voluntary measures.18

The producers were far from ready to reach any such agreement during a one-day meeting the following month in Edmonton with Brownlee and William Calder, recently appointed head of the government's new Petroleum and Natural Gas Section. The more intransigent producers suggested that any cutback would be confiscation of private property. "You will kill production" from Turner Valley if the gas flow is arbitrarily cut back without first pressure-testing wells by "a disinterested and highly-qualified technical man" to determine the maximum rates at which each well could be produced without adversely affecting the ultimate recovery of gas and naphtha from the reservoir, H. Van Mills of Hudson's Bay Oil and Gas and Continental Oil, warned.19

Brownlee then asked if any producers objected to having their wells pressure-tested, adding: "I might mention that we have met definite refusal on behalf of some companies for any such tests." If there were producers who still harboured such objections, they apparently failed to raise their voices at the meeting.

Bill Herron saw a simple solution, suggesting that "certain interests were ready to undertake the piping of 400 million cubic feet of gas to Montana daily, which would solve the whole gas situation in the Turner Valley."20 But export sales would leave Calgary just as vulnerable as flaring to fears of an impending gas supply shortage, a concern that Herron was not about to acknowledge as having any validity.

With no agreement on voluntary measures, immediate interim mandatory measures, followed a few months later by individual well quotas, were said by the Edmonton Journal to be in the offing.21 Two alternative interim measures were being considered: either production would be cut back to 40 percent of open flow capacities, or production would be shut down entirely in different sections of the field at alternate times.

Three weeks after the first failed meeting with the producers, the legislature armed the government with the power to enforce legislation under a revised Oil and Gas Wells Act, which provided for compulsory pressure testing and posting a $10,000 bond before drilling could start on any new wells, to ensure compliance with regulations. There was also

a provision intended to please the government's supporters: it gave the government the power to set the price paid by farmers for naphtha purchased at the well head as it was stripped from the gas, for use as truck or tractor fuel.

In May, the first regulation issued under the new Oil and Gas Wells Act did, indeed, as forecast earlier, order the production of both oil and gas from every well in the province to be cut back to 40 percent of open flow capacity. A few Turner Valley producers refused to comply. Others followed suit, fearing that otherwise reserves would be drained from under their leases. There was no abatement in the rate of gas wastage. The order was never enforced.

Two months later, on July 28, Brownlee announced that Turner Valley gas production was to be cut back by 80 percent, from 500 million to 100 million cubic feet per day. The announcement came as a response to concern raised by Calgary Mayor Andrew Davidson about a threatened shortage in the city's gas supply.

Many of the producers were outraged. Bill Herron called this confiscation of private property and warned that Alberta farmers "might some day find themselves in the same circumstances as the Kulack in Russia who had to give up their land and all stock and farm implements to the Bolsheviks." If a farmer's government could "expropriate the property of those who invested in the oil industry," then farmers, Herron continued, would have "no cause for complaint if the communists demand that they give up the farms for the benefit of those who have none."22

But nothing had changed by 1932 when, in January, Brownlee warned in the legislature that "if gas wastage in Turner Valley is not checked the City of Calgary will have a shortage of supply in three years."23 Despite this urgent note, the problem was assigned to the legislature's agricultural committee — in effect, the entire legislature sitting as a committee — where, at public hearings, it could be talked about some more.

At the opening of three days of hearings by the committee, Brownlee reiterated the belief that "a voluntary agreement is the best method of meeting the situation," and promised that the government "will not force conservation without some compensation to shareholders in companies otherwise sacrificing loss from such a policy." Despite this, "strong opposition" to conservation was reported. "A small group of independents had conducted elaborate radio and press propaganda and has not hesitated to suggest the government's whole policy was dictated by Imperial Oil and other large interests," the Edmonton Journal reported.24

Bill Herron described as “ridiculous” claims that Turner Valley would be exhausted in two or three years at the present rate of gas production. Driller Clarence Snyder said the reports of declining field pressure were greatly exaggerated. The Calgary Stock Exchange wanted any action delayed until economic conditions improved.

There was only one way out, Robert Wallace, a geologist and president of the University of Alberta, warned on the third and last day of the committee’s hearings. “I see no solution to the Turner Valley problem,” Wallace said, “other than the pooling of the whole field and the distribution of profits.”

The unitization scheme Wallace proposed was an ideal way to develop and produce an oil or gas field in which numerous producers have varying interests. It required a calculation of the estimated total reserves of a field and the portion held by each producer, with proportional sharing of costs and revenue. Development and production of the entire field was to be managed by one company on behalf of all the producers. Unitization removed the compulsion to drill and drain as fast as possible, facilitated conservation, and kept costs to a minimum by drilling only the number of wells needed to effectively drain a reservoir. In Turner Valley that theoretically could have saved the cost of drilling possibly as many as a hundred wells. The problem was always getting everyone to agree on who owns what portions of the reserves, especially in a field such as Turner Valley where drilling had not yet defined the limits of the field, nor even found the large oil section.

Nevertheless, Brownlee promised the legislature that “if an immediate conference presided over by Dr. R. Wallace . . . fails to reach a voluntary agreement on a plan of conservation for Turner Valley, then the provincial government will deal with the question by passing legislation at the present session of the house.”25

The conference in Calgary with the Turner Valley producers lasted three days. In addition to Dr. Wallace, the government also sent James J. Frawley, counsel for the legislature’s committee on agriculture, and Frank Fisher, the government’s technical advisor and one of the world’s most recognized authorities on oil and gas conservation. Fisher, now a consulting petroleum engineer, had earlier been the general manager of the mid-continent gas system of Henry Doherty’s Cities Service Company. And Doherty, as we have seen, was the pre-eminent U.S. conservation champion. Predictably, Wallace, Frawley, and Fisher failed at the meeting to win any agreement among the fractious producers.

In one final effort to seek some sort of voluntary agreement, and perhaps hoping to smooth ruffled feathers, Brownlee called on a number of the producers to meet with him yet again in Edmonton two weeks after

the failed Calgary conference. Described as “super-heated in spots,” the Edmonton session turned out even more fractious. Not only did it break up in the evening without any agreement, but when it was over “a fist fight occurred in one of the corridors of the Legislative Building, a prominent Calgary oil man being involved. Several blows were struck . . . but bystanders soon stopped the battle.”26

There was nothing left now but to press on, reluctantly, with mandatory controls, authorized by yet more legislation, the Turner Valley Gas Conservation Act, which established a three-man Turner Valley Gas Conservation Board, and called for a reduction in gas production to 200 million cubic feet per day. That was double the permitted volume that Brownlee had demanded more than a year earlier, but if this was intended to mollify producers, it was far from successful.

Members of Alberta’s first petroleum conservation board were Arthur Carpenter, chairman, and also chairman of the Alberta Board of Public Utilities Commissioners; Robert Wallace; and John McLeish, director of Ottawa’s Mines Branch. A staff, headed by Charles Dingman, began pressure-testing all the wells at Turner Valley.

Nine months after its formation, on May 5, 1933, the Turner Valley Gas Conservation Board issued its “General Order No. 1,” setting individual production allowables for each well, and immediately ran into a hornet’s nest of problems. Four of the independent producers refused to comply. Imperial Oil announced that it, too, would produce some of its wells at full capacity since adjacent wells of Model Oils were flowing flat out and draining reserves from under Imperial’s property. Spooner Oils, facing financial ruin if it complied and cut its production of naphtha from 90 to 4.7 barrels per day, challenged the board’s authority in an appeal to the courts.

It took just five months for Spooner’s appeal to reach the Supreme Court of Canada, which ruled that the board’s orders could not be applied to Spooner or anyone else who held a lease issued by the federal government prior to 1919. The terms by which the mineral resources had been transferred in 1930 stipulated that Alberta could not alter by legislation or otherwise oil and gas leases that had been issued by the federal government, and those that Ottawa had issued before 1919 did not contain authority to restrict production. Since it was impossible to impose restriction on just part of the field, the board’s conservation measures were torpedoed. Fourteen months after it had been formed, the Turner Valley Gas Conservation Board was disbanded.

Nothing further was accomplished in the remainder of the UFA’s term in office, which abruptly ended when William (Bible Bill) Aberhart’s

Social Credit Party swept into office, winning 56 of 63 seats in the 1935 election that marked the start of a 36-year Social Credit reign in Alberta.

For his first minister of lands and mines, Aberhart chose Charles Ross, the engineer who had joined the Calgary office of Ottawa's Mining Lands and Yukon Branch in 1916 and who had soon become head of the Petroleum and Natural Gas Division. Like all the other oil and gas administrators, Ross was an ardent advocate of conservation. Three months after his appointment, he announced a new schedule of production quotas at Turner Valley, to take effect in 30 days. But Aberhart, like Brownlee before him, caved in to producer pressures, the quotas that were to have come into effect within 30 days were trashed, and gas flaring continued virtually wide open.

In a large meeting with Turner Valley producers at Black Diamond, near the centre of the field, Ross reminded the oil men just how costly the flaring was. Since 1912, he claimed, "$104 million worth of gas was wasted to produce $23 million worth of oil," and well pressures were declining rapidly, threatening a short life for the field.27 This was just three days after the Turner Valley Royalties No. 1 discovery well had uncorked the big oil section that lay down-dip from the gas cap. Ross acknowledged that the oil discovery was encouraging but in no way diminished the need to stop the gas wastage. In reality, gas conservation would soon be seen as more imperative than ever.

In December 1936, Aberhart learned that Ross planned to shut down production from some of the most damaging gas wells in the field. He demanded, and received, Ross' resignation. The waste of gas was one thing; the imposition of mandatory controls was apparently a different matter.

The man who succeeded Ross as Alberta minister of lands and mines was Nathan Eldon Tanner, who held the post for 18 years, through the Second World War and the crucial post-Leduc years. A former Mormon bishop, long, lean and lanky with rugged features, a deep tan, a Boy Scout pin in the lapel of his jacket, the taciturn Tanner could have doubled for Gary Cooper in any western movie. After working through grade 11 in high school, Tanner took a year's training at a teacher's college in Calgary, obtained a teaching job in a small community near Cardston and, soon a family man, supplemented his income by purchasing a small general store, at which he clerked after school hours and on weekends. He also became postmaster and Scoutmaster at the tiny village of Hillspring. Later, as high school principal at Cardston in the midst of the Depression, Tanner supplemented his slim teacher's salary by selling suits and insurance. By the mid-'30s he was simultaneously high school principal, a bishop of the Mormon church, a

member of the town council, and a Scoutmaster. Born in Salt Lake City, Utah, Tanner was cast in the mold of those devout Mormons to whom hard work and self-reliance is both a way of life and a part of religion. Tanner's family moved when he was three months old to a farm near Cardston in southern Alberta, and a combination of school work and farm chores did, indeed, provide Tanner with a capacity for work. After winning election in the 1935 Social Credit sweep, Tanner served as Speaker of the House until his appointment as land and mines minister in January 1937.

Tanner, as much as Aberhart and Brownlee, was determined that the Turner Valley problem had to be resolved with the voluntary co-operation of the producers. Business-friendly and conservative by nature, he had assured Calgary oil men shortly after his appointment that his department did not "favour numerous investigations into the oil industry" and its policy "would be to protect investors as far as possible."28 Obviously he was aware of what had happened to Ross who had tried to too hard to push mandatory controls, and he was also aware of the constitutional problem that such controls could face as a result of the Supreme Court ruling in the Spooner case.

At a Calgary meeting with oil producers in September, Tanner hopefully announced a voluntary plan to reduce Turner Valley production to 65 percent of the capacity of each well. But there were few volunteers, and that plan suffered the same fate as every other conservation measure that had been proposed.

Aberhart then, disingenuously ignoring any effective action during the two years his government had been in power, sought to lay the entire blame on Ottawa, a ploy that nearly always plays well in Alberta. In a prepared statement, the premier declared: "Gas wastage in the Turner Valley field has seriously depleted the gas reserves in Alberta, and this can be attributed solely to the restrictions imposed upon the province at the time of the transfer of natural resources to provincial control, which has prevented the Alberta Government inaugurating any scheme of conservation."29

The problem with the Natural Resources Transfer Agreement signed in late 1929 by Alberta and the federal government and effected the following year was, in fact, a matter of concern for yet more pending legislation, the Oil and Gas Conservation Act which would create the Petroleum and Natural Gas Conservation Board. The constitutional problem would stand in the way of the new board until parliamentary approval could be obtained to amend the 1929 agreement. Edmonton and Ottawa had reached an agreement on March 5 for the necessary amendment, but Ottawa was slow in obtaining Parliament's approval.

With its legislation passed and the transfer agreement at last amended, Alberta's second conservation board was officially launched on July 1, 1937, under the chairmanship of Bill Knode. Charles Dingman, the long-serving senior oil and gas official was deputy chairman, having been passed over a second time for the top job. The third board member was John Harvie, deputy minister of lands and mines.

After more pressure-testing, of wells, development of a market prorationing scheme, and public hearings the board ordered a reduction of about two-thirds in the daily volume of flared gas, to a volume that the market could absorb, to take effect October 15, 1938, when the big gas flares were to be all snuffed out. Production of crude oil, at the same time, was set at 28,000 barrels a day, although the limited demand of the Imperial Oil and British American refineries in Calgary later slashed this to less than 12,000 barrels a day.

Yet once more there were problems when three of the Turner Valley producers applied to the Alberta Supreme Court to quash the board's order, and still yet again, more legislation was required. This time it was called the Oil and Gas Resources Conservation Act, and it denied the right of court appeal against any "action, decision and order of the Board." Another provision of this latest legislation, inserted at Tanner's insistence to win more willing co-operation of producers, provided compensation for those adversely affected by the board's orders.

With this latest legislation, the board was unhindered in its business, and mandatory conservation had come at last to Turner Valley, after 25 years of gas wastage and 13 years of politically weak-willed effort to curb it.

The final note in this long epic is the departure of Bill Knode from the board in which he had played such a key role, his fate apparently sealed by his very success in aggressively promoting mandatory conservation. Fourteen months after the board had been established, Tanner failed to renew Knode's contract as chairman, although he was retained for another year as technical advisor.

Even in this capacity, Knode's reliance on strict mandatory conservation continued to earn him the opposition of at least some producers. He was attacked by James Mahaffey, counsel for Gas and Oil Products Limited, operator of a Turner Valley gas processing plant, during hearings before Alberta Supreme Court Justice A.A. McGillivray on oil field and petroleum product prices. As technical advisor, Knode was said to still be the moving spirit behind the board's policies, and Mahaffey accused him of having "no consideration for the individuals, companies and equities in the field."30

Mahaffey was fighting a rearguard action, still trying to open up the valves for greater production of gas and naphtha, based on a faulty analysis of the Turner Valley reservoir, which may have reflected more wishful thinking than science. Mahaffey's argument was that there was little communication between the reservoir's gas cap and the oil column because of some intermittent layers of impermeable rock. This interpretation held that the gas cap could therefore be produced at a faster rate without adversely affecting the recovery of crude oil, an interpretation that Knode correctly rejected. But Mahaffey argued: "Should our business be junked and should the production of a valuable product, namely natural gasoline [i.e., naphtha], be eliminated because the technical advisor to the Board holds an opposite view to that which I have now given expression. After all, it is only one man's opinion."31

Tanner sought the voluntary co-operation of producers in the enforcement of conservation measures and Knode was apparently seen as standing in the way of that co-operation.

It took Tanner a full year to find a replacement for Knode as board chairman, during which the faithful Charles Dingman served as acting chairman. Tanner was looking for someone who could perhaps command voluntary producer compliance with oil field conservation orders. In August 1940 he found his man in another U.S. petroleum consultant, Robert E. Allen of San Gabriel, California, described as "a reputable engineer." More importantly, in Allen, Tanner had found someone who was said to have had "senior level administrative experience gained in the service of the producer-operated conservation authority in California."32

With the appointment of Allen, Knode's services as a consultant to the board were terminated and Charles Dingman, once more passed over for the top job, resigned in frustration.

Hoarding and wasting gas

A striking feature of the way in which natural gas policy was handled is that it seemed politically preferable to allow it to be burned and wasted rather than sold for use by consumers in other regions or districts.

In the summer of 1921, Calgary was faced with an anticipated gas supply shortage for the coming winter months. Production from the Bow Island field, the city's main supply source, had started to decline. There was no pipeline to move the gas that was being flared at Turner Valley, and in any event this volume would not amount to much until after the 1924 discovery of the Mississippian gas cap. The city and Canadian Western Natural Gas were also locked in a price dispute. Medicine Hat seemed to have abundant supplies. The Alberta Board of Public Utilities Commissioners ordered Great West Natural Gas Corporation to supply at

least one billion cubic feet of gas per year from its leases in this large gas field.

Medicine Hat rose up in arms at the thought of sharing some of the gas that was burning day and night to light the city's streets, a feature that Medicine Hatters boasted about but conservationists bemoaned as a profligate waste. The Medicine Hat United Farmers of Alberta protested to Premier Brownlee. Investment broker Wood Gundy and Company warned that "if an Alberta city the size of Medicine Hat is ruined as a result of the proposed scheme, the effect . . . will be disastrous."

This particular crisis in Calgary's gas supply was magically resolved after Canadian Western obtained a price increase and a small pipeline was built to move a modest amount of gas from Turner Valley.

Four years later there was a much greater brouhaha about not wanting to share gas while at the same time it was being wasted on a vastly bigger scale. This lead to three years of angst before the Government of Canada issued the first permit for the export of natural gas from Western Canada, foreshadowing intense national debates in the 1950s and '60s.

The issue involved a gas well, Range No. 1, drilled in 1922-1924 a short distance north of the Montana border by Calgary investors headed by Calgary Herald publisher J.H. Woods and lawyer Eric Harvie. Their company was Canadian Oil & Refining, and its gas well was too remote from any Alberta municipality to be connected to the province's incipient gas grid. Moreover, it was on a structure that straddled the border, and if the well remained shut in, Canadian gas could be drained by nearby wells in Montana.

"There is very strong feeling, particularly in Southern Alberta, that the export of this gas should not be permitted under any circumstance," Premier Greenfield wrote to federal Interior Minister Charles Stewart.33 That view, Stewart responded, "entirely co-incides with my own."34

Stewart found out how to stop the export, by means of the Electricity and Fluids Export Act (1907). Under that act, Stewart was advised by his department, "'fluid' is defined as including petroleum and natural gas . . . [and] no one shall export such electricity or fluid without first obtaining a licence to do so." This was the act that Ottawa would use to control gas export for almost another four decades.

Woods continued to press for the export licence, writing to Stewart the following year, 1926: "This well was drilled by us for oil at a cost of more than $150,000, and we struck a heavy gas flow. There is no possible market for our gas in Alberta, our well being only five or six miles from the border and too far away from Provincial consuming points."35

Only after assurance from the department's Calgary office that "there is little doubt that carefully located wells south of the boundary would drain gas from beneath Canadian territory," was the first licence for the export of Alberta gas issued in June 1928. During a 10-year period to 1940, before it "became exhausted," Canadian Oil & Refining's Range No. 1 well exported an estimated total of 1.3 billion cubic feet of natural gas.36 That was considerably less than one percent of the amount of gas flared and wasted at Turner Valley.

Opposition to gas export, however, was not confined to a single remote well adjacent to the U.S. border. Calgary was opposed to the export of any of the gas that was going up in flames in the late 1920s and '30s. Its arguments were much the same that Medicine Hat had earlier advanced in opposing any of its gas being delivered to Calgary. In 1929, Calgary Mayor Andrew Davidson wrote to Charles Stewart:

During the year 1928 our favoured position in . . . regard [to gas supplies] brought to the city the Manitoba Rolling Mills, the Dominion Bridge Company Ltd., and the Dominion Wheel and Foundries Ltd., all of whom are erecting plants this year and will be large consumers of gas. Remove the attraction only temporarily and our future must be affected adversely. Our citizens would be very loath if any industry in the United States were led to rely upon a fuel supply which is our main industrial attraction and may at any moment be necessary for Southern Alberta consumers."37

The same argument would be advanced in the late 1950s and '60s when much larger proposed export volumes were at issue.

Chapter 6. Norman Wells and the Canol Project

Canol may indeed have been "the sorriest chapter of the American war effort on the home front," as The Nation magazine later claimed. If it really was, and it didn't seem so in 1942 — that was the fault of the generals who ordered it. No one could question the accomplishment of the men who carried out the order. Folly or not, it was possibly the greatest engineering and construction achievement of the entire war.

Imperial Oil was the reluctant, cautious, wait-and-see wildcatter of Western Canada. It was firstly a refiner and marketer of petroleum products, only secondarily an oil producer, and had never been in the business of searching for new oil fields. The Standard Oil approach had long been to let lone wildcatters or small outfits gamble on the wild

search for new oil fields, then later buy control of any that might be found.

It was not until it was prodded by the sharp jab of a competitive threat that Imperial became a wildcatter. But when it moved upstream, it acted with speed and aggression. It was largely Imperial that during barren years kept alive the search, spending 40 percent of all the money devoted to finding oil in Canada during a 30-year period. And until the 31st year, all it had to show for its effort was one sub-Arctic oil field, too remote to be economically significant or profitable.

Imperial's Norman Wells oil field straddles the Mackenzie River, 1,000 miles north of Edmonton, 75 miles south of the Arctic Circle. It was one of the world's most northerly oil fields when it was discovered in 1920. An estimated 235 million barrels of recoverable oil were trapped here at a shallow depth in a large Devonian reef.1 But 65 years after its discovery, barely five percent of the field's store of crude oil had been produced, before it could be connected to the network of pipelines that span North America.

Norman Wells was the key factor in the wartime Canol project, designed to provide Alaska with military fuel requirements in the face of possible Japanese invasion or submarine attacks which threatened tanker supply movements along the west coast. The project involved construction of a string of 10 northern airfields, 2,000 miles of wilderness roads, 1,600 miles of pipelines, and a refinery scraped together from second-hand pieces collected from throughout North America.

Canol has been called "the greatest construction job since the Panama Canal" and "the most colossal blunder" of the Second World War. It cost $134 million in 1940s dollars, took 20 months to build, and 11 months later it was shut down and abandoned. Of that $134 million, only $1 million was ever recovered.

Oil fields of immense value

The Norman Wells story could be said to have started as early as 1889, with a report from Richard McConnell, a pioneer geologist with the Geological Survey of Canada who spent 30 years examining the oil and mineral prospects of Alberta and the Northwest Territories. McConnell envisioned "a possible oil country" spanning the length of the Mackenzie River Valley, in which "large areas afford promising indications of the presence of oil in workable quantities." McConnell allowed as how the remoteness of the area "will probably delay its development for some years to come, but this is only a question of time. The oil fields of Pennsylvania and at Baku already show signs of exhaustion."2

Jim Cornwall, whose Northern Trading and Transport Company operated steamboats on Great Slave Lake and down the Mackenzie, was the first to try to do something about exploring McConnell's possible oil country. He had noticed small globs of oil floating down the river and in 1911 hired an Indian, Karkesee, to search for oil seepages. Karkesee found several seepages in gravel beds on the river shore near Fort Norman. Cornwall sent a sample of the oil to a contact at the Royal Bank in Edmonton, who forwarded it to the Barber Asphalt Company in Pittsburgh for analysis. The report came back that the sample was similar to Pennsylvania oil.3

Cornwall, Calgary Herald publisher J.H. Woods, and Calgary real estate broker Fred Lowes organized a syndicate to further investigate oil prospects in the Mackenzie Valley. They contacted T.O. Bosworth, an English consulting geologist who was in Calgary enroute to London after having completed an assignment in South America for Shell. Bosworth agreed to return the following year.

Bosworth, three assistant geologists, surveyors, and helpers in 1914 spent four months examining oil prospects from the Athabasca country to the Arctic for the Cornwall syndicate, travelling along the north shore of Great Slave Lake and down the Mackenzie aboard Cornwall's steamboats SS Northland Trader and SS Eva. They observed oil-stained rocks along the river banks, explored and examined promising areas, and staked claims in seven localities where they thought oil might be found.

"A very great opportunity has been opened before you by this expedition and there is a distinct possibility that oil fields of immense value are awaiting development in the North," Bosworth reported to the syndicate that fall. If oil is found, exploiting it, he predicted, "will be an undertaking of the first magnitude and will necessitate the construction of railroads and pipelines and refineries and vessels on a considerable scale." He urged the formation of a substantial group of the "most influential men" who could control the discovery and development of the northern petroleum resources. Otherwise, he warned, the wildcatting will be done by numerous small outfits, and after "they have borne the cost of proving the fact, one of the great oil groups of Europe or of America will step in and secure the result."4

The First World War, however, had been underway for a few months by the time Bosworth submitted his report; Colonel Cornwall was on his way overseas with the Canadian Army, and there is no record of the syndicate proceeding any further with plans to look for northern oil fields of immense value.

Imperial Oil, that same year, had looked at and rejected the idea of wildcatting in the West. Within days of the first tiny Turner Valley

discovery that drove speculators wild in May, the dynamic Walter Teagle, then in England, had written to Imperial's vice-president C.O. Stillman: "If there is any likelihood of paying production being developed in Canada, we should, if possible, try and arrange to be in on the ground floor with leases of our own, so that from the very outset we might occupy as important a position as producers of oil in Canada as we now occupy as refiners and distributors."5

Since Imperial owned more than 90 percent of Canada's crude oil refining capacity and sold three-quarters of all the petroleum products used by Canadians, "as important a position as producers" would certainly be dominant.

Imperial sent geologists to Alberta to look at the prospects. Summarizing their findings, John Worthington, Standard's chief geologist, concluded that "no profitable oil 'pool' much less 'field' would be found" at Turner Valley or elsewhere along the Alberta foothills; that Oil City, where a reputed discovery had earlier generated excitement, "as an oil producing area is hopeless;" that the southern plains where gas had been found at Bow Island and Medicine Hat offered "very little hope nor chance of finding oil in commercial quantities."6

On that discouraging note, Imperial turned its back on Western Canada and looked to South America as a better bet for oil production. Before the year was out, Imperial formed International Petroleum Corporation to acquire several English companies with crude oil production and marketing operations in Peru. Hired as the new subsidiary's chief geologist the next year was Dr. Bosworth, who returned to South America where he had previously worked for Shell. He would return to Canada within little more than a year.

The Yellow Peril

In 1916, Imperial and Standard appear to have caught wind of arch-rival Shell's interest in an extensive exploration program in northwestern Canada. Standard and the Royal Dutch/Shell Group were bitter rivals for world oil domination. The thought that "the Yellow Peril," as Shell was termed by Standard, might scoop up the oil prospects in Imperial's backyard, could hardly be tolerated.

Imperial geared up to launch a two-prong attack to halt the Yellow Peril. A lobbying and public relations campaign was aimed at discrediting Shell. A swift and aggressive exploration effort was planned to beat the Dutch and Englishmen to the punch. Alexander M. McQueen, a veteran of the oil fields of southern Ontario, was hired to head the search in Western Canada. Dr. Bosworth was brought back from Peru. The first step in an exploration program, assembling a land spread — leases,

reservations, or options on oil and gas rights — was underway before year-end.

A potential hurdle in Imperial's path was a restriction in Ottawa's Petroleum and Natural Gas Regulations which, for six years from 1914 to 1920, restricted ownership of federal oil and gas leases to companies controlled by British or Canadian citizens. Shell Transport and Trading Company, the British arm of the Dutch-British organization, faced no such restriction.

Imperial skirted the lease restrictions in two ways. The first was by forming a new subsidiary, the Northwest Company Limited. Outside of Turner Valley, it would be Imperial's Western Canada wildcatting vehicle for the next 25 years. Initially, Northwest was owned only 28 percent by Imperial, but by 1920 when the restrictions on foreign ownership of federal oil and gas leases were removed, it was entirely owned by Imperial, except for a few qualifying directors' shares. Among Northwest's first acquisitions were the claims in the Mackenzie Valley staked by Bosworth for the Cornwall syndicate.

Imperial's second way around Ottawa's lease restrictions was to focus on freehold properties. In a 2,000-square-mile area south of Athabasca and straddling the Alberta-Saskatchewan border, Imperial set out to acquire exploration rights from the major freehold owners of mineral rights, the Canadian Pacific Railway, Hudson's Bay Company, the Calgary and Edmonton Corporation, and others.

Following discussions started the previous year, Teagle wrote to CPR vice-president E.W. Beatty on April 6, 1917, outlining what the oil company had in mind for the 2,000-square-mile block. Geological parties were to be in the field that summer. If the prospects looked good, a $100,000 exploratory drilling program would follow. If the CPR was interested in participating, Teagle wrote, a new company could be set up in which the railway could take 49-percent equity.

The CPR declined the participation offer. It was also a tough negotiator. It took two years before a deal was cut. But that didn't stop. On rights obtained from other freehold owners, before the year was over Imperial had drilled two wildcats, the first of 133 it would punch down in Western Canada during a 30-year period. Located 75 miles south of Fort McMurray, both found some heavy oil. But it was too viscous to be produced by existing technology and equipment, and the exploratory holes were abandoned.

Shell Transport and Trading's application for a vast concession embracing northern Alberta and the Mackenzie Valley was filed with Ottawa in July, four months after Teagle had written to Beatty. Shell's

initial bid was twice rejected, and a third proposal was made the following year.

Shell asked for an exclusive concession covering all of northern Alberta and the Mackenzie Valley, including the Athabasca oil sands, from Grande Prairie to the Arctic Circle, an area of 328,000 square miles. A five-year exploration program, "in a manner commensurate with the size of the concession," was promised, after which Shell was to have the right to lease up to 10 percent of the concession area. If successful in finding oil, Shell and the government would share the profits 50-50 — after Shell had recovered its costs plus a cumulative annual six-percent interest. Shell also wanted exemption from duties on any equipment used in its operations, as well as exemption from property tax.

Shell's bid generated considerable controversy, and great opposition from Alberta. Typical was the complaint of W.A. McRea, a member of the Alberta legislature, who claimed that "Canada could not hope to get a dollar from this deal;" the only possible profit would be Shell's six-percent interest. Shell, said McRea, was asking for "a right to exploit almost the entire potential oil territory of Canada . . . a monopoly of the oil production of the northern half of the North American continent."7

The fate of Shell's request dragged on into 1919, but Imperial was far from dragging its feet. It had 14 geological parties examining the West from Montana to the Arctic, and five rigs either drilling wildcat wells or moving into drill sites. One rig was moving to the north shore of Great Slave Lake to drill on acreage acquired from the Cornwall syndicate, while another was being moved to the site of Cornwall's oil seepages north of Fort Norman.

Shell's bid was finally rejected by the government on March 28. McQueen later wrote to Stillman, who had succeeded Teagle and Hanna as Imperial's president: "The primary objective of the two expeditions to the far North was for the purpose of heading off the Shell application, and that objective was accomplished."8

The sub-Arctic oil strike

In July 1919, a cable tool drilling rig with ancillary supplies and equipment, eight men, and an ox, set out from Edmonton 300 miles by rail to Peace River and from there 1,450 miles by winding rivers to Norman Wells, the country that brought summer mosquitoes "big enough to shoot with a rifle," and winter temperatures of -60∞F. Under the direction of a young geologist, Ted Link (later Imperial's chief geologist), their mission was to set up drilling operations and conduct further geological study. The route lay down the Peace River by scow to the Slave River at Lake Athabasca, down the Slave to Fort Resolution on

Great Slave Lake, 100 miles across the lake, and 1,000 miles down the mighty Mackenzie River. There was a four-mile portage on the Peace River and a 16-mile portage that took 15 days to accomplish at Smith Rapids on the Slave River.

Alexander Mackenzie first led the canoes of the Northwest Company down the river to the shores of the Arctic Ocean in 1789. Ever since, the Mackenzie River system has been the highway of the North, first for the frail birch-bark canoes of the fur traders, then the wood-burning paddle-wheelers of the Hudson's Bay Company, finally the diesel tugs with the shallow-draft barges. Second largest river in North America, the Mackenzie is from one to four miles wide, a placid stream of clear, cold water that lumbers on at six miles an hour and dumps half a million cubic feet of water per second into the Arctic Ocean.

This was the first drilling equipment to travel down the Mackenzie River system. Two decades later, thousands of tons of equipment — pipe, graders, tractors, drilling rigs, camp facilities — were moved along much of the same waterway to Norman Wells for the Canol project. Today, transportation for drilling in the far North is augmented by helicopters, giant cargo aircraft, tractor trains, and muskeg vehicles with 40-ton loads that tread over the treacherous bogs with a foostep lighter than a man's. But the Mackenzie is still the highway of the North.

Imperial's Norman Wells party reached its destination in early September. Their ox, Old Nig, was put to work. "There was a cabin to build, a derrick to erect, the boiler and engine to get up the hill, storehouses and a stable to erect and . . . a tremendous pile of wood to be stacked up against the -60°F of January and February," reported the Imperial Oil Review.9 Timber for the derrick and buildings was cut along the steep banks of the river, hauled by Old Nig, and the job was "nearing completion just as the river steamer came on her upward trip back to civilization." Five of the party returned with the steamer — the other three remained at Norman Wells. Isolated for the next 10 months as the long winter night set in, their squat log cabin "marked an exclamation point in two thousand miles of frozen silence," while behind them the river swept on, "sheathed in a 10-foot coat of ice." They were assigned the tasks of northern watchmen and "getting the hole started before the bottom dropped out of the thermometer." By Christmas, Old Nig was being served as stew.

Ted Link, with another party of seven and 20 tons of equipment in two scows and a motor boat, left Peace River again the following May for Norman Wells. One scow was wrecked and lost in shooting the rapids on the Peace River. The whole party was very nearly lost in the Smith rapids on the Slave River. Several times the motor boat was grounded on

sandbars, and freed only by men working up to their waists in icy water. By the time they reached Fort Resolution, the remaining scow, stripped to an essential 16 tons of equipment, was nearly 100-percent overloaded and leaking badly. Ahead of them lay 100 miles of open water on Great Slave Lake before they even reached the Mackenzie. Somehow, by July 8, they managed to reach the drilling site at Norman Wells. And none too soon for the men who had wintered there — for the past month they had lived on nothing but fish and flour.

The new party took over the operations. Four of them carried out the drilling while Link, with two others, continued his field work in the area. Link later wrote:

> Geological work was confined to a study of the formations along the river and tributaries. Plane-table and traverses were made and not without difficulty. Mosquitoes and black flies, although not as bad as last year, made life miserable nevertheless. Inland trips had to be made with bedding, grub, plane-table, alidade, tripod and rod on our backs. Tents were eliminated as excess, and many times we got a good soaking from the rain. Too much food is also a hindrance to inland trips. Hardtack and bacon grease are the staples.10

"On August 23, 1920," reported the Imperial Oil Review, "when the drill was at a depth of seven hundred feet, word was brought to Mr. Link that oil was standing in the casing pipe within a few feet of the surface. 'Don't bother me again until it over-flows,' said the geologist, busy at his work." Four days later, a breathless driller again rushed up one of the tributaries of the Mackenzie to tell Link. The well was now at 740 feet, and this time the oil was flowing over the top. Link returned to the well, and for 40 minutes they watched as a fountain of oil shot 60 feet into the air, before the flow was shut in and the well capped.11

The British connection

Promoters, speculators, would-be oil men and even the Government of Canada were all swept away in their enthusiasm about the Norman Wells discovery with grand visions of a vast northern storehouse of petroleum. "There is reason to believe that oil has been found in large quantities, and indications are that this district may soon become one of the greatest oil-producing areas in the world," Interior Minister James Lougheed declared in a statement released to the news media.12 It was strikingly similar to statements that would be made 50 to 70 years later about Canada's far northern petroleum prospects.

In Britain, Norman Wells was seen as a harbinger of a petroleum storehouse for military needs, and there was apprehension lest such supplies fall under foreign control — specifically that of the United States and Standard's "oil trust" (which by then had been broken up).

The Imperial vision first arose with the short-lived excitement over the putative Oil City discovery near Waterton in 1907. For more than a decade, London applied frequent pressure on Ottawa to ensure that the Empire would have first call on any big oil supplies that might develop. At a time when oil had become crucially important to its navy, Britain was entirely dependent on other countries for its supply, 80 percent of it from the United States. A more secure supply within the British Empire was much to be desired, and for some time Canada was seen as the best hope.

The Imperial vision, unfortunately, was not matched by much British money to help make it a reality. It did, however, result in a change in regulations intended to keep the bulk of any oil in Canada for British or_ Empire use. The irony is that the only use of Norman Wells oil for military purposes was to meet perceived American needs.

The British Admiralty, in 1910, first sought to persuade Ottawa to ensure that federal oil and gas leases could, if necessary, be pre-empted to meet naval requirements.13 Three years later colonial secretary Lewis Harcourt (Lord Harcourt) wrote again urging Canada to make certain its regulations "contain provisions to enable the Crown to obtain a reliable supply of fuel oil when it is most needed, but at the same time most difficult to purchase in the market, and also to prevent any combination of speculators from taking advantage of an emergency to place a prohibitive price on material so essential to success in war at sea."14

One result of the British pressure was the already-noted 1914 change in the regulations that limited federal oil and gas leases to British or Canadian-owned companies.

The First World War made it clear that oil was vital for success in war not only at sea but also on land and in the air. "This has been a war waged largely on oil," British Rear Admiral Philip Dumas declared in 1919. "The next one will be wholly so and Bismarck's dictum of 'blood and iron' brought up to date to read 'blood and oil.'" One measure to help ensure that Britain would have the oil as well as the blood was the formation that year of the Imperial Mineral Resources Bureau. Its job was to encourage the colonies to make sure that needed resources would be "available for the purposes of Imperial Defence or Industry or Commerce."

The Norman Wells discovery was seen by Admiral John R. Jellicoe as "an important Imperial asset" that might be developed with a 350-mile

pipeline to the Pacific coast. The important thing, Lord Jellicoe wrote, was that "the development of the oil resources of the Dominion should be thoroughly under Government control and regulation, and in British hands; otherwise there is a danger that the country may be embarrassed by the control of the market by an oil ring."

To make sure of that control, Ottawa in 1921 amended its oil and gas regulations, limiting the size of leases that could be secured in the Northwest Territories. The regulations had provided for reservations of up to four square miles, half of which could be converted to lease on discovery of oil or gas. The amendment allowed only one-quarter of a reservation to be leased, with three-quarters retained by the government. That, it was calculated, would give Ottawa control of any new northern oil fields. In Norman Wells, however, Imperial leased the entire field. It is still the only oil field in Canada discovered, developed, and produced by just one oil company — and it was far from being British.

Norman Wells fuels Canol

In the two decades following its discovery, Imperial drilled only half a dozen holes at Norman Wells, completing five oil producers. In 1939 the company built a small refinery which initially operated only in the summer to provide the limited demand for petroleum in the far North, mostly aviation fuel for the bush planes. By 1940, production at Norman Wells had averaged no more than 100 barrels a day throughout any one year.

The Second World War brought two of the biggest northern projects ever completed: the 1,400-mile Alaska Highway punched through from Dawson Creek, B.C., to Fairbanks, Alaska by 10,000 troops of the U.S. army engineer corps, and the Canol project. By the time they were both completed, the Canol project resulted in more miles of road construction than the Alaska Highway.

Alaska, in the spring of 1942, looked like the soft underbelly of North America. The Japanese had severely crippled the U.S. Pacific fleet at Pearl Harbor, overrun the islands of the South Pacific, and gained a toehold in the Aleutian Islands which stretch from Japan like a series of stepping stones toward Alaska. Japanese submarines cruised the West Coast waters and posed a threat to coastal shipping.

Alaska was strategic. Lend lease planes enroute to Russia landed here for fuelling. For the United States, it was a potential launching base for an offensive against Japan. For the Japanese it offered a possible base for an offensive against North America, if the Japanese could manage to scramble over the Aleutians. Alaska was isolated. Its military bases were few and inadequate. With no road or rail connection with the rest of

North America, it was dependent on air and sea for all its military supplies.

In March the United States decided that, with Canadian help, it would build a supply line to Alaska — the Alaska Highway. Over this it could drive an army into Alaska, swiftly, safely, surely.

The highway could deliver an army — but could it deliver enough petroleum to fuel that army, as well as the vital Alaskan air bases? The trucks themselves would consume prodigious amounts of gasoline on that long run between Dawson Creek and Fairbanks. If coastal shipping were ever cut off it would require literally hundreds of trucks, perhaps as many as a thousand, in continuous service to supply Alaska's military petroleum needs. The Alaska Highway could become clogged just with tank-wagon trucks.

The answer was Canol, named after Canadian oil. The plan was to build a 600-mile pipeline from Norman Wells across the unexplored Mackenzie Mountains to Whitehorse where a refinery would be built to supply petroleum products at a rate of more than 100,000 gallons a day. From the Whitehorse refinery, other lines would fan out to move the products, one 600 miles northeast to Fairbanks, another 200 miles southeast along the route of the proposed Alaska Highway to Watson Lake, and a third line 440 miles southwest to Skagway on the coast. The project was conceived by a civilian technical adviser, Dean James H. Graham of the University of Kentucky School of Engineering. It was authorized in April 1942, by Lieutenant General Brehon Sommervell, chief of the Army Service Forces, on the basis of a one-page memorandum from Graham. The schedule called for completion of Canol that fall.

"I knew that the time schedule was very optimistic," Sommervell later told a U.S. Senate investigating committee headed by Senator Harry S. Truman. "In fact, I knew it couldn't be done." Sommervell also told the committee that "from an economic standpoint the whole project was cockeyed from the beginning."

Canol was thus embroiled in controversy from the start. Contracts for the project were awarded on May 4. Work was underway before the end of the month. On October 26, 1943 — 17 months later — Canol was finally approved by the U.S. Joint Chiefs of Staff. In November, hearings opened before the Truman committee, and it seemed as though Canol might be abandoned even before it was completed.

The threat to Alaska, so real in the spring of 1942, no longer seemed to exist by the fall of 1943. The Japanese had been driven from the Aleutians, were in retreat slowly but surely in the South Pacific, and their submarines no longer menaced west coast shipping, which was, in

fact, being used to supply material including petroleum products for Canol. “Conclusion of witnesses for all agencies except the Army was that Canol has no war or postwar value to justify its $134-million cost,” reported Life magazine.15 But the army was adamant.

Sommervell urged that Canol not only be completed, but expanded. Under Secretary of War Robert P. Patterson testified that success of Canol might well determine the “size and extent” of an air offensive against Japan. The U.S. Congress might well have scrapped the project except for the fact that it was already 75 percent completed.

Canol may indeed have been “the sorriest chapter of the American war effort on the home front,” as The Nation magazine later claimed.16 If it really was, and it didn’t seem so in 1942 — that was the fault of the generals who ordered it. No one could question the accomplishment of the men who carried out the order. Folly or not, it was possibly the greatest engineering and construction achievement of the entire war.

Three of the world’s largest pipeline construction firms — W.A. Bechtel Co., H.C. Price Co. and W.E. Callahan Construction Co. formed a partnership called Bechtel-Price-Callahan to build Canol. Imperial Oil contracted, for one dollar plus costs and a royalty on production, to develop the Norman Wells field in order to provide 3,000 barrels of oil a day. Ted Link returned to Norman Wells to supervise the development for Imperial and to conduct further exploration work in the area. A subsidiary of Standard Oil of California was awarded the contract to operate the pipeline and refinery once they were in operation. The civilian contractors were to work on the project with the U.S. army corps of engineers.

Canol presented two major challenges. One was the task of laying a pipeline across the unexplored Mackenzie Mountains. Even more difficult, however, was the task of freighting in the thousands of tons of supplies and equipment to the site of the project.

In late May of 1942, some 2,500 U.S. army engineer troops passed through Edmonton to tackle the task of delivering the freight. Their plan was to follow much of the same route that Imperial had used 23 years earlier in reaching Norman Wells with an eight-man crew, a cable tool outfit, and an ox. Only this time a lot more freight had to be moved in — more than 200,000 tons. Before it was completed they had to turn to a variety of routes. Everything for Canol was funnelled through Edmonton. From here, Canol’s supply lines eventually stretched by rail, road, and water over routes that totalled more than 8,400 miles.

Joining the army engineers were more than 2,000 civilian employees. In their employment offices from Edmonton to Dallas, and from New York

to San Francisco, Bechtel-Price-Callahan posted copies of a notice which warned:

> THIS IS NO PICNIC. Working and living conditions on this job are as difficult as those encountered on any construction job ever done in the United States or foreign territory. Men hired for this job will be required to work and live under the most extreme conditions imaginable. Temperatures will range from 90 degrees above zero to 70 degrees below zero. Men will have to fight swamps, rivers, ice and cold. Mosquitoes, flies and gnats will not only be annoying but will cause bodily harm. If you are not prepared to work under these and similar conditions, do not apply.17

The initial route, in early 1942, lay 220 miles by the Northern Alberta Railway to Waterways at the end of steel near Fort McMurray; from there 1,000 miles down the Athabasca River (with the 12-mile portage at Smith Rapids), across Great Slave Lake, and down the Mackenzie River. At Waterways, the army built freight staging facilities and assembled large barges. Military camps were established along the route, at Waterways, Fort Fitzgerald, Fort Smith, the Slave Delta, Fort Resolution, Hay River, Wrigley Harbor, Fort Providence, Fort Simpson, Fort Wrigley, and Norman Wells.

Additional personnel, mail and supplies were brought in by air, and the army established a string of 10 airfields between Edmonton and Norman Wells. River tugs were brought in by rail from as far as Missouri. They joined the tugs and barges of the Northern Transportation Company, and the wood-burning paddle wheelers of the Hudson's Bay Company. Almost anything that would float was used to carry the freight north. Tractors, fuel, machinery, repair parts, knocked-down camp buildings, lumber, drilling equipment and thousands of tons of pipe — four inches in diameter, 22 feet in length, each weighing 230 pounds — were floated down the inland waterway to Norman Wells. It was the strangest looking armada the northern rivers had ever seen.

The route was not without hazards: sandbars, areas of shallow waters, areas of swift waters, and sudden storms on Great Slave Lake. Several loads of pipe were dropped into Great Slave Lake, while half a dozen tractors and a couple of graders were also lost.

By September, less than 20,000 tons of freight had passed through Waterways, far short of the amount required to maintain winter operations. The last two barges to be towed across Great Slave Lake that season "rose on the crest of colossal waves, then plunged unmercifully out of sight in their troughs," reported veteran oil writer C.V. Myers, who worked on the project. "The men in the tug-boat ahead saw that their

cargo was doomed, and cut loose the cable. The barges capsized, spilling forth their contents into the hungry waters. Now the vital supplies could never be shipped in time."18 With winter about to grip the North country in a vise, the Waterways supply route was closed for nine months.

When Canol was built there were two ways to move freight in the far North. In the summer, when the rivers were open, vast muskeg barriers prevented use of overland transportation. In the winter, when the rivers closed, the muskeg froze and tractor trains could haul heavy loads over the snow of winter roads. There were hazards in both the summer and winter routes. Canol had already found out about the summer hazards on the lakes and rivers of the Mackenzie system. They would find out too, about the winter hazards — the task of keeping machinery moving in sub-Arctic temperatures, battling through long stretches of mud where chinook winds had suddenly thawed the snow cover, sleeping on the open road in temperatures of 60 below, the task of just staying alive.

With the route from Waterways closed, the Canol contractors devised another means to move an additional 9,000 tons of freight before the spring thaw. From Edmonton, freight would be moved by rail to Peace River rather than to Waterways. From Peace River they would build 1,000 miles of winter road to Canol. The new route was ordered on October 3 and hundreds of men plus equipment started pouring into a new base camp at Peace River: 130 more tractors, 600 pairs of freight sleds, 23,000 drums of diesel fuel, warehouses, bunkhouses, mess halls, repair centres, hospital facilities. All of this was in addition to the 9,000 tons to be moved to Canol.

"The camp was one problem; building the road was another," Myers wrote. To complete it in time to move the freight before the spring thaw would require progress at the rate of 10 miles per day.

Road crew No. 1 was finding it impossible to meet more than half of this objective. Crew after crew was dispatched to overtake its predecessor, to assist, and to carry on. On December 18, the thermometer sank to -65∞F. On that record day of cold, road crew No. 5 ventured forth beneath a cloud of steam and smoke. Not one tractor train had yet left Peace River.

Road crews worked north from Peace River and south from Norman Wells. Eventually they met halfway, and the first tractor train left Peace River on December 23, only to find that the North had dealt yet one more trick. There was virtually no snow cover. "Huge Caterpillars strained over bare earth in places, almost pulling the runners from beneath the sleds," Myers reported, ". . . it had become apparent that tractor trains could never do the job. Snow had been delayed too long. It might be delayed longer." They decided to use trucks as well as the tractor trains. The

winter road had never been built for trucks, but somehow they managed to get through. It was tough going. A cook on one of the tractor trains decided to “quit for the eleventh time when the butt end of a tree came smashing up through the floor of the caboose, hit the stove smack in the middle and went through the rear wall.” The last freight train left Peace River on April 4 and when it reached Canol, 10 million ton-miles of freight had been moved over the winter road.

There were other tractor trains busy that winter. When shipping closed on the Mackenzie system, 8,000 tons of four-inch pipe had been stockpiled on the south shore of Great Slave Lake. The ice on the Mackenzie River breaks up in May, but on Great Slave Lake it lingers until July. If the pipe could be moved 145 miles across the lake in winter, then the following summer they could start barging it down the Mackenzie River at least six weeks earlier.

The ice on Great Slave Lake buckles and forms huge ridges which run for miles like a line of low hills. At the crest of these ridges, there are great cracks in the ice, some extending all the way down to the water. The tractor trains hauling the pipe had to detour as much as 50 miles around the ice ridges, following meandering and shifting routes across the lake. The most furious blizzards in the sub-Arctic sweep unimpeded across Great Slave Lake, cutting visibility to a few feet. One tractor train got caught on the lake in a blizzard, unable to find its way around the ice ridges and unable to cut across them with its train of sleds and pipe. The pipe was abandoned and the tractor and caboose were able to make it back to Hay River. But it had been a narrow escape. The solution was found by a road and bridge crew which cut through the ridges and built plank bridges across the ice cracks to maintain a constant route. So Canol used not only a winter road over land but also a winter road over endless miles of water.

The 1,120-mile Mackenzie River system from Waterways and the 1,200-mile winter road from Peace River brought in freight for the eastern end of the Canol project at Norman Wells. Freight was also brought in by two other routes to tackle the western end of Canol, working east from Whitehorse. One route was across Alberta and British Columbia by rail to tidewater at Prince Rupert; up the inside passage of the coast by ocean barge 500 miles to Skagway, Alaska, and then up the steep, narrow-gauge track of the historic White Pass and Yukon Railway for 100 miles to Whitehorse. By late fall of 1942 the Alaska highway had been punched through as far as Whitehorse and — at least until the spring thaw — supplies could be moved in by truck from Dawson Creek, which was also connected to Edmonton by rail.

While the freight was moving in, the Canol builders faced their other major hurdle, the Mackenzie Mountains, which cut across the 492-mile Norman Wells-to-Whitehorse route, a stone wall barrier with the rocks piled 9,000 feet high, cut by swift streams and vertical 400-foot canyons, pockmarked by unknown lakes and glaciers. Only one man had ever crossed that section of the Mackenzie Mountains and recorded anything about the country. Joseph Keele, a geologist with the Geological Survey of Canada, following a trip in 1907-08, had described the Mackenzie Mountain range as even more rugged than the Rocky Mountains. But Keele had not come within 100 miles of Norman Wells. Most of the route was completely unknown, and for more than 300 miles there was no human habitation. The task would be to find a pass, then find a route across the pass, build a road along the route, and then lay a pipeline along the side of the road.

Starting in June, bush pilots flew a series of reconnaissance flights across the Mackenzie-Yukon divide in search of a route. But more than aerial surveys were needed, and in late October Guy Blanchet, a Bechtel-Price-Callahan employee, set out from Norman Wells with three Indian guides and their dog teams to complete the survey of the route across the mountains. They made rafts to cross swift, half-frozen rivers, skirted unmapped lakes, lived off game — sheep, caribou, moose, and ptarmigan — fought off an attack by a pair of timber wolves, and battled their way through. Blanchet badly sprained his ankle and hobbled nearly half the trip on improvised splints. When they reached Macmillan Pass it was easy going down the long, gentle slopes on the western side of the divide, and it was clear that the eastern end of the pipeline route would be by far the toughest part.

A month after they started, Blanchet and his party completed their 240-mile trip at a lonely cabin near a lake where a cache of food and supplies awaited them. On December 22, the first road-building party left Norman Wells to start the road across the mountains; 23 men, tractors, and a train of cabooses which served for bunkhouses, store room, and maintenance shop. Their obstacles were described by Myers:

Diesel fuel froze to the consistency of Vaseline, and would not pour. Light machine oil became as hard as cup grease. The best grade of antifreeze froze solid in the tins.

Sometimes tractors stopped as often as every 15 minutes. . . . In 70 below zero temperatures mechanics had to get out and clear the (fuel) lines. The cold rendered the sleigh runners as brittle as cast. Time after time they broke. Welders and mechanics repaired them, and again the

snail pace continued. Motors had to be kept running 24 hours a day. To stop a motor once and let it get cold meant stopping it for good.

In Dodo Canyon underground hot springs kept the ice thin and treacherous. Twenty-ton Caterpillar monsters would drop through the ice and have to be hauled out by other Caterpillars. Fuel sleighs overturned on steep grades.

On January 3 the temperature was -35^{0}F at 11 a.m. By noon it had risen to 35 above. Four days later it was 39 above. Then as suddenly as it had risen it dropped to -15^{0}F, followed by a blizzard so intense that the party didn't move an inch for two days.

Throughout 1943 the tempo accelerated as thousands of men attacked the Canol project in different ways. As the road crew from Norman Wells worked its way slowly west, 1,500 army engineers were working east from Whitehorse. Welders followed the road builders and a ribbon of four-inch steel started snaking its way across the mountains. (Because of its light viscosity, oil from the Norman Wells field would flow at temperatures down to -70^{o}F, thus the line could be laid on the surface, eliminating the need for ditch digging.) Imperial Oil drilled more than 40 additional oil wells in the Norman Wells field. Supplies were pouring in from Skagway over the White Pass & Yukon railway, and in summer freight was again moving to Norman Wells down the Mackenzie River system from Waterways. The branch pipelines were built radiating out from Whitehorse, 106 miles southwest to Skagway, 600 miles northwest to Fairbanks, and 255 miles southwest to Watson Lake on the Alaska Highway.

At Whitehorse, construction was underway on the 3,000-barrels-a-day refinery that would produce gasoline, diesel fuel, and other products from the Norman Wells oil. It was a refinery built of bits and pieces collected from more than 2,000 suppliers from throughout North America. Major refining equipment came from a shut-in refinery of Corpus Christi, Texas. The boilers came from an old power plant at Hamilton, Ontario, while the turbine and generators were from an idle mill at Penedale, California. It was probably the most travelled refinery in the world, and its journey was not yet over. Whitehorse proved to be only a five-year stop.

The Canol road was completed on December 31, 1943. Trucks could now move supplies freely between Whitehorse and Norman Wells. The final weld on the pipeline was made on February 16, 1944. By April, Norman Wells crude oil was surging through the pipeline to the Whitehorse refinery.

It was too late to be of any significance to the outcome of the war. The tide had already turned and the Japanese had long since fled the Aleutian Islands. Plans for an Alaskan-based offensive against Japan were dropped.

A lasting peacetime legacy of the wartime effort was the associated 1,337-mile Alcan Highway from Dawson Creek to Fairbanks. At US$131 million, it cost about as much as Canol, and was built and paid for by the United States. Ottawa had insisted that after the war, the Canadian section be turned over to Canada, but agreed that Canada would provide timber and gravel, and waive import duties, sales and income taxes, and immigration regulations. The highway was opened for tourist travel in 1948, and was later paved the entire distance.

Canol left nothing of similar lasting value. The refinery operated on Norman Wells crude for 11 months and by March 1945, it had processed 976,764 barrels of oil. Then it was all shut in — the pipeline, the refinery, the roads, the airfields and most of the wells in the Norman Wells field. Canol, said Newsweek magazine, was “the white elephant of Whitehorse.”

For more than two years, the $134-million Canol project was literally rusting away. The U.S. Foreign Liquidation Commission vainly looked for a buyer who would at least salvage the refinery, but when the best bid it could get amounted to only $151,133 it turned the offer down. It was the discovery of the Leduc field near Edmonton by Imperial Oil in February 1947 that resulted in the salvage of at least the refinery. Imperial soon discovered it had a major oil field at Leduc, and needed a refinery at Edmonton to process the crude. It bid $1 million for the refinery in August 1947 (just six months after the Leduc discovery), and spent another $6 million to tear it apart and move the 7,000 tons of pieces 1,200 miles by truck and train to Edmonton. It was re-assembled the following year and the refinery at Edmonton was placed on stream less than 18 months after the Leduc discovery. Nearly two decades later, some of the pipe was salvaged from the pipeline.

Norman Wells was at last connected to the energy markets of North America in 1986, and production from Canada’s most northerly oil-producing field was increased more than tenfold.

The pipeline network that connects hundreds of oil pools in the Western Canada Sedimentary Basin with refineries as distant as Vancouver, Toronto, and Chicago had long been creeping north, to as far as the Zama Lake oilfield, within 50 miles of the Northwest Territories. In 1986, Interprovincial Pipe Line (now Enbridge Inc.) already operated the world’s longest oil pipeline system, when it added a 540-mile extension from Zama Lake north to Norman Wells. Imperial Oil spent $880 million

to drill several hundred additional wells and install expanded production facilities. Norman Wells began flowing oil at a rate of 32,000 barrels per day, compared with less than 3,000 barrels a day it had been producing for more than six decades.

The 12-inch line from Norman Wells to Zama is the first buried pipeline through sub-Arctic permafrost, unlike the wartime Canol pipeline to Whitehorse, which was simply laid on top of the ground, or the pipeline that moves oil from Prudhoe Bay on the Arctic coast, which is elevated above ground on support structures. As such, its successful operation provides valuable experience in safe design and operation, protecting both the pipeline and the environment in areas of unstable permafrost conditions.

That experience may soon be put to use harvesting the petroleum resources of the Arctic. Some 300 miles north of Norman Wells are the large natural gas reserves of the Mackenzie River Delta and Beaufort Sea. A major new pipeline to move that gas to markets across North America is expected to be in operation before the end of the first or early in the second decade of the 21st century. When that happens, an oil pipeline may also be required to haul liquids removed from the gas — propane, butane, naphtha. Beyond that, more pipeline facilities will be needed to haul the crude oil that has already been found in the Delta-Beaufort region, with much more still to be found. By 2002, an estimated one billion barrels of recoverable oil had been found here and more than an additional five billion were thought to await their discovery wells.19

When this happens, Canada's pipeline system will span the continent from the Atlantic to the Pacific to the Arctic oceans, and, with connecting pipelines, possibly as far south as the Gulf of Mexico.

The North is still wild, vast beyond the imagination and held in an Arctic grip. But it is no longer isolated, inaccessible or impenetrable. Drillers, engineers, roughnecks, geologists, pipeliners, and their equipment can now roam the North wherever they want, whenever they want, in operations that have almost become routine. They have conquered the North, and it was Norman Wells and Canol that showed them how to do it, and pointed the way to a storehouse of petroleum for tomorrow

Chapter 7. An Accident at Leduc

Standard Oil's top geologist is reputed to have claimed that he would "drink all the Paleozoic oil found in the Western Canada plains." But it was the Paleozoic that produced the Leduc discovery and about 80

percent of all the oil found in Western Canada during the next half century.

The discovery at Leduc was, in part at least, an accident — as fortunate as any accident ever experienced in Canada.

By the end of the Second World War, oil men were starting to despair of ever finding large oil reserves in Western Canada. Tens of millions of dollars had been spent and hundreds of wildcats had been drilled throughout the prairie provinces and far into the north country during the previous 30 years. And what was there to show for it? Substantial supplies of natural gas, Turner Valley oil production which was already in an advanced stage of decline, and the Norman Wells field on the fringe of the Arctic Circle, too remote to produce more than a trickle of oil for local consumption. There were, of course, the vast reserves of Alberta's Athabasca tar sands, but no one yet had been able to devise a method of economically extracting the hundreds of billions of barrels of oil locked in these sands.

It seemed incredible that a sedimentary basin as gigantic as that which covered most of Western Canada would yield only two oil fields. But now, oil men were starting to wonder if that just might not be the case. And even if there were more, just how much could you afford to spend to find them?

The need for a significant new source of oil was becoming desperate. Canada, in 1946, was consuming petroleum at a rate of 221,000 barrels a day — and importing 200,000 barrels a day at an annual cost of more than half a billion dollars in foreign exchange funds. For a nation the size of Canada, it was a heavy economic burden.

On the prairies, the need for an indigenous supply source was even more imperative. Imports of foreign oil, because of the distance they had to be shipped, were prohibitively expensive; Turner Valley, the only local supply source, was dwindling rapidly. Under the stimulus of wartime demand, Turner Valley production had reached a peak of 28,000 barrels a day in 1942. By 1946, it had declined to 20,000 barrels a day. (Ontario accounted for most of the remaining oil production.)

Before the 1936 discovery of the oil column at Turner Valley, Montana oil fields had supplied the demand of the prairie provinces. But now Montana production had dropped to a fraction of its wartime rate, and there was no surplus available for export to Canada. Prairie refineries had to turn to crude shipped by rail from as far as Texas and Oklahoma, at a cost laid down in Regina that amounted to $1.93 per barrel just for the transportation.

There were more than a dozen firms, large and small, still searching for oil in Western Canada, and the most active and persistent of these was Imperial Oil. It had been on the scene for a long time. Imperial's first Alberta wildcat had been drilled in 1917, and by the end of 1946 it had a string of 133 dry holes and just one oil discovery, Norman Wells. Even that was too remote to be produced. Imperial's exploration expenditures in Western Canada amounted to $23.7 million, or 40 percent of total industry expenditures of $60 million, as estimated by Imperial.1 More than half of Imperial's exploration expenditures were in the 1939-1946 period. Imperial's out-of-pocket expenditures, however, were somewhat less than the reported $23.7 million, after accounting for partially offsetting income tax credits and credits against lease rentals earned by wildcat drilling, Imperial's historian J.S. Ewing has noted.2

It was a relentless, unrewarding search, financially disastrous for many of the smaller firms, and even for the majors a bitter, personal frustration for management, geologists, and drillers. Typical of the frustrated efforts was a deep test in the foothills belt, called Imperial-Shell Stolberg, which the Imperial Oil Review described as "another of the bitter climaxes which must accompany Canadian oil industry efforts to find new reserves for an oil-hungry nation."3

"The foothills of Alberta are one of the world's most heartbreaking hunting grounds for oil," said the Review. With formations "folded back and forth like a Chinese fan," it was also one of the most difficult drilling areas. Twisted formations can "hold the drill pipe in a vise-like grip thousands of feet below the surface;" rocks tough enough to scratch glass like a diamond can wear out a drilling bit in just a few inches of hole so that "drillers must start the laborious pulling of thousands of feet of pipe to change them;" slanted and convoluted rocks can twist off a drilling pipe causing lengthy and expensive "fishing" operations to retrieve the lost pipe. The Stolberg well encountered all these problems.

The well began drilling on March 29, 1945. It took nearly two years to drill and cost more than a million dollars. Twice the pipe was stuck in the hole, once for 16 days until the bit was blasted into tiny bits with a time bomb and five quarts of nitroglycerine. At 12,170 feet the drill stem twisted off, leaving a jagged end sticking above the 368 feet of pipe sitting on the bottom, which had to be caught and lifted up more than two miles out of the hole. When the hole reached its total depth of 13,747 feet, a final test yielded a tiny puff of gas and a copious flow of salt water. The drilling crew started the task of tearing down the rig and moving it over 70 miles of mountain and muskeg trail that had been hacked through to the site of yet another deep foothills test, and another dry hole.

"Despite this present rather gloomy picture the prairies, which are today at an economic disadvantage in regard to oil supply, give some indication that they may, ultimately, develop into one of the world's great oil producing areas," commented the Review in 1946. "The petroleum industry, as a whole, is today engaged upon the greatest search for oil in Canada that our nation has ever seen, and has concentrated on the western plains." Then, with a hollow-sounding optimism that must have been born of despair, it added that "the future of oil exploration in Western Canada is bright."

But just in case this bright future failed to provide new oil reserves, Imperial was considering the manufacture of synthetic petroleum fuels from natural gas, and had conducted extensive experimental work. A process for producing synthetic liquid hydrocarbon fuels from coal had been developed in Germany during the '30s and had provided Germany with much of its petroleum requirements during the war. The process involved heating coal to convert it to coke, passing steam through the hot coke to produce "water gas" consisting of carbon monoxide and hydrogen, and then passing this gas over a catalyst at elevated temperatures and pressures to yield a liquid hydrocarbon.

The process could be adapted to produce a synthetic crude oil from natural gas more economically than from coal. The synthetic oil could be refined, noted the Imperial Oil Review, by a "process whereby a very high octane fuel called polymer gasoline is made. The gasoline produced in the synthesis process is not very good quality, but by further treating and by adding cracked gasoline and polymer gasoline a good yield of high grade fuel is obtained."

Imperial Oil estimated that it would require 11,000 cubic feet of natural gas to make one barrel of gasoline, and that a plant to make 5,000 barrels of gasoline per day would cost, in 1946 values, "roughly 25 million dollars." At that rate, it would take an investment of close to $10 billion (1946 dollars) in plant facilities to synthesize from natural gas Canada's 2004 gasoline requirements, and a supply of natural gas that nearly rivals all that has been found in the past 100 years. It was not a very attractive alternate to crude oil, but a possible necessity.

"Imperial Oil has embarked upon an extensive program of exploration drilling to locate natural gas in quantities great enough to warrant construction of a synthesis plant if synthetic produced costs can be brought down to economically practical levels," the Review states. "If an adequate supply of gas is assured and improved processing methods become available it is possible that a synthetic fuel industry may serve the West. . . . It is necessary to proceed cautiously at present, since the

discovery of further adequate crude oil fields in this part of the country would seriously jeopardize such a huge plant investment."

Reviewing the situation

Thirteen geologists, geophysicists, petroleum engineers and senior managers from Imperial Oil and its parent Standard Oil of New Jersey gathered at Imperial's head office at 56 Church Street in Toronto on April 19. Ted Link, Imperial's exploration manager, and Don Mackenzie and Fred McKinnon were there from Imperial's exploration offices in Calgary. Lewis G. Weeks, Standard's top geologist, was there from New York. Leading those from Imperial's head office was Oliver Hopkins, vice-president and later president. They were locked in a series of day-long sessions to answer a crucial question: should Imperial continue the costly search for oil in Western Canada before proceeding with the contemplated gas processing plant? After so many millions of dollars and so many dry holes, was there still a reasonable hope that oil in significant quantity could be found?

Poring over maps, they pooled their knowledge of everything that had been learned — from Imperial's own efforts, from the work of the Geological Survey of Canada, by the exploratory drilling of others — about prospective oil areas from Hudson Bay to the Gulf Islands between Vancouver and Victoria, from the U.S. border to the Arctic coast at the delta of the Mackenzie River.

In spite of the dry holes, they pinned their hopes on Alberta. "The Alberta basin proper," they reported, "continues to offer excellent prospects for developing substantial quantities of new production" of oil.4

Assessing the different prospective areas, the map scanners offered a series of recommendations for the final decision makers of Imperial and Standard Oil.

For Manitoba, a modest program was recommended, including surface geological studies, examination of water well data, and seismic surveys.

No work was recommended in Saskatchewan, "due to the political situation," the province having recently elected the Co-operative Commonwealth Federation government of Tommy Douglas, who came to power on the rhetoric of an avid, fire-breathing anti-capitalism and socialism.

Continued acquisition of leases on the Gulf Islands was urged, "with the ultimate object of drilling a deep test as soon as the acreage has been acquired." No drilling ever followed, undoubtedly for political reasons related to environmental opposition rather than political ideology.

In the North, the group recommended surface geology studies in the Slave Lake region; no more exploration in the vicinity of Norman Wells, where "the chance of discovering sufficient oil to justify a pipeline to the West Coast is very remote;" and no exploration in the Mackenzie Delta because even if large reserves of oil were found the cost of producing and pipelining them made it look economically marginal.5

"The most favourable prospect in all Western Canada" was thought to be the Lower Cretaceous formation in the Alberta Geosyncline. And the best area to look for Lower Cretaceous oil was said to be in the "Edmonton Hinge Belt," an area covering 25,000 square miles: "This is considered to be the most important portion of the most promising or prospective area in Canada for immediate attention. It is the opinion of the group that no efforts should be spared to vigorously explore, by all means available in this area."

The oil hunters declared that they were "of the opinion that eventually the Alberta Basin would produce up to 150,000 bbls. per day, and that this production might be sustained for a period of 30 years." This seemingly wildly optimistic prediction was far off the mark: production of Alberta's conventional oil ultimately peaked at 10 times the forecast rate.

In focusing on the Lower Cretaceous sandstones along the hinge belt, the group completely ignored the substantial reserves of heavy crude oil that had been found as early as 1923 and that were already producing from scores of shallow wells from a belt at Lloydminster straddling the Alberta-Saskatchewan border, at Vermilion, and at Wainwright.6 Located south of the Athabasca oil sands and northeast of the deeper and more promising prospects, there were understandable reasons why this heavy oil belt was not considered. The oil, as thick as a mixture of grease and molasses, was being produced only in small volumes because it was difficult to pump to the surface, impossible to push through a pipeline, and considered suitable primarily for the manufacture of asphalt for paving. Decades later, it would be found that the heavy oil resources are one-quarter as great as those of more desirable light oil, that with new technology they are now economically produced, processed, pipelined, and refined into a wide range of products.

Imperial, meanwhile, was quick to implement the search along the hinge line for reasons that were geologically wrong but with results that were spectacularly successful.

Geological knowledge of the Western Canada Sedimentary Basin was limited; a few hundred wildcats scattered over such a vast area simply had not provided enough information for a complete picture. The geologists knew that the basin was wedge-shaped, the sedimentary rocks as much as six miles thick along the foothills of the Rocky Mountains,

thinning in a northeastern direction until they petered out against the edge of the Precambrian shield. The various sedimentary formations, or rock layers, tilted downward in a southwest direction toward the deeper basin areas. The hinge belt theory held that along the shallow northeastern flank of the basin these beds tilted at a gentle incline, and that deeper in the basin they tilted at a steeper angle, much like a board with a hinge in the middle of it. The point where beds started to dip more steeply formed the hinge line, stretching from the southeast corner of Saskatchewan to the Arctic Ocean. Geologists reasoned that subsurface formations might pinch out along this hinge line, forming traps in which oil might be accumulated.

It was imaginative geological thinking (and that is what finds oil), but later knowledge of the basin has largely demolished the theory.

A second error was in selecting Lower Cretaceous rocks of the Mesozoic era (75 million to 225 million years ago) rather than rocks of the Paleozoic era (225 million to 600 million years ago) as the most likely source of oil on the Alberta plains. One of the geological theories of that time held that the Western plains during most of the Paleozoic era had been a vast desert. Oil is generally held to have been formed from prehistoric plant and vegetation life, and there is not much life on a desert. Ergo, there would not be much oil found in the Paleozoic rocks of the western prairies. Lewis Weeks, for one, is reputed to have claimed that he would “drink all the Paleozoic oil found in the Western Canada plains.”

But it was the Paleozoic that produced the Leduc discovery, and about 80 percent of all the oil found in Western Canada during the next half century.

Discovering Leduc

Having selected the hinge belt as a likely geological feature and the Mesozoic as the most likely oil-bearing rocks, Imperial zeroed in on a large area in central Alberta as a likely locale, and picked up several million acres of government reservations and freehold mineral rights. Geologists had made their regional studies. Now it was up to the geophysicists to help pinpoint possible drilling sites with their seismic surveys, their instruments tracing the energy waves set off by dynamite explosions to measure the buried rock formations.

The seismic surveys revealed a number of anomalies, possible structures in the rock layers where oil might be trapped. None of them looked exceptional; dozens of others had been mapped before in seismic surveys, but when drilled had yielded no oil. Still, there was always a chance.

A well location was picked to test one of the seismic anomalies that had been mapped near the village of Leduc, 18 miles southwest of Edmonton. It was not necessarily the most attractive of the seismic anomalies that had been mapped, but it did offer certain advantages. It was located west of the large Viking-Kinsella gas field where Imperial had been developing gas reserves in the Viking sand for its possible gas synthesis project, and there was a reasonable chance that if the Leduc field failed to find oil it might find more Viking gas.

The well was spudded on November 20, 1946, and at a depth of 3,550 feet it encountered the Viking sandstone, where a test produced only a small flow of gas, a trace of oil, and salt water. A test bottomed at 3,999 feet gave another show of oil, but again, just a teaser. Finally, in a sand at the base of the Lower Cretaceous formation (in the Mesozoic) a test of a 10-foot interval below 4,286 feet flowed gas at a rate of nearly two million cubic feet per day, together with oil. The next test covering a lower interval of the sand yielded generous amounts of salt water.

This Mesozoic sandstone yielded no gusher, but it was encouraging. Admittedly, the pay zone was thin, part of the sandstone was gas bearing, part oil bearing, and part water bearing. With a great deal of skill and some luck it just might be possible to coax enough oil out of this sand to make it an oil well. On the other hand, if the well were deepened further the drilling mud, which is pumped down the hole through the drill pipe and up the sides of the well to bring the drill cuttings to the surface, could mud-off the pay section so badly that any chance of completing an oil well might be lost. And below this sandstone lay the rocks of the Paleozoic, where it had been said there was no hope of finding oil.

The company had to make a decision: attempt to complete a small oil well from the Lower Cretaceous — a puny reward after 133 dry holes — or go for broke by deepening the well to see what lay below. Imperial decided to go for broke.

At a depth of 5,039 feet in the Devonian formation — well into rocks of Paleozoic age — the well encountered a porous limestone, and cores showed unmistakable oil staining. On the first test of this limestone formation, the oil rose 840 feet up the drill pipe, a good recovery of oil. On February 3, another test produced a plume of oil that shot up in the air half the height of the 136-foot drilling derrick, and drenched the crew with oil. The next day the final test, from a total depth of 5,066 feet, yielded an even better flow of oil. Imperial by this time knew it had Western Canada's first oil discovery in 11 years.

Imperial threw a "coming in" party for Leduc No. l, with some 500 Edmontonians standing in the grain field of farmer Mike Turta on the

afternoon of February 13, thoroughly chilled in the -14∞F temperature, to watch the well placed on production. It was a long wait. They started arriving shortly after noon, but it was 2 p.m. before repairs had been completed on the swab — a kind of valve that operates like a plunger on a water pump — and it was lowered down the well tubing on a wire line. At 4 p.m., after the fourth swab had been pulled from 4,000 feet, great gurgling surges of oil, water, and drilling mud spewed forth into the flare pit, 200 yards from the rig. A match was set to some oil-soaked sacking at the end of a rope and tossed into the flare pit. “There was a roar and a whoosh as the flare pipe caught fire, and flames leaped 50 feet high, burning off the first flow of oil mixed with gas, water and contaminating mud,” the Review reported. “Dense black smoke spiralled far into the sky. Some of the crowd applauded as if they had just witnessed a feat of magic, but the sound of their clapping was lost in the roar of the flare.”7

For two hours, intermittent surges of oil, water, gas, and mud spewed forth while 5,000 feet below the well was purging itself. Finally, at 6:10 p.m., Alberta Land Mines Minister Nathan E. Tanner spun a valve and a steady flow of clean oil was directed to the storage tanks. Leduc No. 1 was on production.

The best, however, was yet to come, two months later at Leduc No. 2, a mile and a half southwest of the No. 1 well. It uncovered still another far more prolific pay section than the No. 1 well — in a type of ancient seabed reef that would yield most of Alberta’s oil wealth.

The decision to drill the second well had been made on the basis of the oil found in the Lower Cretaceous sandstone at the first well. Rigging up for the second test started on January 29 and the well was spudded on February 12, the day before the No. 1 was placed on production. It was only a light rig with a shallow depth capacity that had been moved in for the second test, enough depth capacity to test the Lower Cretaceous sandstone. But before drilling had started, of course, the No. 1 well had found the deeper and more prolific production in the Devonian limestone.

The No. 2 well found a thin oil and gas sandstone in the Lower Cretaceous, no better than at the first well, and continued down in search of the deeper limestone production. But here the limestone gave only a show of oil, definitely not enough to make an oil well. It was a great disappointment. It looked as though Leduc might turn out to be only a minor oil field. Drilling had already extended beyond the rated depth capacity of the drilling rig, but a decision was made to drill 50 feet into the dense shale beneath the limestone before giving up on the well. At a depth of 5,370 feet the bit broke though the shale and into a dolomite section, a sponge-like rock with holes big enough to stick your

finger in, a sponge filled with oil. It was the best pay section that had yet been found in Canada.

It took a lot of time and the drilling of many wells before the geological picture at Leduc began to emerge. About 400 million years ago the ocean of the Devonian time advanced from the north into Western Canada. As the oceans advanced, tiny living organisms, seldom more than a millimetre long, built giant reefs near the advancing shores. As the waters grew deeper, the reefs grew higher — some of them to a thickness of more than a thousand feet.

As the prehistoric oceans advanced and retreated, depositing sediments in their wake, the successive rock section was gradually built up, layer by layer. A blanket of impervious shale covered the reefs. On top of this, another layer of porous limestone was draped in big arches over the thick reefs. Living matter that had been converted into oil and gas under immense pressure and over great time, accumulated in the pores of the reef, where they became trapped by the overlying layer of dense shale, or cap rock. Oil and gas migrated also through the higher porous limestone section, and became trapped in the arches were these rocks lay draped over the reefs.

It was in this draped layer of limestone, later called the Devonian D-2 or Nisku, where the Leduc No.1 well had found its oil. In the No. 2 well, there was little oil in the D-2, and the drill bit churned on to punch into the reef, later called the Leduc or D-3 formation.

Devonian reef production in Western Canada had first been discovered in 1920 at Norman Wells, but it was not until several years after Leduc that geologists came to recognize this reef production for what it really was. No one had ever thought of reefs in Western Canada as storehouses of petroleum; no one even knew they existed here. Once geologists and geophysicists realized what they were looking for, the reefs became much easier to find.

Within two decades of the Leduc discovery, dozens of productive Devonian reefs were found, some of them with pay sections nearly a thousand feet thick, some of them up to 20 miles long, with recoverable reserves in individual reefs that ranged up to a billion barrels of oil. By the end of the 20th century, the Devonian reefs of Western Canada had yielded several hundred billion dollars worth of energy. In no other area of the world have reefs produced as much oil as in Alberta. And their discovery was the result of the accident at Leduc.

Chapter 8. Pembina: The Hidden Elephant

There is only a modest amount of oil beneath each square mile of the Pembina field, but the entire producing area covers 1,000 square miles — in area, the largest oil field in North America. But who could know this at the time the first well was completed?

A nightmare that haunted wildcatters was the thought that the drilling bit might grind right through an unsuspected oil zone. The abandoned and supposedly dry hole could leave behind, unknown and untouched for years or even decades, a major oil field worth perhaps hundreds of millions of dollars.

That isn't too likely with the 21st century technology now used in hunting for oil or gas, but it certainly happened throughout most of the 20th century when oil men lacked sophisticated methods of measuring the characteristics of rocks buried a mile or more below the ground. Not all oil zones, when penetrated by the bit, release a great surge of oil. Oil trapped in the tiny pores of many rocks is often yielded only after great coaxing. Rock cuttings, ground up by the drilling bit and carried to the surface by the circulating stream of drilling fluid, may give little hint of the presence of oil.

It might have happened at the discovery well of Canada's largest oil field but for the alertness of a young geologist, an Alberta farm boy just three years out of university. It was an elephant oil field, a well-hidden elephant.

Arne Nielsen as a youth had assumed that he would be a farmer, and probably someday would have his own spread not far from the farm on which he was born, near the village of Standard in southern Alberta. But now, in January 1953, he sat in his new Edmonton office and marvelled a little at the swift course of events that had led instead to his position, at age 27, as central Alberta district geologist with a major international oil firm, the Socony-Vacuum Exploration Company, later named Mobil Oil.

Arne had the stamp of an Alberta farm boy: the short but stocky and powerful build; the large, strong hands; the broad features and blue eyes that hinted of his Danish ancestry. His father, Aksel, had immigrated to Iowa as a boy of 17, unable to speak a word of English, and two years later joined a group of 32 Danes who took up farming on CPR lands in the Standard area. Aksel returned to Denmark to marry his childhood sweetheart, and had brought her to Alberta.

Arne was raised on the farm, attended the small school at Standard, and in 1943 had found himself the only boy in the entire grade 12 class. Most of his friends had enlisted in the armed forces to serve in the Second World War. Like many Alberta farm boys, Arne was a crack rifle

shot, and he too itched to join up for the great adventure. It was only at his father's insistence that he had completed high school before enlisting in the army at 17, still a year younger than the legal age limit.

He served as a rifle and mapping instructor with an armed corps in Ontario, eagerly awaiting the opportunity to ship overseas and see some of the action, and some of the world. He was on his way to Halifax and embarkation overseas when the war in Europe ended. He volunteered for service in the Pacific, but again, Japan had surrendered, the war was over, and 19-year-old Private Arne Nielsen returned to civilian life, a frustrated home-front veteran.

Two-and-a-half years in the army brought an abrupt change in the direction of Nielsen's life. With the financial help of veterans' credits, he could consider the possibility of university.

On the farm at Standard, Arne and his father had gathered a small but intriguing collection of fossils and sea shells, turned up from the rich prairie soil by the plow. Sea shells on a land-locked prairie — moved thousands of miles from what are now the Arctic Islands and deposited more than 30,000 years ago by North America's last retreating ice age — had long intrigued the farm boy. This, and his mapping experience with the army, led him to decide on a study of geology.

Petroleum exploration was almost dormant in Western Canada when Nielsen began studying geology at the University of Alberta early in 1946, and the mining industry seemed to offer a more likely career. Leduc changed that, as it set off a surge of exploration which quickly confirmed the vast petroleum potential of Western Canada. Even at university, Nielsen caught the sense of drama and excitement of this petroleum search, which was radically altering the post-war economy of the prairie_ provinces. During the summer months he worked as a student geologist with field parties, first with the Geological Survey of Canada and later with oil companies, working in the Alberta foothills and the virgin wilderness areas of the Yukon and Northwest Territories.

In 1950, his diploma as master of science in geology still uncrinkled, Nielsen joined the Canadian division of the Socony-Vacuum organization, working in the quiet and serious manner that has characterized his career. Less than three years later, in January 1953, he was named to head Socony's new four-man district exploration office in Edmonton (the Canadian divisional office remained in Calgary).

In a large oil company, the pursuit of oil is a co-operative undertaking of geologist, geophysicist, economist, exploration manager, and top management, who make the ultimate selection of proposed exploration and drilling programs. It was in this manner that Nielsen participated in a rank wildcat, Socony-Seaboard Pembina No. 1, 70 miles southwest of

Edmonton in a wilderness of pine, spruce and muskeg, pockmarked by a few isolated farms. It was one of the first ventures for Nielsen's new Edmonton district and it could easily have missed becoming the discovery well for Canada's biggest oil field.

The venture involved a farmout of 100,000 acres of government petroleum reservation rights from the Seaboard Oil Company of Delaware. In return for drilling a deep wildcat well to an estimated depth of 9,400 feet, Socony would earn a half interest in the reservation. The proposed well site was on a suspected anomaly which had been mapped by seismic exploration, 16 miles from the nearest previously drilled well. It was a $200,000 gamble in which the odds — as with any wildcat — were at least 10 to one against an oil discovery.

Final decision to drill the well was made at Socony's head offices in New York, based on the recommendations of the Calgary and Edmonton offices. Nielsen had participated in the farmout negotiations with Seaboard, had recommended drilling the well, and had prepared the geological prognosis.

A geological prognosis is a guide prepared for the drilling of every wildcat. It attempts to blueprint unknown rock conditions thousands of feet below the surface, based upon the best available geological and geophysical knowledge, deduction, intuition and guesswork. The prognosis outlines the rock formations expected to be penetrated in the hole, the estimated depth at which each will be penetrated, and characteristics of the formations. It indicates which formations should be drilled through, and from which formations cores should be recovered for detailed study. Without a geological prognosis, a wildcat would be no more than a shot in the dark.

In the six years following the Leduc discovery, exploration had yielded a string of prolific Devonian reef discoveries in Alberta: Redwater, Bonnie Glen, Golden Spike, Wizard Lake, Stettler, and several others. From Edmonton, the major pipeline systems were already carrying Alberta oil across most of the continent: east across the prairies to Ontario and south into the United States; southwest across British Columbia to Vancouver and the U.S. Pacific northwest.

Comparatively few tests, however, had been drilled in the deeper part of the Alberta basin west of Edmonton where exploration costs were high due to almost impenetrable muskeg and forest, as well as the greater drilling depths to the Devonian reefs.

Pembina No. 1 was to evaluate all prospective zones down to the Devonian Leduc reef. The major oil prospects were considered to lie in the Devonian, and farther up-hole in the Mississippian. Above that,

secondary oil prospects were considered possible in the sandstones of the Lower Cretaceous, Jurassic, Viking, and Cardium formations.

Few wells had penetrated the Cardium sandstone, and little was known about it. Along the Rocky Mountain foothills southwest of Edmonton, the Cardium outcropped at the surface, but at wells drilled in the Edmonton area it was not present. Somewhere between Edmonton and the foothills the wedge-shaped sandstone must pinch out, and near the point where it pinched out there was a possibility of an oil accumulation, trapped by an impervious layer of shale. The Pembina No. 1 well might be near that pinch-out line, and thus Nielsen's prognosis listed the Cardium as one of the secondary oil prospects. The top of the Cardium sandstone was projected at 5,240 feet, and Nielsen's prognosis called for no cores to be taken from this formation "unless samples show good porosity or oil stain."2

The well was spudded in on February 23, and as the drilling bit ground toward its objective nearly two miles below the surface, the well site geologist examined the rock cuttings returned to the surface in the circulating drilling mud, looking for the changes in rock types which would signify the progression from one formation to the next, and for indications of oil staining which might hint at the presence of an oil accumulation.

The first prospective zone was the Cardium. It wasn't easy to pick the top of this sandstone from the rock cuttings, since the formation was not widely known or easily recognized. From oil-stained rock cuttings, the well site geologist picked the top of the Cardium sandstone at 5,330 feet, and a drillstem test was ordered to determine whether or not the formation contained oil in commercial quantity.

A drillstem test allows formation fluids, such as oil, water, or gas from the interval being tested, to rise up the drill pipe, propelled by the formation pressure. On tests of a high-pressure, prolific oil-bearing zone, such as a Devonian reef, oil will rush up the drilling pipe and flow at the surface at a rate of several hundred or even several thousand barrels a day. On tests of less permeable and lower-pressure zones, the formation fluid may rise only a few hundred feet toward the surface, and is then trapped in the drill pipe by a valve. The string of drill pipe, in 90-foot stands, is pulled to the surface to find out what, if anything, has risen in the pipe during the test period.

Nothing flowed to the surface during the test of the Cardium sand. When the valve was closed and the pipe pulled, it was found that the bottom 110 feet of the drill string contained a mixture of drilling mud and formation oil.

It was the first indication of oil that had been found in Socony's new regional district, but there was nothing to indicate a commercial discovery. It looked just like thousands of other oil shows that had been found throughout Western Canada, teasers which eventually produced little or no oil.

Still, there was always a chance that this could be the exception. In Nielsen's opinion the oil found in the drillstem test warranted further evaluation of the formation, if not immediately, then at least after the well had reached its final contracted total depth, another 4,000 feet down. In a wire March 27 to Socony's Calgary office, Nielsen recommended obtaining sidewall cores and running electric logs over the Cardium sand. "We did not obtain a core from the Cardium and it would be very useful to have some for porosity, permeability and fluid content analysis," Nielsen wired. "This would be very useful in deciding future program for Cardium."

An electric log of a drilled hole looks something like a cardiogram chart of your heart. Electric impulses measure the characteristics of the rock sequences penetrated, indicating the top of each and giving some hints as to which formations might contain oil or gas. The log of the Pembina well indicated that the top of the Cardium sand was actually 16 feet higher than had been established by the well site geologist on the basis of the drilling samples. As a result, the interval covered by the drillstem test might have missed the best part of the sand.

"In view of the result of the microlog and sidewall coring, we feel that further testing of the Cardium sand is imperative before the well is completed," Nielsen advised the Calgary office. He recommended that a string of seven-inch casing be cemented in the hole from the surface to a depth of 5,428 feet, and that the hole then be deepened to its projected depth of 9,400 feet. This casing would protect the Cardium sandstone from being plugged up by drilling mud while the hole was being deepened. Later, the Cardium could be further tested through perforations shot through the seven-inch casing.3

The string of intermediate casing was set and drilling resumed, but not without difficulties. On April 6, Nielsen wired Calgary: "Unfortunately yesterday a one-foot wrench was dropped into the hole . . . what do you propose?" The wrench was fished out by a powerful fishing magnet lowered down the hole on a wire line. The spring thaw turned roads in the Pembina area into quagmires and severely hampered the movement of drilling mud and supplies to the well site.

In May, the well reached its total depth of 9,425 feet without encountering further shows of oil, and was plugged back for more tests to further evaluate the Cardium. A perforating gun was lowered down the

hole, and one-inch holes were shot through the casing into the Cardium sandstone. Tests of the formation yielded only very small amounts of oil, far from enough to make a producing oil well. It still looked as though the well was no more than a teaser.

At this point, Nielsen and Jim Warke of Socony's producing department, who had been in charge of drilling operations at the well, decided that a hydrafracing treatment might open up oil-production from the tight Cardium sandstone.

In hydrafracing (meaning hydraulic fracturing), a mixture of oil and sand is pumped down the hole and into the potential oil-producing formation under considerable pressure, resulting in hairline fractures of the rock formation. The grains of sand keep the fractures propped open, and oil is thus allowed to flow through the fractures into the wellbore. The method had been developed only a few years previously in the United States, and had never before been successfully applied in Canada. But Warke, who had started in the oil business at Turner Valley and later worked in the oil fields of the Persian Gulf, had seen the method work and urged that it be applied at the Pembina well. Nielsen agreed.

"A lack of permeability would appear to be the cause of the low oil recovery," Nielsen wrote in a memo to management at Socony's Calgary office. "It is conceivable that a hydrafrac treatment might substantially increase the oil output . . . I wish to express my strong support of a complete and thorough testing of the Cardium sand in the Pembina well. It is our opinion that the Cardium sand may become a major reservoir and a complete knowledge of the potentialities of this sand at the Pembina well will be of invaluable assistance in determining our future exploration in the area."

Wrote one company production engineer: "Nielsen favors hydrafrac treatment of this interval in the hope of substantially increasing oil output. The writer cannot feel any optimism about the possibility of obtaining oil at commercial rates . . . but in the interest of a full evaluation . . . would concur with the recommendation."

"I sure hope you bring that well in," Warke told Nielsen. "I've spent $13,000 without company approval to gravel this road so we can keep this job going. And if you don't bring in a discovery, I may be out of work."4

A mixture of diesel oil and 3,000 pounds of sand were pumped down the hole and into the Cardium formation at a pressure of 1,800 pounds per square inch. The pressure cracked the tight Cardium sandstone, and the oil started flowing into the wellbore. The well was completed on July 1 after tests had indicated an initial production potential of 72 barrels of oil per day. Heavy summer rains in the area had made roads so

impassable that the oil could not be trucked out, and the well was shut in for two months. But on an extended 30-day test in September, the well sustained an oil production rate of better than 200 barrels per day.

Socony-Seaboard Pembina No. 1 marked the first discovery of Cardium oil in Alberta, the first large stratigraphic oil trap in Canada, and the country's biggest oil field — all from a wildcat well which could have so easily been abandoned.

A well with just 30 feet of net pay capable of producing some 200 barrels a day of oil appeared to most of the industry to be no more than a very minor pool, compared with the big Devonian reef fields with 300 feet or more of pay and wells capable of producing several thousands of barrels of oil per day.

What was not generally appreciated was the type of oil accumulation that had been discovered at Pembina. At all the other large oil fields in Canada, structural features had provided the trap in which oil had accumulated, predominantly in the Devonian reef structures. At Pembina, there was no structure. Instead, there was a comparatively thin and relatively impermeable sandstone, spread over a very large area. The wedge-shaped sandstone lay tilted at an angle, the porosity pinching out into impervious shale at the up-dig edge. Oil had migrated through this sandstone until it had become trapped by the shale, forming what geologists call a stratigraphic pinchout trap. There is only a modest amount of oil beneath each square mile of the Pembina field, but the entire producing area covers 1,000 square miles — in area, the largest oil field in North America. But who could know this at the time the first well was completed?

Following the Pembina discovery, Socony drilled a second well 12 miles to the northeast. Here the Cardium formation was mostly shale, with the rock slightly oil stained, and the well was abandoned. A third test was drilled midway between the discovery and the abandonment, and from the Cardium sandstone flowed oil at a rate of 240 barrels a day. Only then did the significance of the Pembina discovery start to become apparent. Oil companies rushed into the area to buy land and drill as quickly as they could.

Under Alberta regulations, Socony and Seaboard had to convert their 100,000-acre reservation into 50,000 acres of checkerboard leases: the 50,000 acres reverting to the government were offered to the industry bit by bit at competitive lease sales. First such sale on January 26, 1954 "exploded Pembina possibilities to the world," Warke later wrote.5 Leases of 160 acres in the proven area sold for prices as high as $500,000 and a pair of reservations of 100,000 acres each brought in a total of $24 million.

The reservations were the big prize at the sale. Socony and other companies drilled as close as possible to these reservations to acquire information on which to base their bids. Daily reports from these key wells were highly secret, and although scouts from competing oil companies kept the wells under the constant surveillance of their field glasses, they learned little. At his home in Edmonton, Nielsen had installed a powerful radio transmitter and receiver. Daily reports were radioed to Nielsen's home, in code. From there, the information was relayed to Calgary and New York.

On the day of the sale, H.R. Moorman, the head of Socony's Canadian operations, arrived in Edmonton with a $7-million cheque for the reservation block closest to production.

"No one had ever paid that much at an Alberta sale before, and we were confident that we would get the parcel," Nielsen later recalled. But when the sealed tenders were opened that day in the offices of the provincial Department of Mines and Minerals, the high bidder for the parcel was Texaco Exploration with a cheque for $13 million. The second reservation was purchased by Imperial Oil for $11 million. Imperial subsequently drilled a series of dry holes on its block, and eventually abandoned the entire acreage without finding a drop of oil. Imperial's block lay just off the edge of the big field.

During the next four years, Pembina accounted for nearly half of all the oil wells drilled in Western Canada. Drayton Valley, in the centre of the field, blossomed from a tiny, isolated village with a population of less than 100 to a model community with a population of more than 2,000.

Close to one billion dollars was spent to develop the Pembina oil field, and more than 5,000 oil wells were drilled. Fifteen years after the discovery well, the field had produced nearly half a billion barrels of oil. Geologists estimated that close to eight billion barrels of oil had been trapped in the sandstone reservoir, of which about 1.7 billion barrels might be economically recovered with the aid of hydrafracing and secondary recovery techniques. The Alberta government reaped close to a quarter of a billion dollars from competitive sales of oil and gas rights and lease rental fees. With an added royalty on each barrel of oil produced, total revenue for the Alberta government from the Pembina field might exceed $ 1billion by the time the last barrel of oil is produced.

Nielsen wasn't too involved in the subsequent development of the field. A year after the discovery well was completed he was transferred to Regina as district geologist for southern Saskatchewan, and later became exploration manager of the company's U.S. Gulf Coast division. In 1967, at 41, he was the first Canadian to become president of Mobil Oil Canada Ltd. As head of one of the principal subsidiaries of the giant U.S. parent,

Nielsen took over the reins of a firm with 800 employees, more than $60 million a year in oil and gas sales, and an aggressive exploration program which spanned Canada from the U.S. border to the Arctic Islands, from British Columbia to the continental shelf offshore from Nova Scotia.

But there were still some surprising turns in Nielsen's career. In 1977 he left Mobil to head Canadian Superior Oil, subsidiary of the Superior Oil Company of Nevada, founded in the 1920s by wildcatter William Myron Keck, who found large oil reserves in California. Canadian Superior was one of Canada's largest independent oil and gas producers, its assets including more than a million acres of mineral rights in Alberta, which came with its 1965 acquisition of the Calgary & Edmonton Corporation.

Mobil did not look kindly upon Nielsen's departure and launched a lawsuit, claiming he had taken with him, locked in his mind, corporate secrets. The final twist came in 1984, when heirs to the Keck fortune were locked in a well-publicized dispute about whether or not the family jewel should be sold. Howard Keck, son of the founder of Superior Oil and former chairman, was staunchly opposed; his sister, Willametta Keck Day, took out full-page newspaper ads urging shareholders to permit a sale. Sister won. The Superior Oil Company, the largest independent oil and gas producer, was purchased by Mobil for US$5.7 billion.

With its ownership of two Canadian subsidiaries, Mobil made Nielsen president of both Canadian Superior and Mobil Oil Canada, a position he held until his retirement in 1994. In 2000, his numerous business and technical awards were culminated by the one he prized most, an honorary doctorate from his alma mater, the University of Alberta. It had been a long road for a boy who had never expected to leave the family farm.

Part Two: Wildcatters and Pipeliners

Chapter 9. The Anatomy of an Oil Philanthropy

During a period of four decades, Eric Harvie and his family gave more than $100 million — probably closer to $120 million — to cultural projects ranging from Charlottetown's Confederation Theatre to a Chinese garden in Vancouver. Measured in today's money, the value of the Harvie contributions would easily exceed a quarter of a billion dollars.

They were the odd couple of Edwardian England, Albert Henry George Grey and Arthur Morton Grenfell.

Grey was the fourth Lord Grey, governor general of Canada from 1904 to 1911. Grenfell was his son-in-law. Together they set the stage for Canada's most spectacular personal oil fortune and one of its biggest philanthropies. Not that it did them any good: all that Grey and Grenfell reaped was financial ruin.

Grey was out to do good, or at least an aristocratic and imperialistic perception of doing good. Grenfell was out to make money. Grey was universally held as a man of impeccable integrity. Grenfell was a desperate gambler whose financial dealings twice placed him in danger of being thrown in prison.

But they worked together. Grey thought his imperial cause could be advanced by Grenfell's financial promotions. Grenfell wanted to please his father-in-law, needed his unstinting support, and envisioned Grey's cause as supporting his own financial endeavours.

It was Africa that brought Grey and Grenfell together, but it was Canada they would later focus on.

The Grenfell family had interests in both these parts of the world. The family dynasty, based on the copper mines of Cornwall, had been established by Pascoe Grenfell in the final years of the 18th century, and the family entered the ranks of British aristocracy when he established a 3,000-acre estate in Buckinghamshire. Pascoe Grenfell's many progeny_ were noted primarily as bankers and military men: three generations of Grenfells were directors of the Bank of England while the many military Grenfells included a field marshal and a vice-admiral of the Brazilian navy. Other Pascoe progeny included a poet, historian, politicians, and Wilfred Grenfell, the medical missionary who built hospitals, nursing stations, an orphanage, and a medical ship to serve the isolated coastal comm
unities of Newfoundland and Labrador.

Arthur Morton Grenfell was a great-grandson of the dynasty's founder and the sixth of eight sons and five daughters of Pascoe du Pre Grenfell, a partner in the merchant bank of Morton, Rose and Company, the Canadian Pacific Railway Company's biggest initial underwriter. The other partners were Levi Morton and Sir John Rose. Morton was a New England storekeeper who established a New York banking firm before becoming a governor of the state of New York and later a vice-president of the United States. Rose was a confidant of John A. Macdonald and a former finance minister of Canada. When the CPR in 1881 raised its initial $5 million in Britain, it was Morton, Rose and Company that subscribed for the largest single block of shares, $766,000 worth.

The Grenfell connection with South Africa was initiated in 1859 when Francis Wallace Grenfell, Arthur's uncle, then a young ensign and later Field Marshal Lord Grenfell, began nearly half a century of military service there that helped expand the British Empire from Cape Horn to the Mediterranean. All of Arthur's seven brothers would later see action in Africa, either as full-time professional soldiers or part-time reservists. The action wasn't all military. Even the field marshal became a director of the Bank of Egypt, and other Grenfell commercial interests in South Africa soon followed.

Grey's interest in South Africa stemmed from his staunch support of the fortune-seeking, colonizing, Empire-building Cecil Rhodes. Grey viewed Rhodes' and other British firms as instruments of foreign policy in bringing the advantages of British civilization to a benighted world. Serving a one-year term as colonial administrator of Rhodesia, Grey viewed a native rebellion there "as an inevitable result of the white settlement — a last struggle of a people who stubbornly but naturally resisted what was good for them, white civilization."1 Grey assumed a leading role in three of Rhodes' most important companies, as chairman of the Charter Trust and Agency Limited, vice-president of the British South Africa Company, and director of the African Transcontinental Telegraph Company.

It was at Chaplin, Milne, Grenfell & Co., successor to the Morton, Rose and Company bank, that Albert Grey and Arthur Grenfell became associated, financially and as staunch friends. Grenfell joined the bank in 1898 as a junior partner, shortly after his father's death. The 25-year-old Arthur by this time had six years of training at what became the large Morgan Grenfell bank where an uncle was a partner, and had served as London director of Willoughby's Consolidated Company, an Anglo-African mining company. The two English managing directors of Willoughby's were in prison over their role in a paramilitary raid that had attempted to overthrow the Boer government of South Africa. Among the 500 who rode in that ill-fated Jameson raid, a precursor of the South African War that soon followed, was one of Arthur's brothers. Arthur Grenfell was also active in financing mining ventures in Spain, the United States, and especially Africa, among other endeavours.

With their shared African interests, it doesn't seem surprising that Albert Grey would do business with the Chaplin, Milne, Grenfell & Co. bank. Grenfell managed Grey's investment portfolio. Grenfell also became a director of the Charter Trust and British South African Company, the Rhodes companies in which Grey was very active. In 1901, Grenfell married Lady Victoria Sybil Mary Grey, Albert Grey's daughter and Queen Victoria's goddaughter.

There is nothing to suggest that Grenfell was anything other than successful in managing his father-in-law's financial affairs. His own speculative investments were an entirely different matter. He may have been born into a wealthy family but under the English custom of primogeniture there is precious little left for a sixth son. It may have been because he was determined to build his own fortune that Grenfell became a bold, speculative investor, and when these speculations turned sour, a desperate gambler driven to unsound action.

Arthur Grenfell had a "craze for speculation [that] has unbalanced his judgment," his brother-in-law, Major Guy Stewart St. Aubyn, a director in Grenfell's biggest enterprise, would later complain to Earl Grey. St. Aubyn wrote that "Arthur suffers from a sort of financial megalomania. Figures, facts, transactions, ideas appeal to him because they are big rather than because they are sound. Consequently facts are often confused with fiction — with disastrous result."2

That craze for speculation put Grenfell £111,000 in debt in 1902, in trouble with the London Stock Exchange, and in danger of prison over alleged misconduct by an associate. He was rescued by a family board of trustees that took over the management of his troubled finances, with the help of a £65,000 loan from his father-in-law. Grenfell vowed to mend his ways, recover his lost fortune, and redeem his reputation. Possibly his biggest reform was to speculate on a bigger scale. The next time he was bankrupt, his debts were not a mere £111,000, but more than £1 million.

Two years after he had helped rescue his son-in-law, Grey left London for his seven-year term as governor general of Canada. His interests continued to hopscotch among the many causes he enthusiastically promoted, from the Garden Cities movement aimed at bringing sunshine to the "streets upon streets of sunless slum" in the smog, smoke and squalor of early-20th-century big cities, to the theatre, the arts, and Canadian football, to which he donated the Grey Cup. To his biographer, Grey was "a genius of ideas, fancies, and imaginations." No man, said a close associate, "had more babies than Albert Grey, but he was always leaving them on the doorsteps of his friends — he simply hadn't the time to bring them up himself."3

Chief among the causes promoted by Grey as governor general of Canada was strengthening British ties by importing British capital and "young Englishmen of the right class." He even saw "young Englishmen of character and good manners" as a means to provide both Britain and Canada with a commercial advantage in Latin America. "The Latin races do not like Americans, whom they regard as cads and bounders," he

wrote. “They will prefer to give what they have to give to men whom they regard as gentlemen.”

Just as Grey saw Rhodes’ companies as an instrument to carry British interests and civilization to Africa, so too could British enterprises bring the same benefits to Canada. What Rhodes was to Africa, Grey apparently envisioned his son-in-law being to Canada. It was at Grey’s urging that Arthur Grenfell organized an investment agency that would become the unsuspected owner of billions of dollars worth of oil and gas hidden under the prairie soil of central Alberta.

The Canadian Agency and the CPR lands

The vehicle which Grey and Grenfell hoped would bring both British money and young Englishmen of the right class to Canada was the Canadian Agency. Organized in 1906, it was Grenfell’s personal investment company: he held 50,000 of the 51,007 issued shares, with his brother, Riversdale Nonus, and brother-in-law Major Guy Stewart St. Aubyn, each holding 500.

The Canadian Agency’s main focus was in Canada but it was also involved in financing an oil company in Russia, railway construction in Chile, mining in South Africa, Mexico, and California, and other endeavours. In Canada, it sold bonds for provincial and municipal governments, and was involved in such enterprises as Ogilvie Flour Mills, Algoma Steel, Canada Cement, Lake Superior Paper, the Algoma Eastern, Algoma Central and Hudson Bay Railway companies, a mortgage company, and various real estate development and land settlement ventures. The Agency — that is to say, Grenfell — at one point controlled more than three million acres in Canada. In Saskatoon, the Canadian Agency sought to develop a hydroelectric project, a railway streetcar system and a new residential subdivision, all aided by bribes to appropriate city aldermen.4

The Canadian Agency and the Chaplin, Milne, Grenfell bank shared premises at 6 Princess Street in London. It was a cozy relationship. Grenfell was both the Canadian Agency and a director and senior partner in the bank. Grenfell introduced wealthy friends who deposited money with the bank, and the bank loaned the money to Grenfell for investment — or speculation.

The Canadian Agency’s ventures seem, for the most part, to have been successful, but perhaps none more so — at least for Grenfell and his friends — than the Western Canada Land Company. The Agency and the land company were formed within weeks of each other. In January, Grenfell had helped negotiate the purchase of half a million acres of land and mineral rights in central Alberta from the CPR. The purchase price was $2 million, with a down payment of $50,000; the rest was to be

raised by shares sold by Chaplin, Milne, Grenfell. The purchase agreement with the CPR was assigned to Western Canada Land, for which it issued 150,000 shares to Grenfell and his associates. Since they had put up only the $50,000 down payment, their holdings in Western Canada Land cost them 33 cents per share. Later shareholders brought in by Chaplin, Milne, Grenfell paid $15 each for 300,000 shares to cover the remaining purchase price of the land and mineral rights. In a matter of weeks, Grenfell and his partners had a profit of $700,000 on an investment of $50,000.5 They also retained a substantial interest in one of the largest spreads of freehold oil and gas rights in Alberta, on a thousand parcels of farm land scattered throughout central Alberta.

Profits were not as swift for Western Canada Land. It reckoned the cost of its property at $5.30 per acre, and it hoped to sell the land at between $6.50 and $15 per acre. This was at the peak of the Western Canada land boom, when more than a million immigrants from the United States, Europe and Britain flooded into the prairie provinces to settle on government and railway land grants during three decades before the First World War.

In 1910, the Canadian Agency and Western Canada Land obtained the services of a new representative in Edmonton, Harry Marshall Erskine Evans, later a mayor of Edmonton, who would be associated with the affairs and misfortunes of the half-million-acre property for the next 33 years.

By 1912, Western Canada Land had sold nearly 300,000 of its 500,000 acres and an additional 150,000 acres was said to be subject to a firm purchase commitment. Significant profits had been distributed by way of dividends. Cash in the bank amounted to £160,000, while investments in mortgages and other assets were valued in excess of £285,000 — large sums in 1912.6 The future of Western Canada Land looked rock solid — until the craze for speculation once more gripped Arthur Grenfell.

That year, Grenfell began accumulating shares in the Grand Trunk Railway, then building a third, ill-fated railway across Canada to the Pacific coast. His plan was to acquire control of Grand Trunk, using money borrowed from the Chaplin, Milne, Grenfell bank. That Christmas, he suffered a serious injury in an accident while horseback riding. His brother Riversdale took temporary charge of affairs at the Canadian Agency, St. Aubyn having by this time left in despair over Grenfell's financial speculations. Rivvy was neither very knowledgeable nor interested in financial matters: what he really wanted was to be a soldier, but lacked the money to buy a commission. By the time Grenfell had

recovered from his accident, four months later, the price of Grand Trunk shares had crashed, and his ruin was just a matter of time.

There was not only financial ruin, but, again, a risk of prison. Natomas, the California land and mining syndicate in which Grenfell had been involved, had started court action against both Arthur and Rivvy, charging them with misappropriation of funds. The Canadian Agency had held a £125,000 trust fund for Natomas, which alleged that Arthur and Rivvy had used the money to invest in such blue-sky ventures as the Western Ocean Syndicate. Natomas backed off when it discovered there was no money in the Canadian Agency to collect. Russian creditors couldn't be held off, and Grenfell and his empire collapsed, despite the efforts of Earl Grey to once more rescue him.

The venerable Times of London reported the collapse on August 6, 1914, with proper British restraint under a small headline that read simply, "The City Failure." The front page of the New York Times was more explicit: "BIG LONDON BANKING HOUSE SUSPENDS. Chaplin, Milne, Grenfell & Co. Hard Hit by Canadian Commitments. Earl Grey is a heavy loser."

By the time the dust finally settled, Arthur Grenfell wound up more than £1 million in debt. The Canadian Agency brought down with it not only the Chaplin, Milne, Grenfell bank but brokerage houses and many of the firms Grenfell was involved with and owed money to (he was on the board of 14 firms and chairman of eight). Among those brought down was the Western Canada Land Company. It had £54,000 on deposit with the bankrupt bank, without any security, and was placed in receivership.

The final humiliation, perhaps, occurred when Christie's auctioned off 67 of Grenfell's pictures, Old Masters by such artists as Gainsborough, Reynolds, and one that was possibly by Titian. They brought less than half of what Grenfell had paid for them.7

Long before the receivers had wound up matters, Grenfell and his brothers were in the thick of action in the First World War. Two of the eight brothers had been killed some 15 years earlier in the South African War. Two more would be killed in the war that was supposed to end all war.

Raking the ashes over half a million acres

Eventually, Western Canada Land would, like a phoenix, rise again from the ashes, under a new corporate mantle, British Dominions Land Settlement Corporation Limited. The resurrectionists included Mervyn A. Brown, a go-getter former mayor of Medicine Hat; Herbert Greenfield, the homesteader from England who became the first non-Liberal premier of Alberta; John C. Dallas, a hustling Calgary oil promoter; and such

English investors as Sir Edward Manville, chairman of the Daimler car manufacturing company and Phoenix Oil and Transport.

By the time the First World War was over, it was clear that the boom in Western Canada farm lands was finished. At the crest of the flood, in 1914, 400,000 immigrants had arrived in Canada; between the two world wars the number of new arrivals averaged barely more than 40,000 a year. Crop failures, lower produce prices, unemployment and restrictive immigration policies were all factors.

Mervyn Brown spent five years promoting a grand vision of settlement on 30 million acres of still unsold railway lands on the prairie provinces. He imagined the sale of these lands creating 100,000 new farms which would support half a million people on the farms and another half million in prairie towns and cities. Farms and factories would flourish everywhere and the "national wealth" would be increased by $2.6 billion. All that was needed, Brown preached, was a co-operative effort by the railways, provincial and federal governments, and business.

Brown's "national land settlement plan" never got off the ground, but it did lead to the formation of British Dominions Land Settlement Corporation. Organized in 1925 with British financing, British Dominions acquired from the receiver for Western Canada Land title to some 488,000 acres of mineral properties and 260,000 acres of unsold farm lands in Alberta. Debenture holders of Western Canada Land recovered £100,000 of their investment of £500,000: 20 cents on the dollar after going without interest payments or dividends for 12 years. British Dominions then embarked on what Canadian Press called "a colonization scheme for central and northern Alberta which exceeds in magnitude anything of the kind which has been put into effect in this province."8

It took British Dominions nearly two decades to sell the rest of its Alberta farm lands. Searching for oil and gas under these lands proved even more frustrating. The mineral rights under the 488,000 acres of the farm lands consisted of 996 separate parcels scattered throughout much of central Alberta.

A new venture, Anglo-Western Oils Limited, was organized in 1931 to look for oil on these and other Alberta oil properties. Recruited to manage this venture was Herbert Greenfield, the English-born farmer and homesteader who for four years to 1925 had been premier of Alberta as leader of the new United Farmers of Alberta. Greenfield was soon managing director of Anglo-Western, British Dominions, and Calmont Oils, a job he held until his death in 1949. It was not an easy task.

Anglo-Western issued a total of 1,350,000 common shares, including eight qualifying shares to the directors; 750,000 shares to Dallas and his

associates for leases near the Turner Valley field; and 599,992 shares to British Dominions Land Settlement for the right to obtain 999-year leases on its 488,000 acres of freehold properties. British Dominions would also receive a 10-percent royalty from the sale of any oil or gas that might result.9

To finance its search for oil, Anglo-Western planned to issue eight percent, 10-year first mortgage bonds to a total of £100,000, or close to $500,000. But bonds were hard to sell in 1931, and Anglo-Western raised only $198,000, with all of this from the shareholders of British Dominions.

Anglo-Western used most of its borrowed capital to buy 100,000 shares of Calmont Oils at a price of $1.50 per share. Two years later, Calmont shares were trading for less than five cents each. More money was sunk in a dry hole. What was left was used to purchase a one-percent royalty in two Turner Valley oil wells, providing a trickle of revenue that barely paid the rent. The leases near Turner Valley that Anglo-Western had purchased for 750,000 shares were abandoned. By 1938, unpaid interest on the debentures amounted to $138,000. The debenture holders put the company in receivership.

British Dominions and Anglo-Western fared even worse than Calmont Oils. They were both unmitigated failures.

In late 1932 Greenfield wrote to Manville in London, outlining the difficulties that Alberta farmers and British Dominions faced in the midst of the Great Depression. Immigration had come to almost a complete stop, Greenfield reported, while farm prices had fallen to "the lowest level in the history of Western Canada," in many cases failing to cover the cost of production. The result, said Greenfield, is a "serious decline in volume of collections on land payments and lease rentals."

"The man on the land in Western Canada," Greenfield wrote, "is facing the problem of meeting the liabilities entered into . . . on the basis of wheat at 25 cents per bushel. In other words, it takes four times the volume of grain to pay a creditor a given amount than it did when most of the company's lands were purchased."10

British Dominions attempted to cope by closing its Vermilion sales office, re-organizing the field staff, and reducing salaries. In February 1931, the company's debenture holders had approved a two-year moratorium on interest payments by farmers who had purchased but not yet fully paid for land, but the moratorium was about to expire. "While I regret the impelling circumstances," Greenfield wrote to Manville, "I desire to urge upon the Board in the strongest possible terms the necessity for a renewal of the moratorium now in effect, for at least a further period of two years."

There was, however, at least some hope for relief in the search for oil being conducted on the company's lands. Frontier Developments Limited, with an option to sublease from Anglo-Western, had undertaken "extensive and thorough geological exploration for oil" which was said to have "revealed a promising structure." A deep well was drilled by Frontier but, like other wildcats on Anglo-Western leases, it turned out to be another dry hole.

In November 1936, Greenfield wrote to the Alberta Companies Branch seeking a reduction in the annual $500 corporation tax, which was based on the firm's authorized capital. The company's only assets, Greenfield explained, were its leases from British Dominions:

> I would hesitate to place a value on mineral rights. They have no market value under present conditions. Considerable geological work has been done. Two wells have been drilled in the Brosseaus and Two Hills districts. Both were dry holes. The company is not in a position to undertake any exploratory work. The failure of the test wells drilled renders it difficult to interest capital for investment.11

Again in May 1938, Greenfield once more wrote to request a reduction in the corporation tax. "Due to financial difficulties the company has been unable to proceed further with the original plans for exploring and developing the petroleum and natural gas rights held by it," Greenfield wrote. He expressed the hope that "at some date its finances can be so arranged that some program of exploration and development of said leases may be undertaken." Geophysical examination of the eastern part of the company's properties was meanwhile being carried out by Toronto and California interests.

On July 28, 1939, a London accountant, Norman W. Wild, was appointed receiver and manager of Anglo-Western Oils by trustees of the debenture holders. Harry Evans and Edmonton lawyer Sem W. Field were subsequently appointed to act as agents for Wild. Trustees for the English investors who had sunk $198,000 into Anglo-Western were Sir William Cope and Commander Archibald Eaton de Burgh Jennings.

The start of the Second World War did nothing to facilitate administration of Anglo-Western Oils by its London receiver and his two agents in Edmonton.

The problem of the corporation tax levied by the provincial government grew worse; the annual rate was increased to one thousand dollars. By October 1940, Anglo-Western was $5,000 in arrears. Evans wrote to the Deputy Provincial Treasurer to explain the problems: "Mr. Wild's great difficulty, is that one of the trustees for the debenture

holders [Jennings], whose signature is required . . . is a commander in the British Navy, now on active service. Moreover, due perhaps to the bombing of London, even cables which we have sent to Mr. Wild remain unanswered."12

Anglo-Western was being kept alive, Evans explained, only because it would cost too much to wind it up. Before the company could be wound up, title to all the 996 mineral properties would have to be vested in the trustee, "and the vesting of the titles in the Receiver would cost much more than the whole thing is probably worth," Evans added.

The oil prospects on this spread of former CPR railway grant lands had never looked bleaker. Yet three years later, these mineral rights would be sold in what would prove to be the most spectacularly successful gamble in the history of the Canadian oil industry.

The $10,000 gamble

It took Calgary lawyer Eric Harvie only 20 minutes on a summer morning in 1943 to consider an opportunity from Harry Evans to purchase the freehold mineral properties that lay under nearly half a million acres of farm lands in central Alberta. Then he made an offer, which was soon accepted. Harvie had just agreed to pay $10,000 for sole ownership of recoverable oil and gas reserves with an ultimate sales value of hundreds of millions of dollars at 1940 prices, and billions of dollars at today's values.

With this acquisition, Harvie would become an oil developer different in an important respect from virtually all other Canadian oil explorers and developers, and more akin to American wildcatters. The fortunes of American oil finders, at least until late in the 20th century, had all been based on individual freehold ownership of the mineral rights. In Canada, of course, most of these rights are owned by the provincial and federal governments, and through them it is the public that has reaped the major share of net profits. Harvie's newly acquired holdings were the third largest spread of freehold oil and gas rights in Alberta, exceeded only by the CPR, the Hudson's Bay Company, and the Calgary and Edmonton Corporation. These rights were thus owned by thousands of shareholders, unlike Harvie's. No one in Canada, before or since, has personally owned as much oil and gas as Eric Harvie.

Harvie, of course, had no idea that he was buying all that oil and gas. No one did. Most Alberta oil experts, in fact, thought that the chances of finding commercial accumulations of oil or gas under these lands was pretty remote. During nearly half a century, 38 wells had been drilled in search of oil or gas on or adjacent to this checkerboard block of mineral properties, without finding anything encouraging.

Nearly every wildcatter and oil company in Alberta had looked at these mineral properties at one time or another. A few had taken reservations or leases from British Dominions, its subsidiary Anglo-Western Oils, or the predecessor Western Canada Land Company.

One impediment to exploration lay in the great amount of painstaking work required to check and validate the title to 996 individual properties. But even after Harvie and his associates had taken care of that task, the opportunity to acquire these well-hidden petroleum resources was turned down by dozens of oil companies, one after another. It was only because he was unable for several years to get help from the oil companies in exploring his properties that Harvie's $10,000 purchase turned into a $100-million public philanthropy.

Harvie may well have guessed why Evans had phoned so early that particular morning, saying he had to catch a train to Winnipeg at 11 a.m. but wanted to see Harvie before he left.

Harvie was very familiar with these properties. He had negotiated leases to a number of the properties for several of his oil clients, starting shortly after the First World War. "I had known of the acreage for a great many years and there was always a question of title," Harvie testified in 1956 during an appeal to the Exchequer Court of Canada against income taxes levied on his subsequent sale of some of the properties. "I had investigations made, or personally investigated, the titles to these lands and I had my own view as to what the title consisted of, so I was really familiar with them."13

He had not only negotiated leases for his clients, he had also, in 1941, leased some of these rights for one of his own ill-fated exploration ventures. He knew the precarious position of British Dominions and its subsidiary, Anglo-Western Oils; that they had been placed in receivership by the bondholders; and that they were in arrears in payment on provincial and municipal property taxes. Evans, in fact, had earlier told Harvie that the receiver and trustees for the bondholders hoped someday to be able to unload the property and get some money. Harvie replied (according to his testimony in the tax appeal), "Whenever you feel like that, give me first chance." So Harvie may well have guessed that Evans wanted to see him to give him that first chance to buy the properties.

The man from Orillia

If Eric Harvie had been a conventional oil man he might never have bought the half million acres of mineral properties, with their tangled titles and tax obligations. But Harvie was more lawyer than oil man, and anything but conventional.

He was a lawyer with a passion for painstaking detail, a penchant for the complexity of the smallest business problem, and a love of bold

ventures on a grand scale. He made quick, almost impulsive decisions on big gambles, but studied small deals endlessly. Horace (Hod) Meech, one of his closest business associates, recalled that Harvie had no difficulty deciding to gamble millions of dollars on an Arctic drilling venture, but could not make up his mind about drilling a shallow well on the outskirts of Calgary. His vision encompassed vast undertakings but his managerial style was that of a small town prairie lawyer who had never learned how to delegate responsibility. When Charles Barlow, in charge of Harvie's drilling operations in the Redwater field, was informed that he had been authorized to approve expenditures of up to several hundred dollars, Barlow exploded, "Hell, my cigar bill is more than that."

Harvie had served in the trenches during the First World War and patrolled Calgary's Glenmore reservoir on horseback during the Second World War. He became reputedly the wealthiest man in Canada, but lived in the same modest bungalow for more than half a century and drove an even more modest Studebaker. He was fascinated by the prospects promised in the development of the West's resources, particularly oil and gas, but abhorred public stock promotions.

He never spoke to journalists. He was married to a Southam, was a director of the Southam newspaper chain, and had been an associate and long-term close friend of a former publisher of Southam's Calgary Herald. Yet such was his passion for privacy and anonymity that when he officially opened the Glenbow museum for public display of his collection of thousands of artifacts, the news media were explicitly excluded from those invited to attend. When a Herald reporter was discovered hiding behind an antique to record the event, he was "unceremoniously ousted" with the quip, "Too bad they outlawed the whip."14

Many of his staff viewed him as the most compassionate and generous man they knew, while others viewed him as a penny-pincher; a man who paid all the medical expenses for an employee with an extended illness then offered him a month-long vacation anywhere in the world, but who reputedly deducted $5 from the final pay of retiring caretakers at his ranch for groceries they had taken with them. He was an avid collector of things — some 140,000 things that wound up in Calgary's Glenbow museum, from the Duke of Bedford's collection of moths, birds' eggs, and stuffed animals, to a pair of bloomers once worn by Queen Victoria. It was, perhaps, Eric Harvie's idiosyncrasies as much as his millions that, for Calgarians, made this tall man with the clipped, regimental mustache and intense brown eyes, an enduring, and even an endearing, legend.

Harvie was born on April 2, 1892, in Orillia, Ontario, the small town made famous as Mariposa by Stephen Leacock. The Harvie family was

well known in Orillia, where Eric's father was a dentist and other family members included doctors, lawyers, and a judge.

Eric Harvie was 19 when he first arrived in Calgary in the winter of 1911 to live in the home of his uncle, Dr. J.D. Lafferty, a former mayor of the city, and to article in law with another uncle, James Short of the law firm of Short, Ross, and Soldwood. Harvie studied law at Osgood Hall in Toronto and had articled to read law with John Thomas Mulcahy in Orillia, but the articles had been assigned to James Short and Harvie began his service with the Calgary firm on November 20, 1911.

The Calgary law firm included a number of newly formed oil ventures among its clients, and Eric Harvie soon found his interest absorbed by the fascinating quest for petroleum wealth. Calgary's first oil boom would not explode for more than another two years, with the completion of the first small oil discovery at Turner Valley, but already it was gathering steam. The wildcatters, promoters, visionaries, adventurers, and fortune seekers were all drifting into this frontier cow town, with the smell of oil in their nostrils, when Harvie arrived to article in law. Forty-five years later he recalled,

> I have been interested in oil and gas since 1911. Ever since a boy, ever since I started practicing law . . . I had a bent to acquire basic natural resources and during my career I have acquired a lot and I always have held them where I could or surrendered them where I couldn't afford to keep them, or to develop them, but my approach was always to try and develop them ourselves . . . I always had a fascination for the development of these [resources]. I never did any public financing.15

Harvie's career as a young corporate lawyer and oil speculator was interrupted by the First World War. June 1917 found him in the trenches of France, a lieutenant with the 49th Battalion, Canadian Expeditionary Force. That fall, in the battle at Courcallete on the Somme Front, Harvie was severely wounded by an exploding shell, and buried under mud and debris. Wounded in the elbow, knee and hip, pinned down by sniper fire, Harvie crawled from shellhole to trench to shellhole. Two of his rescuers were killed, and Harvie was left with a lifelong recurring fever. He was hospitalized for more than a year, first in England and then in Toronto, before being seconded to the Royal Flying Corps in August 1918, serving as an adjutant at flight training camps in Ontario and Texas, and finally discharged in January 1919 with the rank of captain.

While stationed in Ontario he met Dorothy Jean, daughter of Frederick Neil Southam of Montreal, scion of the wealthy Southam

family, and soon after he had returned to the practice of law in Calgary, they were married.

Harvie was now a junior law partner of Clinton J. Ford, later chief justice of Alberta, and Leo H. Miller. During the next quarter of a century, his oil industry clients included such firms as British American Oil Company, Okalta Oils, Hughes Tool Company, Dow Chemical, drilling contractors Newell and Chandler, Barber Machinery, Schlumberger, National Supply Company, and E.L. Cord, a Californian who had made his name as the maker of the Cord automobile and who, in the 1930s and early '40s, searched for oil and gas in Alberta.

In acting for private syndicates or public companies, where he sometimes served as corporate secretary, Harvie often took a piece of the action, investing in more than 80 different oil ventures, according to Hod Meech. He was a founding director of Okalta Oils, formed in 1925. He helped finance the Turner Valley Royalties oil discovery in 1936, and a later northern extension of the field drilled by S.C. Nickle's Northend Petroleum, and a number of ventures at Ribstone, Wainwright and Lloydminster where accumulations of heavy oil yielded small wells that were, at best, economically marginal. In 1926 he incorporated Managers Limited under a federal charter to provide corporate and management services for oil, ranching, and land interests, and to manage his own expanding interests in these areas. Like any wildcatter — and especially Alberta wildcatters before 1947 — Harvie's ventures included only a few winners and a lot of losers. Among the losers he founded was Ribstone Oil Company, in which he, many of his office staff, and some of his friends lost all that they had invested.

In his work for the oil companies and in his own investments, Harvie was able to make use of his expertise in the legalities of land titles in Western Canada. After the First World War, he had won the contract for the legal work in connection with the transfer of land grants throughout the prairie provinces to returning soldiers under the Veterans Land Administration Act. The work involved checking titles to thousands of properties. Harvie hired a staff of more than 30 lawyers to process the grants, working around the clock at his Calgary office on a three-shift basis. To oversee the work, Harvie was at his office for a part of each of the three eight-hour shifts, five days a week. "He was a very, very hard worker," his son, Don, later recalled. His thorough understanding of the Western Canada land tenure system was especially useful in his later study of the British Dominions properties, their purchase, and the work involved in clearing the titles.16

Harvie may have been a corporate lawyer with an enormous capacity for detailed paperwork, but he was far more than a desk jockey. He loved

the outdoors. He was an expert hunter, fisherman, marksman, and trail rider, as well as an active rancher. He was a close friend of George Hume of the Geological Survey of Canada, probably Canada's most acknowledged expert on petroleum geology during the 1930s and '40s. On summer weekends the Harvie family often packed picnics and drove out to join Hume at fly camps in the mountains or foothills. "We would spend the day in the country and Dad would go off hiking with George and sometimes we (Don, his brother, and his sister) would tag along," Don recalled. "They loved to talk about the possibilities of oil and gas reservoirs that lay along the front of the foothills."17

As a government geologist, it was certainly not any expectation of personal wealth that motivated George Hume to scramble over mountain outcrops and envision the development of petroleum resources in the foothills and plains of Alberta. Nor was it likely the thought of wealth that primarily motivated Harvie to share the same vision. They were both witness to the struggle and hardship of Alberta's early settlers in an empty land, and driven by the frontier religion that was called "development."

When the Second World War came, Eric Harvie organized the Calgary Mounted Constabulary, serving first as troop leader, then assistant commandant and finally commandant. Members of the Calgary Mounted Constabulary equipped themselves with horses and 30-30 rifles in scabbards, donned shiny, black riding boots, held frequent rides and drills and patrolled the Glenmore reservoir to safeguard Calgary's water supply. Don and his younger brother, Neil, kept their father's boots and buttons shined.

The properties under new management

Service with the Calgary Mounted Constabulary did not halt Harvie's quest for oil and gas, particularly in the Rusylvia area near the eastern edge of the British Dominions land block.

Harvie began to assemble a block of oil and gas leases at Rusylvia, which he later said "took a good many years to put together."18 Included were leases from the Alberta government, the CPR, and Anglo-Western Oils. From August 8, 1941 to November 26, 1942, Harvie made five payments to Anglo-Western totalling $2,840.64 for leases at Rusylvia.

Harvie later said that he had "arranged financing for a large development program [at Rusylvia] but I had done a lot of seismic work at my own expense. It was all at my own expense." His work at his own expense included a geological study by Hume, summarized in a report dated October 28, 1940; a further geological survey by Hans Lundberg Limited in 1941; and a seismic survey by Heiland Research Corporation

in 1942. But with the wartime shortages, Harvie was forced to surrender much of the acreage, “because we couldn’t get the equipment, we couldn’t get the pipes, we couldn’t get the money, we couldn’t get the personnel, we couldn’t get anything.”

But Harvie did manage to keep some of the leases, including three sections from Anglo-Western, and put this acreage into Rusylvia Oils Ltd., which he incorporated on March 4, 1943. Rusylvia was owned almost entirely by Harvie.

His venture at Rusylvia had brought Harvie into contact with another speculator in oil ventures who later became an important partner. Bill de Koch was a consulting petroleum geologist from California, a veteran hunter who had searched for oil throughout much of the United States, sometimes searching for clients and sometimes on his own. One of the firms with which he had long been associated was the Barnsdall Oil Company of Los Angeles.

De Koch came to Alberta in 1940 to look for oil in the Lloydminster-Vermilion region, including Rusylvia. Like Harvie, he had leased a few sections of land from Anglo-Western, as well as from others. De Koch was a “lone wolf,” according to Harvie, who described his partner in these words:

> He is quite an outstanding oil man of long standing. I think that for a long term view of a geologist he is the best thinker in the world. I have seen him work up North and I had made inquiries about him. The companies he was employed by described him as a thinking geologist and . . . I think his thinking was way ahead of any geologist I have known. He was up there with his own money . . . and I thought it was invaluable to have an associate like that.19

The play at Rusylvia, however, was in a state of limbo when Harry Evans hurried over that morning in the summer of 1943 to the office of Eric Harvie and his two law partners, Ed Arnold and George Crawford (who was then in Europe on active service with the Canadian Army). Harvie recalled what happened after Evans reached his office:

He had to leave for Winnipeg at eleven that morning to meet people from New York that were interested in it and just wanted to have a talk and give me the first right of refusal . . . I asked him what kind of deal he had in mind with these people and he told me. I said, “Aren’t you getting from the frying pan into the fire?” He said, “Yes, but these people want to get rid of it at any cost.” I said, “I can do better than that. I think a deal like this might appeal to you,” and we discussed the thing and within 20

minutes, half an hour, we had a deal, subject to it being confirmed by old-country liquidators, and I might say that I really didn't have much time to decide what I was going to do [with the property] or why.

Subject to acceptance by the liquidators in England, Harvie had agreed to pay $10,000 for the properties, and to assume the arrears in provincial mineral taxes and municipal taxes, which turned out to amount to an additional $7,942.49. He also faced the task and cost of transferring titles, which added another $5,797.00. Thus, the total cost of the properties, including the purchase price, back taxes and fees to transfer titles, amounted to $23,739.49. But $10,000 was all that Eric Harvie and his office associates ever invested, and even this investment was recovered in a matter of months. From then on, it was all profit. After Harvie had concluded a handshake deal with Evans, he offered his office associates — Arnold, Crawford, and his secretary, Nettie Cooper — a total of 10 percent interest in the properties. The sale was quickly agreed to by the English interests, and the agreement was signed on September 7, although it was another 10 months before the deal was completed and Harvie took possession of the properties.

After Harvie had agreed to a deal with Evans, Arnold later said:

> The first and big job that we had to do was to prove our titles and that was a tremendous task. In searching back through those thousand titles we found a considerable number of errors that had been made. We also found that the description of a lot of the lands had reference to boundaries of certain lakes. The lakes had changed their locations in the meantime . . . that involved nearly a year and a half.20

Still, it must have seemed like a pretty good buy, all things considered. Although the chance of finding oil and gas by this time seemed remote, it was still a long-shot possibility, and long-shot ventures were the very essence of the oil business. Meanwhile, there were good possibilities for other resources, including salt, coal, sand, and gravel. The carrying charges were modest, the main item being the annual provincial tax on freehold mineral properties; this was half a cent an acre, or less than $2,500 per year for the entire spread, although by 1946 the tax had been tripled to nearly $7,500 per year. Against this, Anglo-Western had collected $6,739.61 in lease rentals and fees during its last fiscal year. A few months after the purchase, Harvie wrote to de Koch: "I believe it is possible that this income can be maintained if not considerably increased if only a definite policy of handling the minerals is adopted."

Whatever risks Harvie and his office associates faced were soon eliminated by a deal made with de Koch less than a month after the purchase agreement had been signed. It was de Koch, apparently, who approached Harvie, seeking to acquire an interest in the British Dominions lands. Harvie agreed to sell up to a half interest in the lands for $120,000 — 24 times his per-acre purchase price. De Koch also agreed to pay rent on Rusylvia's leases ($49,000 for three years) and to drill three wells, all of which later turned out to be dry holes.

Meanwhile, de Koch and his partner, George Bauerdorf of Los Angeles, seemed either to have had problems in finding the money to buy into the British Dominions lands, or to have lost interest. In any event, the option to acquire 50-percent ownership was extended six times, from November 15, 1943, to April 17, 1944, when they finally purchased not a half interest, but a one-eighth interest, for $30,000.

Nevertheless, the $30,000 allowed Harvie and his associates to recover their initial $10,000 investment, with $20,000 left over. This $20,000 was then loaned to finance two new companies that Harvie incorporated on April 21, 1944. Western Minerals was organized as the holding company to take title to the half million acres of mineral properties, while Western Leaseholds, intended as the active company, acquired the option formerly held by Anglo-Western Oils to lease any or all of the subsurface properties for up to 999 years.

It was probably the most unique financing that Canada's oil industry has ever seen. All of the shares of Western Minerals were issued to the Harvie syndicate (Harvie family 78.9 percent; Harvie's office associates, 8.6 percent; de Koch and Bauerdorf, 12.5 percent) in return for title to the properties. All of the shares of Western Leaseholds were issued to the same syndicate in return for the right to lease the properties. In addition, Western Leaseholds issued $250,000 in debentures to the syndicate members. Neither Western Minerals nor Western Leaseholds ever sold shares for money. The entire financing for their operations came from the $20,000 loan from the shareholders, and from revenues generated by the properties, as well as later bank loans.

It was a few years before the money started rolling in, years in which Harvie, de Koch, and Bauerdorf scoured the continent in search of an oil company willing to explore their holdings.

Harvie was eager to make an arrangement with a substantial-sized oil company because no one else could afford to gamble the amount of money required to properly explore such a large block of properties. But he was not interested in granting a typical oil concession, which he was afraid would permit an oil company to simply sit on its holdings. What he wanted was an arrangement that would ensure an active program of

exploration and development. Unfortunately, it was not a seller's market. There were, after all, tens of millions of acres of potential oil and gas lands in Western and Northern Canada readily available to the oil companies from the governments of Canada, Manitoba, Saskatchewan, Alberta, British Columbia, and from other owners.

It was not until after the war that interest picked up a little. On October 2, 1945, Harvie wrote to a Mr. Hunter of Shell Oil in Calgary, summarizing discussions held that day. In return for a payment of $90,000, Harvie had offered to refrain from leasing any of the oil and gas rights to others, except 20,000 acres already leased, for a period of nine months, during which Shell was to undertake a program of geophysical and geological work and to make the results available to Western Minerals. No deal was made at the time, but discussions continued.

De Koch, meanwhile, held discussions with Barnsdall Oil Company in Los Angeles. On April 18, 1946, Harvie telegraphed de Koch: "Imperial and Shell are pressing us for reply regarding their applications for options and reservations but we do not wish to do anything that would interfere with your negotiations." One week later, Harvie again wrote to de Koch: "We are having daily discussions with Shell." On May 3, Harvie wrote to Bauerdorf at the Park Lane Hotel in New York: "Bill (de Koch) has just phoned from Los Angeles stating that he had a meeting with Barnsdall today and, after a directors' vote that was five to four, the deal was turned down on the ground that they thought they could get quicker turnover on their money on something else they had in mind." Thus a possible deal with Barnsdall fell through, and on May 15, an agreement was signed with Shell.

Shell paid $30,000 for an option, good to the end of 1946, to purchase (not lease) up to nearly two-thirds of the properties (299,948.87 acres "more or less"). For a further payment of $50,000, the option could be extended to the end of 1947. The actual price would vary, depending on the amount of acreage taken and when, but Shell could have purchased the entire 300,000 acres for $1.8 million plus a gross royalty on production of 2.5 percent.

On December 23, A.W. Henricks of Shell's land department wrote to Harvie to advise that "we do not propose to take up any of the land or obtain an extension of the option." Six weeks later, on February 13, Imperial Oil completed its milestone Leduc discovery. Shell thus missed out on big chunks of both the Leduc and Redwater fields, but others were soon to share a similar fate.

Lord, how the money rolled in

Don Harvie was among the 500 Edmontonians who stood up for six hours on the snow-capped wheat field of farmer Mike Turta as the temperature plunged to -14∞F, to watch Imperial Oil bring in its Leduc No. 1 discovery well that Thursday afternoon. The Leduc well was across the road and to the west of a quarter section (160 acres) of Western Minerals' properties. Half a mile north lay another half section of subsurface mineral properties owned by Western Minerals. Beyond that, for scores of miles in every direction, there were scattered farms under which Western Minerals owned whatever oil and gas and other minerals might exist.

Don was thoroughly familiar with these properties. As a student at the University of Alberta, he had spent two summers surveying them, mapping the coal, sand, salt, and gravel deposits, and all the 38 wells that had been drilled on or adjacent to the lands. After obtaining his degree in chemical engineering in 1945, Don had served nearly two years with the Royal Canadian Engineers, and in early 1947 had returned to the University of Alberta as a lecturer and to study geology. In a few months he was scheduled to leave for Harvard and his MBA. But on the morning of February 13, he had driven down from Edmonton, arriving at the farm of Mike Turta shortly after noon when the crowd began to assemble.

Imperial Oil had sought to obtain a lease on the 480 acres owned by Western Minerals near the site of its Leduc well before drilling started on November 20, 1946. But Harvie would not lease the land unless Imperial made a firm commitment to drill on it. As the Leduc well was drilled it encountered repeated shows of oil and gas — at 3,550 feet, at 3,999 feet, and at 4,286 feet, with enough oil at this latest depth to probably make a modest oil discovery — raising hope that it might be on to something big at a greater depth. With this encouragement in hand, Imperial finally accepted Harvie's terms and in January leased the 480 acres for a term of 979 years.

The discovery of a thin oil section in the Lower Cretaceous sandstone below 4,286 feet had also prompted Walker Taylor, Imperial's general manager at Calgary, to approach Harvie with a bigger deal. On February 4, just nine days before it completed the Leduc well from the Devonian limestone pay section below 5,000 feet, Imperial signed a deal with Harvie under which it committed to pay $250,000 for a five-year option to 200,000 acres of Western Minerals' properties. Imperial later took up leases on 193,000 acres for a total cash payment of $2,231,378, including the option payment, plus nine-percent gross production royalty, plus the normal annual rental of $1 an acre.

After flaring off the first gushing surges of oil, drilling mud, and water — the roar of the 50-foot ball of fire from the flare pit drowning out the applause of the spectators — Alberta Minister of Lands and Mines Eldon Tanner spun a valve and a steady flow of clean oil was directed to the storage tanks. After an 11-year dry spell following the Turner Valley Royalties discovery, Canada's oil producing industry was, in effect, back in business. And so were Western Minerals and Western Leaseholds. Within a few months, 24 oil wells were completed by Imperial on the 480 acres leased from the Harvie companies (12 wells produced from a Devonian section trapped over the reef, initially called the D-2 and later the Nisku section, and 12 produced from the reef itself, initially called the D-3 and later named the Leduc section). Western Minerals and Western Leaseholds started collecting their first royalty revenues.

Near the end of 1947, when Imperial Oil exercised its option agreement with Western Minerals and Western Leaseholds, it decided to pick up only acreage that lay west of the Range 21 survey line, a north-south line that runs about 15 miles east of Edmonton. Harvie later said that he phoned Walker Taylor at Imperial, an old friend, who said to him, 'I see there is only 193,000 acres.' I said that doesn't reduce the purchase price. He said, 'No, our geologists tell us that it is worth it.' They did not have to surrender for another year but rather than go to the trouble of putting it in lease, he said, 'We are not interested in Range 21.' Within nine months that was the Redwater field."21

Imperial had given up what soon turned out to be the most valuable parts of the Western Minerals properties.

At Redwater, discovered by Imperial in September 1948, close to one billion barrels of recoverable oil lay trapped some 3,200 feet below the surface in a giant reef structure that looks like a map of Italy, stretching 20 miles in a northwest-southeast direction with a curved toe at the southern end. By the time the field area had been delineated by follow-up drilling, it was found to embrace nearly 41D 2 square miles of Western Minerals properties, on which 72 oil wells would eventually recover more than 50 million barrels of oil.

Imperial Oil, as we have seen, was not the first to pass up this property, nor was it the last. Shortly after the option to Imperial had been granted in 1947, discussions began once more with Barnsdall group on a deal involving close to 150,000 acres — half the properties retained by Western Minerals after its deal with Imperial. The Leduc discovery had obviously whetted the interest of Barnsdall and its partners in the property that it had turned down in 1945, but the negotiations dragged on.

Ed Arnold described what happened during his testimony at the tax appeal case in 1956. Arnold noted that prior to Redwater, Leduc was still the only oil discovery in the region, near the southwest corner of the Western Minerals properties, “and no one was willing to go in and spend money in an area from which all results to date did not look very attractive. They were clearly wrong about it because the Redwater field was included in this area originally and if Barnsdall had gone through with their deal when we negotiated they would have owned that property.” The terms of the deal had been negotiated, but it was still awaiting confirmation from the Barnsdall directors when Imperial found Redwater. The Western companies advised Barnsdall that they were removing property near the Redwater discovery from the deal and, Arnold said, the Barnsdall group “had to concur with that view because they understood they were not prepared to go ahead with it before.” Thus it was only by default that the two Western companies wound up retaining full ownership of their Redwater properties, their most important asset.

The deal ultimately signed by Barnsdall was dated January 1, 1949. Barnsdall’s partners were the Honolulu Oil Corporation, Seaboard Oil Company, and Los Nietos Company. The deal gave the Barnsdall group a renewable 20-year lease on 146,279 acres, rather than for a period of nearly 1,000 years. Lease payment included the customary annual rental of $1 an acre, a production royalty of 12.5 percent (2.5 percent for Western Leaseholds and 10 percent for Western Minerals), and a cash bonus payment of $887,744.

As it eventually turned out, the acreage leased to the Barnsdall group did include 19 wells at Redwater, leaving Western Leaseholds and Western Minerals with full interest in 53 producing wells. Additional wells were drilled by Western Leaseholds on leases acquired from the government.

Leduc put the two Western companies into the oil business but Redwater catapulted them into the big league. Total revenues from lease rentals, royalties, and production climbed from less than $11,000 in 1947 to nearly $3.5 million in 1950, while cash bonus payments from Imperial and the Barnsdall group provided an additional $3 million.

Redwater also changed Western Leaseholds from a land brokerage company into an active oil company. The fact that the property at Leduc had been leased to Imperial meant that the Western companies had only to sit back and collect the lease rentals and royalty payments. But since they retained full title to most of the properties at Redwater, Western Leaseholds soon found itself in the business of drilling and producing oil wells.

By 1949, two months after the Redwater discovery, follow-up drilling by Imperial had proven 32 well sites on the Western Minerals properties. Harvie arranged to have Imperial drill these wells on a cost-plus basis. Each well took an average of only 25 days to drill and complete. Using up to six drilling rigs, Imperial had completed Western Leaseholds' first 32 Redwater wells before September. For a few months, until the burgeoning supply of oil began to outstrip the demand of prairie refineries, the Western Leaseholds wells were each producing at daily rates of 1,400 to 2,200 barrels. Drilling costs for each well were recovered within a very few weeks.

While this initial drilling was handled by Imperial Oil for Western Leaseholds, the company was rapidly assembling a staff and organization to conduct its own operations. Eric Harvie directed operations as president and managing director. Don Harvie joined the firm on a full-time basis as assistant to the president after obtaining his MBA from Harvard. By fall 1951, Western Leaseholds had a staff of more than 100, of which some 35 were in the field operating the producing wells. Most of the others worked at the company's head office in Calgary's Michael Building in administration, geology, land, and accounting activities. Land holdings had been expanded to an interest in nearly 2.2 million acres, including government leases and reservations in Alberta, Saskatchewan, as well as additional freehold properties — although none of this would prove to be as profitable as the property at Redwater.

As Western Leaseholds expanded, the original shareholders gradually sold portions of their holdings. Unchanged, however, was the ownership of Western Minerals. It continued to collect large rental fees and production royalty payments through the ownership of its 488,000 acres of mineral properties. Nearly 80 percent of Western Minerals continued to be owned by the Harvie family.

George Webster, a Toronto mining promoter, and one of the new directors of Western Leaseholds, thought that the two companies should be merged, an action he urged on Harvie in a letter in June 1949. The main advantage of such a merger, Webster wrote, is that "if you are selling shares to the public you have a nice clean-cut issue and one that would be almost unique in that this company would own the land 100 percent without any royalty to be paid to anyone."

> My experience is that the public likes an issue that is simple and clean. There would be no necessity of explaining to a prospective buyer that there is a parent company to whom a royalty has to be paid and the public is always suspicious of interrelated companies such as Minerals and Leaseholds are. My experience in the courts

> over the lawsuits between BEAR and Yellowknife [firms with gold mines near Yellowknife, NWT] has made me very wary of such relationships. A director is sometimes faced with having to make a decision in which it is extremely difficult to be absolutely fair to both companies.

As to the effect the merger would have on taxes, Webster was quite sanguine, concluding that "well, like death, they are inevitable and bear equally on the just and unjust."

Eric Harvie, however, was never known to be sanguine about paying taxes. Moreover, he had no intention of selling any of his interest in Western Minerals to the public. Western Minerals and Western Leaseholds remained two separate companies, with increasingly different ownership.

While the Western companies exploded with growth, Eric Harvie and his associates lost little time in cashing in on their 1943 purchase of freehold mineral properties. Their first return, of course, was the $30,000 paid the following April by de Koch and Bauerdorf for their one-eighth interest. In 1949, this expanded group of founders collected $1,280,000 from the sale of 21 percent of their shares of Western Leaseholds, primarily to a group of investors headed by the Empire Trust Company of New York. In 1950, the founders collected a further $250,000 when Western Leaseholds redeemed the debentures it had issued as part of its payment for the option to lease the freehold properties.

The first public offering of Western Leaseholds shares was made in late 1951, not by the company but by its major shareholders, who sold a further 18 percent interest (1.25 million shares) for $12.5 million.

This secondary public offering created a market for Western Leaseholds' shares, allowing Harvie and his associates to dispose of more of their holdings. From late 1951 to early 1955 they sold an additional 1,661,579 shares, or nearly 25-percent ownership, on the open market, for which they would have received something in excess of $15 million.

The final return for the founding shareholders of Western Leaseholds was in June 1955, when they sold their remaining 3,122,736 shares to Belgium-controlled Canadian Petrofina for a cash payment of $18,736,416 and agreed to swap a further 340,010 shares for Petrofina stock worth some $2.6 million (including shares acquired from the other owners, Petrofina paid approximately $50 million in cash and securities to buy Western Leaseholds).

The sale of Western Leaseholds marked a sharp turn in Eric Harvie's career, from oil man to culture collector and philanthropist. But there

was still one big play to complete, a classic wildcat gamble on a bold scale involving the first exploratory wells drilled in the Canadian Arctic.

The venture began in 1952 when George Webster's Con West Exploration acquired nearly eight million acres of petroleum reservations from the federal government on the Peel Plateau and Eagle Plains areas in the northern Yukon. Western Leaseholds joined in the play as the major participant and operator. Trajan Nitescu, who headed Petrofina's Canadian exploration and production, had not been impressed at the thought of spending millions of dollars looking for oil and gas in a remote wilderness beyond the rim of the Arctic. Even if oil and gas were found it could be decades before it might be economic to transport it to markets in southern Canada and the United States, Nitescu reasoned. So when Western Leaseholds was acquired by Petrofina, the Yukon properties were excluded. Western Minerals took over the operation and spent several million dollars — mostly Eric Harvie's money — to drill two wells on the Eagle Plains block.

It was a formidable operation. Muskeg and permafrost limited the movement of heavy equipment to the winter months when the ground was frozen solid. Winter cold and darkness limited drilling operations to summer months.

In the winter of 1956, a convoy of heavy trucks set out from Edmonton on the Alaska highway bound for Dawson City, carrying a drilling rig, camp, fuel, and other equipment. From here the freight trains moved over snow and ice roads, in Arctic darkness and temperatures that plunged to -60^{0}F, to the site of Western Minerals Eagle Plains No. 1. During a three-year period, 5,500 tons of heavy equipment were moved in by tractor train, while lighter supplies and workers were flown in, to drill the Eagle Plains well and Western Minerals Chance No. 1. As it turned out, Nitescu had been right. The Chance well did discover both oil and gas, but not in the quantities required to build a pipeline from the Arctic. Half a century later, the Chance discovery had still to produce its first drop of oil or gas for sale.

The final return from the 1943 purchase of the mineral properties came exactly 30 years later when Western Minerals was sold to Brascan Limited in 1973. Well before the sale, ownership of Western Minerals had been transferred to the Devonian Foundation, one of the charitable foundations established by the Harvie family. Eric Harvie had asked his son, Don, to head up the management of the foundations. But Don Harvie, then vice-president in charge of exploration and production for Western Leaseholds, did not want to assume the responsibility for a foundation whose principal asset was a competing oil company. He

agreed to his father's request only on condition that the foundation first sell Western Minerals.

The sale price for Western Minerals was $32.5 million, boosting the total capital gains from the $10,000 investment of 1943 to about $80 million. Revenue from annual lease rentals and 10-percent royalties on the production from hundreds of oil and gas wells was in addition. About three-quarters of these profits were realized by the Harvie family and the foundations they established.

The $100-million giveaway

During a period of four decades, Eric Harvie and his family gave more than $100 million — probably closer to $120 million — to cultural projects ranging from Charlottetown's Confederation Theatre to a Chinese garden in Vancouver. Measured in today's money, the value of the Harvie contributions would easily exceed a quarter of a billion dollars. And the value of all the projects would be two or three times as much, since the Harvie foundations typically provided only one-third to half the cost of any endeavour.

While they started much earlier, Harvie's donations were consolidated in 1955 with the creation of the Harvie Foundation. By 1973 the total donations approached, or possibly even exceeded $20 million; no precise figure has been reported but one contribution alone was nearly $12 million. That year, the numerous Harvie foundations were further consolidated into the Devonian Foundation, which in the following 15 years gave away a further $90 million.22

Less than half the money had been given by the time of Eric Harvie's death in 1975 at age 82. By then, the task of giving away the rest — the capital and the accumulated income — had fallen to Don Harvie as head of the Devonian Foundation.

An enormous collection of artifacts that Harvie eventually contributed to Calgary's Glenbow-Alberta Institute started in his basement, long before he made his fortune. Don Harvie later recalled that during the 1940s his father began to pick up native artifacts. He had soon collected some 20 or 30 items — beadwork, arrowheads, and the like. "They were just hung up on the basement wall," Don related. "I don't think my mother liked all this material coming in very much. We used to tease him because he would never throw anything away. . . . You'd go into his shooting closet and there'd be old boots and vests. He just loved them. I suppose that trait just carried on when he started to collect."23

When this first collection outgrew the Harvie basement it wound up in the Luxton Museum in Banff, a museum of Indian artifacts and natural

science pieces founded by Norman Luxton but silently financed by Eric Harvie.

One of Harvie's first charitable works was as a trustee of and contributor to the Woods Foundation, established on the death of former Calgary Herald publisher Colonel J.H. Woods. Harvie had been legal counsel for the Herald, as well as a director of the Southam company. Major undertakings of the Woods Foundation included contributions that helped establish the Banff School of Fine Arts, an aviary conservatory at the Calgary zoo, and Heritage Park, a re-created pioneer village on a 60-acre site that juts out into Calgary's Glenmore reservoir.

His first major undertaking outside of Alberta arose from a discussion with Dr. Frank MacKinnon of Charlottetown, Prince Edward Island, during a meeting of the Canada Council. The result was the $5.6-million Fathers of Confederation Centre — including theatre, art gallery, museum, and library — built to mark the centennial of the first meeting of the fathers of Confederation at Charlottetown in 1864. Funding came from the provincial and federal governments, and Eric Harvie.

In 1955, with the sale of Western Leaseholds, Harvie established the Glenbow Foundation, "for the primary object," he has said, "of researching, assembling, preserving and displaying the history of our Canadian West." Then he set out to collect in earnest, travelling around the world to examine museum pieces, which he bought by the thousands. There is a widely told story that when Eric Harvie and his wife Dorothy set off for a trip to Egypt, an aide turned to a fellow worker and muttered, "Where are we going to put up the pyramids?"

Harvie's interest in the artifacts of Western Canadian Indians stimulated an interest in native cultures worldwide. Robes, masks, drums, and other items from Central and South America, Africa, and Australia were shipped to Calgary to join their North American counterparts as Harvie's international spending sprees continued.

He was also intensely interested in military history. Statues of military leaders on horseback, guns, swords, spears, saddles, and uniforms joined the growing collection of native artifacts, Western Canadiana and natural history pieces.

In the early 1960s, Harvie commissioned a pair of four-ton bronze statues of King Robert the Bruce of Scotland. The first was unveiled in 1964 by Queen Elizabeth at the site of the Battle of Bannockburn where Robert's highlanders had defeated the English 700 years before. The replica was mounted in front of the Southern Alberta Jubilee Auditorium on the crest of a hill overlooking Calgary, much to the chagrin of university students who condemned this "monstrosity" as an artistic blight on the city's landscape.

In 1967, a 14-foot statue of General James Wolfe suddenly appeared in front of Calgary's planetarium. It had once stood with two American generals in front of the Astor Building on Lower Broadway in New York. When the Astor Building was demolished, the statues of the American generals were displayed in a park while the statue of the British general was stuck in a warehouse, until Harvie bought it and shipped it to Calgary. At about the same time, the Viscount Woolsey collection arrived at the Glenbow museum, including the field marshal's dress uniform, saddle, several swords, baton, and ermine robes of a peer of the realm. Woolsey is remembered as the soldier who led the Red River expedition against Louis Riel in 1870 and enlisted Canadian boatmen for his 1884-85 expedition up the Nile to rescue General Gordon, besieged at Khartoum. Harvie bought the collection when he learned that a military museum in London was being broken up.

The Glenbow museum started out in 1955 with a staff of one. A dozen years later the staff had grown to 60. The collection filled the city's former courthouse building, the former public library, the former estate of one of Calgary's first millionaires, a church manse, while such large items as a 1912 La France fire engine were housed at Heritage Park.

The Glenbow became a public donation in 1966 under an arrangement that Harvie negotiated with Alberta Premier Ernest Manning. Harvie's contribution to the Glenbow-Alberta Institute included $5 million cash plus all the assets of the Harvie Foundation, valued at $5.6 million, including buildings, public displays, and the vast collection.

The collection included some 14,000 items of art, 20,000 books and pamphlets, 24,000 natural history specimens, 10,000 pioneer specimens, 20,000 native artifacts, and 500,000 pages of documentary material in the archives. The collection of natural history and archaeological items were considered Canada's finest outside the National Museum in Ottawa, while the library and archives constitute the most extensive source of reference material on Western Canadian history available anywhere.

Harvie had no sooner given away the Glenbow Foundation than he established the Riveredge Foundation, and started collecting again. This collection was smaller than the Glenbow collection, but more costly. By the time the Riveredge collection was donated to the Glenbow-Alberta Institute in January 1979, it had involved expenditures of $9 million for some 40,000 items.

The Riveredge collection was one of the assets of the Devonian Group of Charitable Foundations when Don Harvie took over as chairman in 1973. In addition to the Riveredge collection, major contributions by the Devonian Group have included:

$6 million for Devonian Gardens, 2.5 acres of tropical trees, plants, pathways, benches, waterfalls, and fountains located 46 feet above street-level in downtown Calgary.

$1.6 million for 50 miles of footpaths along the Bow and Elbow Rivers in Calgary.

$1.5 million for the Maritime Museum of the Atlantic in Halifax.

$3.5 million for the Centre for Cold Ocean Resources Engineering at Memorial University, St. John's, Newfoundland.

$3.5 million for the Centre for Veterinary Disease Research in Saskatoon.

$2.5 million for the Centre for Frontier Engineering Research in Edmonton.

It is quite a legacy from a cluster of 996 titles to mineral rights that virtually no one wanted in the 1940s, except Eric Lafferty Harvie.

A postscript

And what of Arthur Morton Grenfell, who unknowingly had briefly held those billions of dollars worth of oil and gas in his hands?

Two of the remaining six Grenfell brothers were killed in the First World War. Arthur was one of the survivors. Twice wounded, mentioned in dispatches three times, awarded the Distinguished Service Order, he returned from the war "lamed, half-deaf, bankrupt and on the brink of middle age, with a single-minded resolve to retrieve his fortune and pay his creditors," according to the Times (December 2, 1958). He was once more, despite his bankruptcy, involved in financing a wide range of ventures, including a chrome mine in Serbia, a gold mine in Tanganyika, but focusing mostly on Central and Eastern Europe where he raised money for a shipping venture on the Danube and several railway ventures. Any remote hope of repaying his creditors ended when the Second World War destroyed many of the European assets he had helped assemble. He died in 1958. His first wife, Earl Grey's daughter, had died in 1907, six years after their marriage. His second wife died in 1972. He was the last survivor of the 13 siblings. He had lived long enough to see uncovered the oil wealth he had once unsuspectingly held in his hands. Fortunes had slipped through his fingers. He left behind £10,612.24

Chapter 10. Max Bell: Oil, Newspapers, and Racehorses

Bell's oil fortune was only a part of his large field of interests: Assembling Canada's largest newspaper chain; unsuccessful but profitable quests for

control first of the venerable Hudson's Bay Company and then the CPR; a small background role in public policy; unflagging support of the Presbyterian church, of which he was an ardent member, and horse racing. He was a student of the Bible, which frequently sat beside the latest racing forms on his desk at the Albertan

George Maxwell Bell — better known simply as Max Bell — an athletically trim five-feet 10-inches with crewcut hair that looked like a steel brush, was a mass of contradictions. A devoutly religious man and a carefully calculating gambler. A keen student of the Bible and racetrack forms. A teetotaller who threw lavish parties. A quiet, publicity-shy man who loved to hobnob with such famous friends as Bing Crosby. A public benefactor and a soft touch for people in distress who had no compassion for such causes as universal health care. A man with a passion for publishing newspapers, but criticized for lack of interest in their editorial quality. A man obsessed by good health, plain food and vigorous exercise who died at age 60. An ardent champion of the virtues of hard work, thrift, individual resourcefulness, free enterprise, and the capitalist system, who invested and gambled in oil, newspapers, the Hudson's Bay Company, the Canadian Pacific Railway, and racehorses to build one of the largest personal fortunes of his era, and who left behind a substantial philanthropy.

Bell was still in his early teens, living in Regina, when he decided that he would one day become rich. "We called him millionaire Bell," his boyhood friend and later newspaper sports columnist Jim Coleman is quoted as stating. "He was always talking about someday he would make a lot of money."

Coleman introduced Bell to the art of racetrack handicapping when they were both students at Montreal's McGill University. Bell, with a computer mind for facts and figures, converted it from an art to a science, became one of the best handicappers ever, and applied the same technique of careful calculation of odds and payoffs to his business interests. At McGill, Bell played rugby and hockey while his hobby, according to the McGill 1931-32 yearbook, was "playing the ponies."

Max Bell was a natural heir to the spirit of entrepreneurship. His grandfather, George Alexander Bell, had been one of the first blacksmiths in Western Canada, and the first Saskatchewan Minister of Telephones. His father, George Melrose Bell, started out as a postal clerk, and made and lost a fortune in the insurance business, newspaper publishing, oil, and mining.

"The good Lord put me in the right place at the right time with the right friends, and I'm happy to say we all made money," Max Bell once said.

Max's father had worked his way up to assistant postmaster at Regina before he quit to establish an insurance agency followed by the paper business. By 1922 he had four daily newspapers: the morning Post and the evening Leader in Regina; and the morning Phoenix and evening Star in Saskatoon. In 1926, he sold his Saskatchewan papers and purchased the Albertan in Calgary from W.M. Davidson, who had established it in 1902. Melrose Bell moved the Albertan into a handsome new three-storey red brick building on Calgary's 9th Avenue, established a radio station, acquired the semi-monthly Western Farmer, launched, with a Regina partner, another daily newspaper, the Northern Mail in The Pas, Manitoba, and in 1930 added to his chain the ill-fated Vancouver Star, a money-loser that would be a big part of his financial undoing.

The senior Bell befriended a young stableboy in Calgary, Johnny Longden, perhaps triggering Max's interest in racehorses.1 By the early 1950s, Johnny Longden was North America's top jockey, a reputed millionaire, and his son, Vance, was a partner in Max Bell's stable of horses.

In addition to his newspapers, Melrose Bell invested in British Columbia mining ventures, including a small gold mining operation in the East Kootenays, where he tolerated squatters who panned for gold on his property, feeling that in the hungry '30s they needed what they could get from the small amounts of gold they could pan by hand.2 And, of course, he speculated in oil, most importantly in the Turner Valley Royalties well which, as we have seen, uncorked the field's big oil reservoir.

While earning his commerce degree at McGill during the first of the Depression years, Max worked on the business side of the Albertan during the summers. His new commerce degree was no job ticket in 1932 and Max headed to B.C.'s East Kootenay Valley. He prospected for gold on Wild Horse Creek — possibly joining the squatters who panned on his father's property; played hockey for the Kimberley Dynamiters of the Western International Hockey League; won a contract from the CPR to supply railway ties (subcontracting the labour); and married Suzanne Staples of Cranbrook. The prospecting was a bust — the six ounces of gold that Max panned were stolen — but railway ties were profitable.

Max returned to Calgary in late 1935 with his new wife and enough money to buy a one-percent gross royalty in the Turner Valley Royalties well. While drilling at the well proceeded intermittently as funds permitted, Max once more worked on the business side of the Albertan,

then controlled by the Royal Bank to whom Melrose Bell owed some $400,000. For more than seven years, Max worked for the Royal Bank, running the Albertan, for a salary of $35 a week.

Under Melrose Bell, a lifelong Liberal, the Albertan had been a supporter of William (Bible Bill) Aberhart, whose Social Credit swept into power in the fall of 1935 for a 36-year reign in Alberta. At the time of his death, the senior Bell had been negotiating a sale of the Albertan to the Social Credit Party. On March 20, 1936, the Albertan carried both the news of Bell's death and an advertisement by investment dealer O.C. Anott & Company Limited, offering $700,000 in shares in a new publishing company organized to acquire the Albertan, which would then "become the official organ of the Social Credit Party." The sale, however, never went through; possibly newspaper shares were even more difficult to sell than oil royalties.

Thirty-five dollars a week was at least a survival income during the '30s, but Max soon had more than that. The Turner Valley Royalties well came in three months after his father's death, at an initial rate of 850 barrels of oil a day,3 which meant the income from 8.5 barrels a day for Max's one percent gross royalty. That suggests an oil income about three times as much as his Albertan salary, and even allowing for a steady decline in the initial rate of flow, it must have at least doubled his salary for quite a few years. Modest though it was, it was the first trickle in Max's oil fortune.

Less fortunate was Melrose Bell's estate. When he had drawn up his will in early 1929, "he had reason to believe that he was possessed of an estate of very substantial proportions," Regina lawyer Harold F. Thomson later wrote to the estate's beneficiaries. The Depression and such failures as the Vancouver Star changed that. Mrs. Bell made an application under the Widow's Relief Act, which would entitle her to one-third of the estate, in the hope that the oil, mining, and other investments held by the estate might one day be worth more than the debt. It was a remote hope. In fact, Thomson wrote, "it is almost beyond the realm of possibility that there will ever be anything in the estate for any of the beneficiaries."4 Thomson was right: there wasn't.

After seven years of "clerking," as he termed it, Max turned his attention to the possibility of retrieving the Albertan from hock, and acquiring it. Writing to H. Ray Milner, long-time head of Alberta's two major gas utilities, Max claimed that the newspapers had been "operating with fairly substantial cash gain for the past two years," would be profitable if the "debt structure" were removed, and offered "considerable value with regards [to] directing public opinion."5 The upshot was the formation in mid-1943 of the Essex Company, which

held an option to buy the Albertan from the Royal Bank. Five Essex backers, including Ray Milner, put up $35,000 to provide working capital for the Albertan.6 Three months later, Bell wrote to his friend Wilder H. Ripley: “A rather historical event in the Albertan’s history has occurred, as we made a profit of about $2,000 in July.”7 And before year-end, Milner wrote to advise Bell that he had spoken to other members of the Essex syndicate, “and we are all agreeable to your salary being raised from $60 to $85 a week.”8 Bell later paid back the Essex backers and exercised the option to buy the Albertan, perhaps paying the Royal Bank 35 cents on each dollar of debt, which he had suggested to Milner was the maximum that should be offered.

The Essex syndicate appears to have barely been paid back before its members were involved in another Bell-managed newspaper acquisition, the Edmonton Bulletin. Founded in 1880 and published until 1923 by Frank Oliver, a Liberal member of Parliament and minister of the interior, the Bulletin had fallen on hard times. Once more, there was a political as well as a potential profit motivation. In December 1947, Milner wrote to Imperial Oil President H.H. Hewetson seeking financial support for the acquisition of the Bulletin and stressing “the importance from the point of view of people like ourselves, of these newspapers being kept in sound hands.” Milner suggested that Imperial exercise an option to buy the three-storey Albertan building in Calgary for $200,000 cash and assumption of a $200,000 mortgage.9 He also sought financial support from the CPR and CPR’s mining and smelting subsidiary, Cominco. Imperial did buy the Albertan building, but not necessarily to help keep the Bulletin in “sound hands;” on the heels of its big Leduc discovery, Imperial needed much more office space for its rapidly expanding Calgary staff.

Bell acquired the Bulletin with the help of Milner and his friends, but folded it three years later when he was faced with labour problems and antiquated presses that needed replacement. “It must be remembered that at this time I had no knowledge that oil investments would pay off as handsomely as they did,” Bell later stated. “The financial problems of the Bulletin were a crisis for me, and one which I could see no way of solving.”10 He was undoubtedly mindful of how the Vancouver Star had sunk his father.

A fortune in oil stocks

Like his father before him, Max continued to speculate in oil while running a tight ship at the Albertan. Perhaps typical of the highly speculative penny stocks of the era was Empire Petroleums Limited, in which he participated with Frank McMahon and others to raise $95,000

for an unsuccessful wildcat by selling shares at 15 cents, three years before the Leduc discovery that changed everything.11

Just months before Imperial brought in its Leduc discovery, Max and his partners Wilder Ripley and Frank Graham had floated another pair of penny oil stocks, Tower Petroleums and Reef Petroleums. Wilder was an American investor who had moved to Calgary in the late 1930s; Graham was a wealthy Vancouver businessman, chairman of Acadia-Atlantic Sugar Refineries Limited. As with later ventures, it was Bell who organized the companies, but Graham who put up half the money, while Bell and Ripley each took a quarter interest. Tower and Reef never found any oil or gas, and their unlisted shares never traded for more than 30 cents on over-the-counter trading. But the founders' shares that the partners bought for five cents each would soon lead to spectacular success.

It was not Leduc so much as the bigger, billion-barrel Redwater field, possibly Canada's most profitable oil pool, that led to the Bell fortune. Imperial completed its Redwater discovery well, northeast of Leduc, on September 26, 1948. Within weeks, Bell had organized another oil venture, named Calvan Petroleums to reflect the Calgary and Vancouver interests of Max, Ripley, and Graham. The three partners traded in their five-cent shares of Tower Petroleums and Reef Petroleums for 25-cent shares of Calvan, Graham again taking half the issued shares, and Bell and Ripley one-quarter each.

Calvan was organized to participate with Frank McMahon's companies, Pacific Petroleums, Atlantic Oil Company, and Princess Petroleum, as well as Sunray Oil Corporation of Tulsa, in bidding on Redwater Crown leases auctioned by the Alberta government. These were the quarter and half sections of rights surrendered to the Crown when an oil company converted an exploratory reservation into a lease, which it had to do before oil could be produced. The Redwater area was checker-boarded with Crown leases.

Pacific was operator for the group. Calvan was a passive investor, putting up its share of the money. The group planned to base their bids for Redwater leases on the work of Pacific's geologist Art Nauss and seismic contractor Cec Cheshire. Interpretation of seismic data roughly mapped the buried reef and indicated that the thickest oil-bearing section lay along the northeast flank of the structure. This is where the group would focus on bidding. If their theory and interpretation of the seismic data was right, they could expect to get some of the biggest oil wells in the field. If they were wrong, and drilling missed the edge of the reef, they would get salt water.

At the government auction in Edmonton on November 12, barely six weeks after the Redwater discovery, the Pacific group acquired a half-section (320 acres on which eight wells could be drilled), with a successful bid of precisely $384,006.76.

While the Pacific group was still drilling its first Redwater well and the outcome was not yet known, Bell wrote to his banker, outlining his assets. These he estimated at $281,000, of which $264,000 consisted of 132 shares or less than one-third of the 350 issued shares of the Essex Company, owner of both the Albertan and the Edmonton Bulletin. “In addition,” wrote Bell, “I have sundry oil stocks, including 125,000 shares of Calvan . . . also options and so on, on oil stocks such as Pacific Petroleums. All these latter items I did not put a value on, as at this time they would seem to have speculative values.”12

Before the end of the year, Pacific successfully completed the group’s first Redwater well, and the value of Max’s Calvan shares was considerably more than speculative.

Calvan, at this stage, was managed almost out of Max Bell’s back pocket. Its only office was Bell’s office in the Albertan building, and the staff amounted to a total of three, including Bell as president.

Other than Bell, Calvan’s first employee was Doug Fraser, a former Ontario school teacher who had served in the RCAF as a flight instructor during the war, then graduated from the University of Alberta in Edmonton in 1949 with a degree in psychology and economics, planning a career in personnel administration. Fraser’s wife, Joyce, had known Bell through her work as a clerk at J. Vair Anderson’s jewellery store in Calgary, and it was through his wife that Fraser met Bell. Fraser’s planned career in personnel administration was sidetracked when he accepted an offer from Bell to work for Calvan as the company’s representative in the Redwater field.

Fraser’s job was to report to Bell on the progress of the Calvan-interest wells being drilled by Pacific, most notably those in the Redwater field. For two years, Fraser operated from a desk in the Edmonton Bulletin building, driving back and forth between Edmonton and Redwater, compiling daily handwritten reports for Max Bell, on call seven days a week. Eventually Bell suggested that Fraser’s reports should be typed. “How will I get them typed?” Fraser asked. “Buy a typewriter and type them,” Bell responded. So Doug Fraser learned how to type. Any really important well information was to be telephoned to Bell immediately, regardless of the time of day or night. Bell wanted to know about any important developments before the Toronto Stock Exchange opened for business each morning, at 7:00 Calgary time. There were few, if any, rules about insider trading in the 1950s, the type of rules that

would land such people as social arbiter Martha Stewart in so much trouble. Max undoubtedly saw nothing wrong with making use of information he paid for: he was an ardent advocate of unfettered free enterprise.

Calvan's second employee was Jack Lambert, Bell's brother-in-law. Lambert's planned career as a concert pianist had been derailed by the Second World War, during which he served in the army as a warrant officer, earning a medal for his actions as leader of a mobile mechanized reconnaissance unit. He was a salesman in a Calgary men's clothing store when he was hired early in 1950 as a corporate secretary and administrative assistant to Bell.

Experience in a particular field of endeavour was apparently not the most important criterion in Max Bell's hiring decisions. In the late 1940s, Bell hired Frank McCool as the Albertan's sports editor. McCool's qualifications as a journalist consisted of a long career as goaltender for the Toronto Maple Leafs. Nevertheless, McCool proved a capable editor, and was later general manager of the Albertan.13 Fraser and Lambert continued to work for Calvan until they joined Canadian Petrofina when the Belgium firm bought Calvan.

Calvan's efforts were so successful that Bell organized four more oil companies in 1948 and 1949: Polaris Oil Company, Zodiac Oil Company Limited, Garrison Oils Limited, and Garnet Oils Limited.

In April 1951, Calvan Consolidated Oil and Gas was incorporated to acquire Calvan Petroleums and the other four companies in a share exchange agreement and four months later an initial public offering of one million shares at $6 each was made. Calvan by now had a one-third interest in 77 producing oil wells at Redwater and one in the newer Excelsior field; recoverable oil reserves estimated at more than 12 million barrels, and an annual revenue rate of more than $1 million.14 Calvan had acquired, Bell advised an associate, "oil in the ground at around 15 cents a barrel,"15 which would have been close to the lowest cost anywhere in the world.

The initial public sale of one million shares placed a value of $750,000 on Bell's 125,000 shares, which had been purchased for $31,250.16 That didn't include whatever profit he might have made by trading in shares of the Pacific group companies, based on Doug Fraser's timely tips from Edmonton.

While Bell was building his oil wealth, his marriage to Suzanne ended in 1949 and Max later married Frank McMahon's widowed daughter, Agnes. Frank McMahon Jr. had been killed in a 1953 car accident. Max now had a large family: two sons and two daughters by his first marriage, and Agnes' son and daughter.

A field of bigger interests

The 1955 sale of Calvan to Canadian Petrofina for $40 million marked a turning point in Max Bell's far-reaching activities. He would continue to dabble in oil, most notably a 1969 play to develop shallow gas reserves in southeastern Alberta with Alberta Eastern Gas Limited. But he was now pursuing a field of bigger interests: assembling Canada's largest newspaper chain; unsuccessful but profitable quests for control first of the venerable Hudson's Bay Company and then the CPR; a small background role in public policy; unflagging support of the Presbyterian church, of which he was an ardent member, and horse racing. He was a student of the Bible, which frequently sat beside the latest racing forms on his desk at the Albertan.

One of Bell's first major investments after selling Calvan was a bid to gain control of the Hudson's Bay Company, then still headquartered in England. He had control within his grasp when he changed — reportedly because he had been unable to find anyone in whom he had the confidence to properly manage the company — and sold his shares at an attractive profit. In the early 1960s he plowed his money into CPR shares, reputedly becoming the largest individual shareholder, just as the shares began a two-year climb that saw them triple their market value.

Almost as profitable, it seemed, were Bell's investments in racehorses. In 1952, Bell, Frank McMahon, Wilder Ripley, and Vance Longden formed Alberta Ranches, with a string of horses that raced primarily in California. Longden and Ripley soon dropped out, while Bell and McMahon later formed Golden West Farms, which raised thoroughbreds on a 501-acre spread at Okotoks, southwest of Calgary.

There was a regulation-size racetrack at Golden West Farms, but it may have been used by more than just racehorses. Bell was almost obsessive about plain food and regular exercise, had two swimming pools at Golden West, and fully equipped gyms at both his farmhouse and his Calgary home. It was said that in his mid-'50s, he could still run a mile in six minutes. Writer Jeannine Locke, visiting the Bells at Golden West, reported that "observing Bell at full centre . . . [she was] beset with the stupefying notion that he will not stop before Winnipeg."17

The Bell and McMahon colours were soon flying in Canada, the United States, England, and Ireland. In London, according to a Canadian Press dispatch, Bell invited 600 guests to dance and drink champagne at the posh Savoy Hotel, in anticipation of winning the Epsom Derby with Blue Sail in June 1953. Blue Sail came in tenth, but none of the guests at the party are reported to have complained.

Their biggest winner was Meadow Court, purchased as a yearling for $9,000. On the eve of the Irish Derby in 1965, Bell, to fulfill an earlier commitment, sold a one-third interest in Meadow Court to Bing Crosby, much to the chagrin of Frank McMahon. Meadow Court took the $165,000 purse at the Irish Derby, and Bing Crosby sang "When Irish Eyes are Smiling" to a cheering racetrack crowd. Two weeks later Meadow Court won two big races at Ascot. In just three races, the horse that Bell bought for $9,000 had won purses totalling $281,000. At the end of the 1965 racing season, Meadow Court was retired to a stud farm in Dorset, England, and the three owners sold shares in the horse for $1,260,000.

Bell's most passionate interest, however, was as a newspaper publisher. In 1954 he purchased the Victoria Times, the Victoria Colonist, and an interest in the Lethbridge Herald, giving him a stake in four newspapers, including the Albertan. In 1959 he joined forces with Victor Sifton, owner of the Winnipeg Free Press and the Free Press Prairie Farmer, to form FP Publications, which then purchased the Ottawa Journal and later the Vancouver Sun. In 1961, following the death of Sifton, Bell became chairman of FP Publications. In 1965 R. Howard Webster became the third principal owner (together with Bell and Sifton's estate) in FP, when Webster's Toronto Globe and Mail was brought into the fold. FP Publications had what was then the largest newspaper chain in Canada, with some 850,000 subscribers. In 1980, eight years after Bell's death, FP Publications was sold to the Thomson newspaper chain for $164.7 million.

Bell's most noticeable effort in the political field was a 1959 three-day conference at his "log cabin lodge" at Twin Isles on the Gulf Coast north of Vancouver where some 20 invited guests talked about Canadian-American issues in what was dubbed the "West Coast Pugwash" conference. They voyaged from Vancouver to Twin Isles on an eight-hour cruise aboard Bell's 37-foot yacht, Campana, Spanish for 'bell.' Participants included Alberta's Premier Ernest Manning, opposition leader and soon to be prime minister Mike Pearson, journalists Blair Fraser, Bruce Hutchison and the editor of the Chicago Daily News, two labour union leaders, the head of the American Stock Exchange, and the presidents of Imperial Oil and Gulf Oil Corporation.

Shortly before he died at age 60, on July 19, 1972 at Montreal's Neurological Institute, Bell established the Max Bell Foundation, to which he bequeathed more than $17 million worth of stock in FP Publications. Thirty-one years later, the Max Bell Foundation had made more than 200 grants across Canada amounting to some $65 million, and had funds of $55 million generating earnings for future grants.

Under the terms of the bequest, 30 percent of the grants go to Montreal's McGill University, half to the Faculty of Medicine and the other half to the general purposes of the university. Among more than two dozen capital grants that have been supported by the foundation are the Max Bell Theatre and the Max Bell Arena in Calgary, the Max Bell Marine Mammal Centre in Vancouver, the Max Bell Regional Aquatic Centre at the University of Lethbridge, and the Max Bell Building at the Banff Centre for Continuing Education. Now located in Calgary, the Foundation, under president Dr. David Elton and a six-member board, is currently focused on three areas of interest: health care, Canada and Asia-Pacific relations, and veterinary medicine and education.

Chapter 11. Frank McMahon: The Last of the Wildcatters

McMahon's efforts would ultimately lead to the development of two substantial firms that played key roles in the formative development of Canada's petroleum resources. One was an aggressive oil company, the other was the builder of Canada's first major long-distance natural gas pipeline.

Francis Murray Patrick McMahon was born with the mantle of a fortune seeker destined to spend his days in quest of a motherlode. He was driven by the unassailable conviction of wildcatters that pay dirt lies just a few feet in front of the drill bit, and all that is required to find it is determination and faith.

It was an honest inheritance. His father, Francis Joseph McMahon, was a drifter and boomer, Frank later recalled, a man who "felt he had to follow the mining booms wherever they took him."1

They took the elder McMahon and his brother Pat to Dawson City in the days of the Klondike gold rush, where Frank McMahon sought his fortune panning the gravel of the creek beds for gold while Pat sought his fortune at the card tables.

From Dawson City in the Yukon the wanderlust took Frank McMahon to Moyie, another mining boom town, a stone's throw north of Idaho in the East Kootenay Valley of British Columbia. A short-lived silver mine on Yahk mountain had made Moyie a bustling town of 500 people and six hotels, one of them owned by the McMahon brothers. It was here that Francis Joseph McMahon met and married Stella Maud Soper, and where Francis Murray Patrick McMahon was born in 1902, the first of three brothers (George followed in 1904 and John in 1905). But Frank soon left his wife and sons for San Francisco, where he and Pat operated

another hotel until it was demolished in the big earthquake of 1906. They then moved to Oregon, where they owned another two hotels in quick succession. Frank senior was next in the booming real estate business in B.C.'s Peace River country until the First World War put an end to the boom. In the 1920s, he was in Coalmount, a coal-mining town tucked in the tiny Tulameen Valley, not far west of Moyie, where he bought a three-storey, flat-roofed hotel after the previous owner had been shot and killed in a poker game. During the Great Depression years the only business that boomed was gold mining, and the 1930s found an elderly, white-haired Frank McMahon in B.C.'s historic gold mining town of Barkerville where he operated the Red Front Cigar Store. He sold milkshakes in the front and whisky in the back.2

After Frank senior left for San Francisco, Stella McMahon and the three McMahon brothers moved from Moyie to nearby Kimberley, where they lived in the three-storey North Star hotel, owned by Stella's widowed mother. The only school in Kimberley was in the North Star hotel, and it was here the McMahon brothers started their education. Kimberley was a former boomtown in decline, with the North Star mine, its only reason for existence, nearly exhausted. It would take another decade to solve problems in processing ore at the much larger Sullivan mine, but when these were overcome, Sullivan became the world's largest lead and zinc mine. In an area dotted with rich silver, lead, and other mines, where promoters dreamed of instant fortunes, and hardrock drillers earned big wages, it seems almost inevitable that mining would drive the energies of an ambitious Frank McMahon.

Frank completed high school in Calgary and Spokane, then attended Spokane's Gonzaga University, before dropping out after his third year. One of his younger classmates at Gonzaga earned pocket money by singing at smokers, boxing matches, and private parties. He became a lifelong friend: Bing Crosby.

Great salesmanship is the essential attribute for any successful promoter, and Frank began to develop this ability as a door-to-door salesman, peddling gasoline coupon books for Standard Oil of California. But it was not long before he turned to hardrock drilling, starting as a helper on one of the three-man crews of a Spokane contractor. He worked hard, learned the business, made good money and saved it. By 1927, he was in business for himself, with a diamond core rig powered by a Ford automobile engine and a contract drilling exploratory holes for British Metal Corporation on Vancouver Island. Later the same year he was drilling on the 25-mile tunnel in the Coast Mountain range through which San Francisco receives its water supply from the Hetch Hetchy Reservoir, 167 miles away.

His mother, meanwhile, had married a Kimberley mining engineer, Owen C. Thompson, and they had moved to Vancouver. Thompson would later become associated with one of McMahon's earliest oil ventures. Brothers George and John were also in Vancouver, both in the investment business, selling insurance, municipal bonds, and stocks.

Frank, too, moved to Vancouver in 1928, where he courted a young lady who had no intention of getting married. Isobel Grant was a private secretary who had dropped out of the University of British Columbia after three years, had a second part-time job at the Vancouver Stock Exchange, dabbled in the commodities market with another secretary, and had saved enough money to buy her own car. It was a slack time between drilling contracts and for a few months Frank was again a door-to-door salesman, selling oil furnaces. Basically a shy person, selling did not come easy. He would sometimes walk several times around a block before knocking on a door.

Frank also worked at joining Isobel's smart social set by smoothing off the rough edges of a hardrock driller. He was determined to get into the swim of things, even if he couldn't swim. At a beach party, he amazed Isobel and his new circle of friends by boldly walking into the ocean wearing a pair of water wings.3 Difficult though it might have been, his salesmanship was getting better too. Good enough that in the fall, Frank and Isobel were married.

McMahon and his diamond core rigs had worked from Alaska to California, but the rigs were all stacked for lack of work during the Depression. Casting about for another opportunity McMahon's imagination was captured by a vision he would pursue for more than a quarter-century, the prospect of supplying natural gas for a hungry market in Vancouver and the U.S. Pacific Northwest. Frank McMahon was about to join the ranks of the wildcatters.

The small sedimentary basin in the Fraser River Delta lay within sight of Vancouver, which had long been supplied by manufactured coal gas. Natural gas, so close at hand, would be a superior and much cheaper fuel. Starting as early as 1891, a number of shallow wells had been drilled in the Delta, yielding a few small gas shows. Interest had revived in the 1930s, and wildcatters and promoters were leasing oil and gas rights from Delta farmers, in return for little or no cash but royalties on any commercial production that just might result. Frank, too, knocked on farmhouse doors, and picked up a few leases.

The McMahon leases were pooled with those that Charles Stewart Shippey and Victor J. Freeman had signed up at about the same time. Shippey had made some money drilling shallow gas wells in Kansas and had been one of the promoters of a gas pipeline built from Kansas City to

Detroit in the early 1920s. Freeman had drilled for oil in West Virginia, Ohio, and Pennsylvania. Between them, McMahon, Shippey and Freeman had acquired leases on 25,000 acres in the Delta.

The grand nature they envisioned for their undertaking was reflected in the name of their new company: International Pipe Lines Limited. McMahon was the drilling contractor. Investors were underwhelmed. A public share offering raised a meagre $12,500. Shippey put up more money. Drilling resulted in a personal tragedy. Isobel's father, John Grant, visited the drilling operations from time to time and often lent a helping hand. On one visit he was struck and killed by a length of pipe.

International Pipe Lines drilled four wells to maximum depths of 900 feet by the fall of 1931. One on Lulu Island was a gas well, of sorts. Frank hooked it up to the house of farmer Henry Fentiman on whose lease it had been drilled. For 12 years, it supplied enough gas to fuel the kitchen stove, the hot water heater, a fireplace in the den, and heaters in the dining room and hall. That was the extent of the gas from the Fraser River Delta. McMahon would have to look much farther afield to supply Vancouver — and eventually, he did.

The long quest for oil

McMahon had now set out on a new path, as a putative oil man and pipeliner. The rest of his working days would be spent looking for oil and gas; promoting new speculations; establishing one of Canada's largest independent oil companies; building the country's first major, long-distance gas pipeline; financing such ventures as a pipe mill and a distillery; backing Broadway plays, and raising racehorses in partnership with Max Bell. Getting there was a long, tough journey.

After the gas play in the Fraser Delta, Shippey headed south to look for gas nearby in the state of Washington, with no better luck, and Freeman, soon followed by McMahon, set off to drill in the Flathead Valley in the extreme southeastern corner of British Columbia where oil shows had tantalized and frustrated wildcatters and Vancouver promoters for more than three decades.

On the west slope of the Rocky Mountains, hemmed in on nearly all sides, the Flathead is one of British Columbia's most inaccessible areas. The Sage Creek anticline in the Flathead is but a short distance west and on the other side of the mountains from the oil seepages that had generated brief excitement at Alberta's Oil City near Waterton. Prospectors looking for gold are said to have fuelled their kerosene lamps with light, straw-coloured oil from seepages along Sage Creek. The oil seepages both at Oil City and at Sage Creek were visited during the summer of 1891 by Dr. Alfred R.C. Selwyn, director of the Geological

Survey, and later by Dr. George Dawson, who had succeeded Selwyn as GSC director. It was Dawson who explained the anomaly of oil and gas seeping from Precambrian rocks. In the upheaval that created the Rocky Mountains, the ancient Precambrian rocks had been thrust over younger, sedimentary rocks where oil and gas might be expected, and the oil had seeped to the surface through fissures. “The indications certainly seem sufficiently promising to warrant some outlay in development work” at Sage Creek, Dawson had concluded.4

A dispute between the Canadian Pacific Railway and the British Columbia government about who owned the mineral rights in the Flathead delayed any exploration until Amalgamated Oil Company, financed by Vancouver investors, was finally able to obtain leases on 15,000 acres from the B.C. government in 1911. Amalgamated would hold these and other leases for 40 years, but they would prove to be the graveyard of a string of companies that drilled on them in search of oil: Akamina Valley Oil Company Limited, Majestic Oil Company, B.C. Oil & Development Company Limited, Crow’s Nest Oil Company, and Glacier Oil Company, and finally, a McMahon venture, Columbia Oils.

During a period of some 15 years, half a dozen holes had been punched down in the Flathead Valley, at a cost estimated by Amalgamated’s president Colonel Guy H. Kirkpatrick as “not less than $600,000, and probably more.”5 None had reached the sedimentary rocks where the source of the oil and gas seepages might lurk.

For cable tool rigs, it was slow, tough work, pounding through Precambrian rock literally as tough as granite, because that’s what it was. One well, by now renamed Crow’s Nest-Glacier No. 1, had been drilling off and on for more than 13 years. The steep-dipping rock caused the drill bit to veer off at uncertain angles. Drill pipe twisted off. When drilling wasn’t stopped for lack of money, it was often stopped while the crew went fishing for tools lost down the hole. By 1927, hundreds of chisel-shaped bits had been pounded through 3,265 feet of rock, but no one knew how deep the hole actually was because no one knew how much it angled.

Five hundred quarts of nitroglycerin were exploded at the bottom of the hole in the hope that this would crack open a flow of oil and gas from the underlying source of the seepages. What it mostly did was cave in the lower part of the hole, filling it with crumbled rock and trapping a string of drilling tools. It took two years to clean out the hole when once more it caved in and another string of drilling tools was lost.

This was the situation when Crow’s Nest-Glacier Oil Company — the two formerly separate companies having merged — hired Victor Freeman to take charge of a third attempt to reach the hoped-for oil. But rather

than the ceaseless pound-pound-pounding of a cable tool outfit, McMahon convinced Freeman that there was a better way: Use one of my diamond coring rigs to grind through rather than smash through rock, Frank argued.

The spring of 1932 found Frank, Isobel, their two young sons, George_ McMahon, Isobel's cousin Bain Grant, and a drilling crew of about 25 ensconced in the Sage Creek camp of log cabins and clapboard shacks, working on a third attempt to deepen the hole with one of Frank's diamond core rigs that had been designed for drilling shallow hardrock holes for miners. The GSC's Dr. George Hume visited the operation and was impressed by the oil escaping at rates up to one-and-a-half gallons a day, which he said provided "evidence of large volumes from which the seepages are derived."6

When Crow's Nest-Glacier, always on the edge of bankruptcy, ran out of money, drillers were paid with company shares. Isobel and George — who doubled as administrator and sometimes camp cook — wrote to hundreds of the company's shareholders, seeking donations of a few dollars, with the prospect that this might help turn worthless shares into something of value if the drilling kept going. By fall, the hole was back down to 3,265 feet, but Frank's rig was not the biggest nor best, and shattered rock conditions meant it could go no farther.

Returning to Vancouver, Frank was determined not to abandon the quest for oil in the Flathead. He obtained an option on 1,601 acres of leases at Flathead from Crow's Nest-Glacier and Amalgamated Oil and organized a new outfit. Columbia Oils Limited was the seventh firm organized over a 22-year period to search for what was thought must be a big pool of oil that fed the seepages at Sage Creek. Frank's stepfather, Owen Thompson, was president of Columbia Oils, and Frank, George, and Bain Grant raised enough money to ship in a bigger, more powerful rig and start drilling one more test hole. It took a year to drill to 1,570 feet before the money once more ran out. Frank and George remained involved in Columbia's off-and-on drilling at Sage Creek Oils, as money and the occasional paying work for one of Frank's stacked rigs permitted. By 1936, Columbia Oils had spent $190,000 (more than $2.5 million in 2004 dollars) and drilled through some 5,000 feet of rock, finding enough oil and gas to excite the news media and some investors, but far from enough for commercial production. Columbia was later acquired by other interests in Calgary who raised an additional $100,000. In April 1938, five years after it had spudded in, the Columbia well was finally abandoned after drilling 8,000 feet of hole, and still in Precambrian rock. After another 13 years, Frank McMahon would be back in the Flathead

for yet one more try to unlock the secret of the suspected oil and gas in this Rocky Mountain valley.

During one of Columbia Oils' numerous drilling halts at Sage Creek, McMahon travelled to England, seeking money for a much larger opportunity that had seemed to open with the election of a new B.C. government.

Thomas Dufferin Pattullo, then B.C. minister of lands and later premier, had been instrumental in 1919 in withholding from wildcatting all provincial oil and gas rights in the northeast corner of the province, encompassing more than 40,000 square miles of prospective oil- and gas-bearing rocks. Duff Pattullo, a dapper former newspaperman, saw oil and gas as a public resource that could generate great wealth for the people of British Columbia. The B.C. government drilled six wells along the front ranges of the Rocky Mountains in the Peace River country, finding some small gas shows in each and shows of oil at three. The Conservative government of Dr. Simon Fraser Tolmie lifted the ban on Peace River wildcatting in 1932, and it was this that grabbed McMahon's attention.

McMahon saw in the Peace River country not only the prospect of oil but the prospect of the gas supply for Vancouver and the U.S. Pacific Northwest that he and Shippey had failed to find in the Fraser River Delta. Gas had already been found at a wildcat well drilled in 1921-23 by Imperial Oil's Northwest Company near the Alberta village of Pouce Coupe and within a quarter-mile of the B.C. border. Imperial wasn't interested in gas, and the drilling rig moved on.

McMahon's 1934 trip to London in search of English money was financed with $5,000 from Colonel Joseph Victor Norman Spencer, the fifth son of the founder of B.C.'s largest chain of department stores. An adventurer and a speculator, Victor Spencer was a veteran of the South African War and the First World War who had gambled on seemingly worthless shares of Pioneer Gold Mines, which later brought into production a successful gold mine at Bridge River, 100 miles north of Vancouver, making enough money to keep the Spencer stores in business during the Depression.

McMahon, accompanied by Vancouver businessman Bill McKenzie whose family was said to have connections with English oil interests, spent four months in London, calling on every prospect they could find, including such major concerns as Shell Oil and Anglo Iranian Oil (later British Petroleum). They came home empty-handed.

It didn't much matter, because Duff Pattullo had been elected premier as the head of a new Liberal government, and the ban on Peace River leasing had been re-imposed before McMahon and McKenzie were back

in Vancouver. Not until it had spent $750,000 on a dry hole that took two years to drill — Pine River Well No. 1 on a prospect known as the Commotion Creek structure — did the B.C. government abandon the idea of using public money for wildcatting and again, in 1947, open the Peace River country for leasing — over the strenuous objections of Duff Pattullo. McMahon, ironically enough, was involved in drilling the Pine River well as part owner of the drilling contractor, and it was McMahon who filed on the first three oil and gas exploration permits issued by the B.C. government.

Victor Spencer was but one of a wide circle of prominent Vancouver men who, despite one failure after another, continued to back McMahon's wildcat ventures, testimony to their confidence that he would at least give them a good run for their money, speculative gambles though his ventures were. Others, in addition to his stepfather Owen Thompson, included such local luminaries as A.J.T. Taylor, a former machinist who had made and lost several fortunes in mining, engineering and heavy machinery manufacturing; lawyer W.B. Farris, later chief justice of British Columbia; his brother Senator John Farris; D.S. Wallbridge, another prominent lawyer and former dealer in mining stocks; and later, and most importantly, lumberman Norman R. Whittall. While Columbia Oils sputtered on, it was backers such as these that enabled Frank and George to organize yet another company, London Pacific Exploration Co. Ltd., and finance two more unsuccessful wildcat wells, this time in Montana.

The turning point

Two events in 1936 stand out in the affairs of the McMahon brothers, one frustrating and the other offering a glimmer of hope.

The first was a fire at the Pouce Coupe well that Imperial's Northwest Company had somewhat haphazardly abandoned in 1923. Pent-up pressure blew out the valve and the escaping gas caught fire with a roar that could be heard for miles. McMahon rushed to the scene with a photographer, apparently in the hope that photos of the 35-foot burning flare might ignite some action in Victoria in opening the Peace River to exploration.

He was also armed with a report that Calgary consulting geologist Dr. J.G.O. (Pete) Sanderson had prepared for a syndicate headed by farmer Lee W. Alward, who hoped to find on the Alberta side of the Peace River area a cheaper supply of tractor fuel for Peace River farmers. Sanderson's report pointed to the prospect of oil "in very large quantities," as well as sufficient gas for a pipeline to Vancouver and the U.S. Pacific Northwest, "the largest unserved market for natural gas in Western North America."

It seemed “almost certain,” he reported, that the required gas reserves could be proven by the drilling of three or four wells, and that “a very attractive commercial venture awaits the enterprise that will develop this commodity alone.”7 But Duff Pattullo was still determined that his government would develop what he was convinced was the Peace River’s great oil and gas wealth for the people. McMahon’s big pipe dream would have to wait.

The McMahon fortunes were now at their lowest ebb. The wildcat ventures at the Delta of the Fraser River, in the Flathead Valley, and in Montana, were all failures. The “very attractive” prospects in the Peace River were frustrated. George and Frank were as hard pressed for money as Columbia Oils and London Pacific Exploration. It was then that George was dispatched on the CPR steamer Princess Margaret to collect some funds that were owed by a man in Victoria, a sum paid in cash so large that no one aboard the ship on the return trip would provide change, and George dined on packages of peanuts. Frank, Isobel and Bain Grant were all waiting at the dock when the ship pulled in, and George stood in the bow, excitedly waving the windfall he had collected, a single $100 bill.8

The other defining event of 1936 offered more immediate prospects. The Turner Valley Royalties well of George Bell, Robert Brown, and John Moyer that discovered the oil column down-dip from the gas cap at Turner Valley seemed to Frank McMahon like the last chance to succeed in the oil business. Promoters, drillers and oil companies were rushing to tap the giant oil reservoir. Frank was determined not to be left out.

Perhaps it was the $100 that George had brought back from Victoria that provided the opening for Frank to get in the action at Turner Valley. In any event, $100 is what it took. Scouting all the maps and information on Turner Valley area land holdings he could lay his hands on, McMahon found that a man named Maitland Shore, a CPR agent at Abbotsford, who lived on a nearby farm, owned 80 acres including mineral rights on the western edge of the developing field. On a Saturday evening, five months after the Royalties well had been brought in, Frank and Isobel drove through a Vancouver pea soup fog and up the Fraser Valley to Abbotsford and paid Shore $100 cash for an option to purchase the 80 acres of oil and gas rights for $20,000 plus 10 percent gross royalty. Now all he needed was the $20,000 to exercise the option, plus perhaps another $120,000 to drill a well, and the $20,000 had to be paid within a month.

Within that month McMahon incorporated West Turner Petroleums Limited and raised from his backers not only enough to exercise the Shore lease but also enough to pay Robert Barker of Vancouver $5,000

cash plus a production royalty for an adjacent 40-acre lease, and in early 1937 picked up another 40 acres from a Robert Kerr of Victoria, this time in return for a block of treasury shares. The three leases with 120 acres were enough to drill three oil wells — assuming there was any oil beneath them.

Now came the tough part: finding the money to drill. Frank and George organized British Investments Limited to flog shares of West Turner Petroleums and Central Turner Petroleums, which briefly held one of the three leases. Enough penny shares were sold to purchase a proper oilfield drilling rig. But more money was needed for drill pipe, equipment, supplies and to pay a drilling crew, and that was proving to be very difficult. The task was made even tougher when a couple of wells drilled near the three leases were dry holes. (The oil industry calls them dry holes but they're not really dry at all: it's just that instead of producing oil, they flow salt water.)

Unless drilling could start soon, the leases would be cancelled, and so would West Turner Petroleums. That seemed almost its certain fate until Victor Spencer put Frank in touch with Norman R. Whittall. Born in Istanbul, Turkey, of British parents, and with a classical education at Cambridge University, Whittall had arrived in Vancouver in 1912, prospered in the lumber business, and dabbled in oil stocks when naphtha was being stripped from the gas flared at Turner Valley. After the 1929 stock market crash he had formed a brokerage business with partner Major J.S. Ross, Ross Whittall Ltd., which dealt largely in mining and oil shares.

Whittall helped raise enough money to get drilling started at West Turner's first well on August 6, 1937, nine months after the company had been incorporated. "Under the most adverse market conditions, Mr. Whittall took firm commitments on shares of the company and furnished enough money to keep the drilling going for a time and preserve the property," McMahon later wrote in reviewing the company's operations. Without Whittall's help, he added, West Turner "would in all likelihood have lost its leases and the company have gone out of existence."9

While Whitall's help got drilling started, more was needed to meet drilling commitments on all three leases. More help came from bank loans, from supplier credits, and from Imperial Oil's Royalite which, after the first well had reached some 5,000 feet, agreed to complete drilling in return for a share of future production. West Turner No.1 was brought in by Royalite on April 17, 1938 at a depth of 7,274 feet, one of the largest producers in Turner Valley, flowing oil at an initial rate of more than 1,300 barrels a day. Successful wells were also drilled on the other two leases. Frank and George McMahon were oil producers — at last.

By early 1938, the directors felt so confident the company would survive that West Turner hired its first full-time employee, Allison Patrick Bowsher, a 29-year-old accountant from Oyama, British Columbia, who had been called in the year before to do an audit on the books of Columbia Oils. By the time he had finished, Pat Bowsher found the books in something less than perfect order and suggested to the McMahon brothers that they could do a better job of keeping track of their complex financial affairs by hiring an accountant to serve as secretary-treasurer. A few months later, George phoned Bowsher and asked, "How much do you want, and when can you start work?" Pat, who worked for an accounting company, had been warned by his employer that West Turner wouldn't last and that a job would await him when the putative oil company folded.10 As it turned out, Bowsher stayed with West Turner and its successor company for more than 30 years, and the day would come when, as senior vice-president and treasurer, he could pick up the phone and in 10 minutes negotiate a bank loan for as much as $10 million.

Like other promoters and wildcatters, Frank had to rely on other people's money: he didn't have any himself. His control of the companies he and George organized was invariably tenuous. At Columbia Oils, London Pacific Exploration, West Turner Petroleums and other later ventures, the basic approach was invariably the same. Frank would acquire some prospective leases, or options. A company would be formed, with initial financing by Vancouver backers. Escrowed shares — which could be released only if commercial production resulted and were otherwise worthless — were issued for the leases. More money was raised from the public sale of penny stocks (the sale of West Turner stock netted only seven cents a share before production was obtained). Sometimes Frank would be the largest single shareholder, but more often it was one of the initial financial backers, and in any event the largest single block would be a small part of the total issued capital. Frank would be employed as managing director and drilling contractor. George would be busy selling shares. One of the initial backers would be president of the company: in the case of West Turner Petroleums, it was initially Douglas Wilkinson, a former member of the B.C. legislature, followed soon by Norman Whittall.

Even while scrambling to finance the first West Turner well, and nine months before it was completed, this same basic approach was followed in the formation of yet another oil company. With backing from Whittall, British Pacific Oils Ltd. was organized in July 1937 to acquire from the Calgary & Edmonton Corporation 1,120 acres of freehold leases, half of which were thought might lie within the limits of the Turner Valley field.

Enter Pacific Petroleums

McMahon's efforts would ultimately lead to the development of two substantial firms that played key roles in the formative development of Canada's petroleum resources. One was an aggressive oil company, the other was the builder of Canada's first major long-distance natural gas pipeline.

The oil company came first, launched on January 14, 1939, when shareholders of West Turner Petroleums and British Pacific Oils at meetings in Vancouver approved a merger of the two firms to create Pacific Petroleums Ltd. The acquired assets gave Pacific three producing oil wells, leases that might yield as many as another 15 oil wells at Turner Valley, about 1,000 acres of dubious exploratory lands known in the industry as moose pasture, an interest in Grease Creek Petroleum which West Turner had earned by lending its drilling rig for a wildcat that turned out to be another dry hole, and a pile of debt.

It was a stretch to call it McMahon's company. Frank was the largest single shareholder, but that amounted to only about 2.5 percent of the issued capital, while George held less than one quarter of one percent. The president was Norman Whittall, and Frank was not even on the board of directors. He was managing director, but even that was terminated two years later to the month, when the directors decided they could cut costs a little by hiring a drilling superintendent to combine the jobs of McMahon and outside drilling supervisor Clarence Snyder. It would be another eight years before McMahon would rejoin Pacific's management, although he remained very much involved, one way or another, in the company's affairs.

The man who succeeded McMahon at Pacific was Neil McQueen, the former Imperial Oil geologist who had brought in the Royalite No. 4 gas discovery at Imperial Oil. Born in Petrolia, McQueen grew up in the oil patch. His father, Alex McQueen, had been operations manager for John Fairbank, the largest producer of Canadian oil in the late 19th and early 20th centuries, before heading Imperial Oil's venture into exploration. Starting at age 16, Neil McQueen had spent four years divided between work on Imperial's field parties in Western and Northern Canada, and classes at the University of Pittsburgh, the only university that then offered a degree in petroleum geology. McQueen never got his degree because, he explained, "I spent six months every year on field parties, with the result that I always missed the start of classes and the final exams." That didn't stop him from scoring some notable geological successes.

Four years after bringing in the Turner Valley gas cap discovery well, McQueen had left Imperial for mining ventures in British Columbia. As

managing director of Bralorne Mines, McQueen resuscitated a bankrupt company with mining claims near Bridge River, and for less than $300,000 brought into production a mine that eventually produced $90 million worth of gold.

McQueen's five-year stint in managing Pacific Petroleums was somewhat less successful. He was responsible for a $100,000 program in the Cat Creek area of Montana, picking up leases surrounded on four sides by producing wells, one within 500 feet of Pacific's property. Pacific, however, "had the phenomenal bad luck of drilling five successive dry holes . . . the most glaring example, experienced by myself, of the hazards of the oil business," McQueen wrote to the directors in tendering his resignation. "Anyone who cannot appreciate the run that the company has for the money expended on your Cat Creek leases, and accept such discouraging results, should not be connected with this business. They have just not got the viewpoint of the oil man."11

McMahon, as it turned out, was not actually fired by Pacific. Just days before the boom was lowered, he resigned, writing to the directors that he had accepted "what appears to be a very promising position with a development company operating in Turner Valley. . . . May I assure you of my willingness and desire to be of assistance to your company at any time in the future."12 He had left on a good note, as optimistic and positive as ever. And although he was no longer part of Pacific's management, through his new enterprises he would continue to work in close relationship with the company he had founded, and especially with Norman Whittall, until he returned to take over.

McMahon by now had moved from Vancouver to Calgary, to be at the centre of the oil patch, and a bewildering array of new ventures.

He had left Pacific for the first new venture, Drillers & Producers Ltd., where he was vice-president, general manager, and partner with Matt Newell. Newell and Shorty Chandler had operated a contract drilling business, but Chandler had retired in ill-health. The drilling business would continue as a subsidiary under the name of Newell & Chandler but the new element, of course, is that Drillers & Producers would also be in the business of looking for and (hopefully) producing oil.

The drilling business was soon in trouble. Newell & Chandler had already started drilling the B.C. government's costly Pine River well on the Commotion Creek structure. But drill pipe had been lost down the hole, a year was spent first trying to retrieve it then sidetracking around the obstacle, and the rig stood idle during a bitter controversy over contract terms. The well was eventually completed but the $750,000 cost was a loss not only for the government but also for Drillers & Producers and its Newell & Chandler subsidiary.

In 1942, Whittall and McMahon lobbied C.D. Howe, the powerful federal industry minister, for help in financing drilling at Turner Valley as a war-time measure to increase needed oil supplies. The following year, Ottawa created War Time Oils, which ultimately spent $4 million to finance more oil wells, including several by Pacific, recovering costs from 100 percent of initial production.

While lobbying Howe, McMahon was also chasing his vision of Peace River gas supplies for Vancouver. The ever-cautious Pacific directors authorized company president Whittall "to invest not more than $1,250" in a syndicate "which might be formed to acquire acreage . . . in the Peace River block."13 The syndicate, formed as Peace River Natural Gas Company, was assembled by McMahon. In addition to Frank McMahon and Pacific, the other backers were Whittall, Victor Spencer, and Vancouver investment dealer George Martin. Three years later, on August 22, 1945, the syndicate filed applications with the B.C. government for a 700-mile gas pipeline from the Peace River area and more than one million acres of exploration permits. But Duff Pattullo was still determined that the government would find and develop the people's petroleum treasure. It was still another two years before private oil companies would be allowed to enter the Peace River country.

When British Columbia finally moved, Frank McMahon, on an August morning in 1947, was first in line on the steps as the doors of the legislative building in Victoria opened at 8 a.m. He was there to file with the Department of Mines for oil and gas permits 1, 2, and 3, covering 750,000 acres. The applications were for the Peace River syndicate, which by this time had been joined by Frank Ross, a wealthy Vancouver industrialist who was later lieutenant governor of British Columbia. Next in line at the Department of Mines that morning was Phillips Petroleum Company of Bartlesville, Oklahoma, to file for permits 4, 5, and 6.

While waiting for British Columbia to open its doors for northern exploration, the McMahon brothers kept busy in Alberta, and it was here that their fortunes would at last start to bloom.

Standard Oil of California, in 1944, made what at first looked like a promising oil discovery in the Princess area 110 miles east of Calgary. It turned out to be no more than a very small oil pool, but it ignited a small flurry of interest and activity, and gave the McMahon brothers a pad from which to launch yet more new ventures: Princess Petroleums, Atlantic Oil Company, Empire Petroleums, and a few others.

The Princess play also enabled Frank to entice Sun Oil Company, which had been marketing gasoline in Ontario for a few decades, to launch its first exploration program in Canada. McMahon travelled to Philadelphia, armed with maps and geological reports, where he

negotiated for a couple of weeks with J. Howard Pew, patriarch of the family that then owned 80 percent of Sun. McMahon was negotiating on behalf of a syndicate headed by D.C. (Skinny) McDonald and stockbroker Cliff Cross, who had acquired half a million acres of leases from the CPR. Under the deal McMahon negotiated, Sun paid $250,000 plus an overriding royalty to acquire the leases and started exploring. McMahon pocketed a 10-percent finder's fee.

Thrifty Pacific had emerged in profitable shape after the Second World War; Drillers & Producers had not. Pacific's net earnings from 15 oil wells at Turner Valley were running at a rate of $174,000 a year, it had no debt, $200,000 in the bank, and a modest interest in several other penny companies. Drillers & Producers was essentially bankrupt. Revenue from its three oil wells at Turner Valley went mostly to paying overriding royalties while the contract drilling business had apparently not gone well. Pacific rescued Drillers & Producers with a $343,000 loan, and purchased a one-third interest in the company for $10,000.

Frank McMahon departed Drillers & Producers, not only for other oil ventures this time, but for a foray into the liquor business. There was only one Canadian distillery west of Toronto, owned by the Reifel family in Vancouver. McMahon saw Calgary as an ideal location for a second one: Alberta offered ample grain, natural gas for low-cost fuel, a large supply of exceptionally good, clean spring water, and a nearby source of bottles from one of Canada's largest glass factories, at Redcliff. McMahon bought a defunct soap factory to salvage stainless steel tanks and fittings suitable for a distillery, formed Alberta Distillers, raised $750,000 from the Reifel family and the ever-supportive Norman Whittall, and was soon producing booze. Unwilling to wait five years for its rye whisky to age, McMahon decided to also produce vodka, which needs no aging. The catch was that the sale of colourless, odourless vodka was illegal in Alberta because it was deemed by the government of Bible preacher Ernest Manning to be an insidious danger to the morals of Albertans. Alberta Distillers produced vodka anyway, just as a craze swept New York City for "Moscow Mules" and "Bloody Marys," and the distillery did a landslide business. Nearly six decades later, when many of the oil wells had been pumped dry, Alberta Distillers was still pumping out rye and vodka.

George McMahon, meanwhile, was plugging away on the Princess play. As president of Princess Petroleums, he announced a six-well drilling program on February 3, 1947. Ten days later, Imperial brought in its Leduc discovery, and Princess was quickly forgotten. Frank filed on 260,000 acres of oil and gas reservations farther north in central Alberta, and acquired eight quarter sections of leases. Pacific and Atlantic then

each acquired a half interest in these properties in return for treasury shares. Atlantic (whose name was now changed to Canadian Atlantic Oil Company) had no problem in the post-Leduc boom in raising half a million dollars from a public share offering, to finance its portion of drilling costs.

Atlantic's rogue well

More important than the quarter of a million acres, however, were freehold mineral rights on a mere 160 acres, located a mile northeast of the Leduc discovery, and soon surrounded by producing oil wells. It was an error by Imperial Oil that enabled McMahon to lease this quarter section.

Bronislaw and Rose Rebus had acquired the land and mineral rights when they arrived from Poland in 1897 to farm. Imperial had leased the rights from widowed Rose, but under the terms of Bronislaw's will, it was apparently John Rebus, the eldest of seven sons, who held the title. Learning about the uncertain status of the Imperial lease, McMahon and veteran lease broker Norman (Bus) Lacey spirited John Rebus to Calgary, safely away from Imperial and any attempt its land department might make to correct the faulty lease. John Rebus really wasn't keen on leasing the oil rights, all he wanted to do was keep on farming, and he didn't want an oil company with its big drilling rig, its trucks and heavy equipment messing up his land. It took a week of negotiations before John Rebus accepted an offer of $200,000 cash plus a 12.5-percent production royalty. McMahon then persuaded Imperial to drop its uncertain interest in the lease in return for 100,000 barrels of oil from future production. The lease was then assigned to Canadian Atlantic.

It was the 40-acre Rebus lease that produced Canada's most famous wild well, dramatized the world's newest oil province in spectacular fashion, and provided a financial gusher for the McMahons.

Drilling at the third of four planned wells on the 160-acre lease had just reached the producing formation a mile below the ground, when Atlantic No. 3 blew out of control in early March 1948, and in a six-month rampage spewed nearly 1.5 million barrels of oil and more than 10 billion cubic feet of natural gas. Every day, oil and gas were bubbling up through the ground at a rate of some 10,000 barrels of oil and up to 100 million cubic feet of gas. Just two and a half days before this torrent of energy was shut off, it caught fire, sending a ball of flame 800 feet into the sky with a column of smoke that mushroomed up to 7,000 feet and trailed eastward over the prairies for nearly 120 miles.

When the well first blew out, drillers quickly, if temporarily, cut off the flow by pumping hundreds of tons of mud down the hole. Although it

was not known until later, the drill pipe had been broken 2,800 feet from the surface, and thus the mud had not shut off the flow from the source. The gas and oil, driven by great pressure, escaped through the break in the drill pipe. Three days later it had seeped through fissures in the earth and was escaping at the surface.

During the following weeks, more material was pumped down the hole to cut off the flow — feathers, sawdust, cottonseed hulls, shavings, golf balls, and 10,000 bags of cement. But still the oil kept spouting up through the ground until in two months there was a 40-acre lake of oil. The oil kept coming as fast as it could be pipelined to the railway siding and hauled away by tank trains, or pumped back to the producing formation through nearby wells.

Normally the flow of oil from a well is controlled through a choke that might be reduced to as little as half an inch. Under normal conditions, six months' production from Atlantic No. 3 would have been choked down to about 36,000 barrels. "But that well," McMahon famously said, "was producing through a 40-acre choke."

Two relief wells were eventually drilled to kill the flow at Atlantic No. 3. Located 700 feet away on opposite sides, the relief holes were drilled at angles to intersect the producing hole a mile below the ground and a few feet above the producing formation. Water was pumped down the relief wells at rates of as much as 1,500 barrels an hour, followed by mud and cement to eventually seal off the rogue well.

Risk of fire throughout the entire operation was extreme, and police cordoned off the area to exclude thousands of spectators who wanted to see what was happening. Ignoring the dozens of "no smoking" signs, one roughneck working not far from the wellsite retired to an outdoor privy for a secret smoke. When he struck his match, the roughneck and privy took off like a space ship, thrown 200 feet by the blast of the explosion. Miraculously the roughneck survived, and even more miraculously no fire resulted.

Just as the relief well, after months of drilling, seemed on the verge of taming Atlantic No. 3, the 136-foot derrick, undermined by the cratering of the earth, toppled over and continued to sink a little further each day into the subsiding ground. A spark, perhaps caused by the friction of escaping gas against the metal of the rig, perhaps caused by a rock hurled by the force of the escaping gas, finally ignited Atlantic No. 3, which burned for 60 hours before the relief wells quenched the flow.

Surprisingly, little of the oil had been lost, and the escaped production gave McMahon's Canadian Atlantic a quick million-dollar profit, while the Rebus family collected $366.544.17 in royalty payments.

Before Atlantic No. 3 blew wild, Pacific had issued a block of treasury shares for an equal number of Canadian Atlantic shares, the net effect of which was to give Pacific a bigger stake in the Leduc wells, and the McMahon brothers a bigger stake in Pacific. At 15 percent of the issued capital, they were Pacific's biggest owners. Before Atlantic No. 3 was under control, McMahon had rejoined Pacific's management, as managing director, the position from which he had been fired eight years earlier. More importantly, he was also chairman of a three-man management committee that included Whittall and Reg Smith, a Vancouver mining geologist and promoter who was one of the founding directors, when West Turner Petroleums had been formed in 1936.

Despite the hectic pace of activity in Alberta, the Peace River area in northeastern British Columbia had not been forgotten. After it had acquired B.C. oil and gas permits 1, 2, and 3, Peace River Natural Gas Company drilled British Columbia's first commercial gas well, just across the border from Alberta's Pouce Coupe gas field, in early 1949. The next six wells, however, were all dry holes, and it was apparent that finding enough gas for a pipeline to Vancouver would require more money than the six members of the syndicate could pony up. To find it, McMahon went to Los Angeles, where he had an introduction from Reg Smith to Edwin Parkford, an associate of J. Paul Getty, who was on his way to becoming the wealthiest man in the world.

Through Parkford, McMahon met with Howard Hughes, the reclusive billionaire movie producer, aircraft builder, and drilling bit manufacturer. Hughes was interested in investing in McMahon's ventures as a possible tax shelter, but when the shelter appeared less weatherproof than hoped for, the pending deal fell through. McMahon had better luck with Getty, and even greater luck with Clarence Wright, the country-boy head of Sunray Oil Corporation of Tulsa, Oklahoma. The son of a cotton farmer, Wright had started work at age 10 as an errand boy for a grocery store, later established a chain of clothing stores, speculated in oil leases, and in 1930 acquired control of Sunray, a significant regional oil producer, refiner, and marketer.

Wright flew to Calgary, took a good look at McMahon's properties, flew down most of the length of British Columbia for a bird's eye view of the pipeline route to Vancouver, then invested more than $1 million in Pacific, making Sunray for a time the largest shareholder, with an option on even more stock.

Parkford was also instrumental in bringing in two Getty companies, Pacific Western Oil Company and Tidewater Associated Oil Company, for a combined 40-percent participation in what was then the most aggressive exploration program in Canada. Bear Oil Company was

organized to conduct a $5-million search in northeastern Alberta. In addition to the Getty companies, Sunray and Pacific each had a 20-percent share and the remaining 20 percent was held by Princess Petroleums, Anglo-Canadian Oil Company, and Toronto mining promoters Donald Hogarth and John Frame. Bear Oil proved to be just one more example of the vicissitudes of wildcatting. By the time the $5 million was spent, all Bear Oil had for that money was a cluster of dry holes.

There would be many more dry holes in Pacific's history, as there is with every oil company, but one in particular is notable. In 1951, Pacific, Canadian Atlantic, and Sunray agreed to drill one more wildcat in that graveyard of sunken hopes, the Flathead Valley, where the McMahon brothers had struggled with Columbia Oils two decades earlier. Pacific Atlantic Flathead Valley No. 1 would earn the three companies 75 percent interest in 60,000 acres of leases that Guy Kirkpatrick's Amalgamated Oil Company had held for 40 years. The well drilled through 5,700 feet of Precambrian rock before encountering the younger Mississippian rocks, rocks that had yielded Turner Valley and so many large gas fields along the eastern foothills of the Rocky Mountains. At this deepest Flathead test, the Mississippian produced gas flows at rates up to one million cubic feet per day, enough to be commercial at less costly wells, but not at one that took 15 months to drill at a cost of nearly $1 million. The last Flathead wildcat was abandoned at a depth of 10,500 feet, and in a later study George Hume concluded that there remained "the very practical question as to whether large oil fields do still exist" under the overthrust Precambrian rocks in this rugged corner of British Columbia.14

There was much better luck at the big Redwater oil field where, as we have seen, Pacific, Max Bell's Calvan, Sunray, and others bid successfully at auctions for some highly profitable Crown leases. During a two-year period, the group paid some $5.5 million for Redwater leases on which it drilled more than 50 oil wells, with Pacific's interest nearly 25 percent.

Not all the directors were entirely pleased with the aggressive directions in which McMahon steered Pacific after becoming chairman of the three-man management committee in 1948. He had held that position barely four months before two of his earliest backers, Victor Spencer and George Martin, abruptly and dramatically resigned from Pacific's board, although Spencer would later return. There were more fundamental changes that December when George McMahon, Pat Bowsher, Stan Slipper, Pacific's exploration manager, and Jerry Wood, a mining engineer who had been on the board since 1938, all resigned to

make way for the company's biggest shareholder. They were replaced by Sunray president Clarence Wright, Sunray geologist William W. Porter, and Edwin Parkford. Whittall stepped up to the chairmanship. McMahon became president, managing director, and chief executive officer.

McMahon was at last in charge at Pacific, and under his direction annual revenue would climb from $342,000 in 1949 to $19 million in 1960. But Pacific was no longer a profitable company. During that 11-year period, it accumulated losses of nearly $13 million, although the financial figures did not fully reflect the value of the oil and gas reserves that had been built up. They did, however, fully reflect Frank McMahon's aggressive wildcat approach.

After 1949, McMahon's and Pacific's histories are inextricably linked to Westcoast Transmission and its efforts to build Canada's first major long-distance gas pipeline, to be related in a subsequent chapter.

Chapter 12. The Fina Saga

The skeptics said it could not be done. The smart money bet that an upstart organization backed by an upstart European parent would fail. But Petrofina accomplished their goals, and more, in less than three years. Never before in Canada, or possibly anywhere else, had a petroleum refining and marketing organization of this size been built from scratch in such a short time.

Petrofina Canada was the biggest fish in the diet on which the state oil company, Petro-Canada, grew during its formative years. Petro-Canada swallowed Atlantic Richfield Canada, Pacific Petroleums, and the refineries and service stations of Gulf Canada and BP Canada. But its biggest feed was Petrofina, which in turn had already swallowed two of Canada's pioneer oil enterprises, Max Bell's Calvan Consolidated and Eric Harvie's Western Leaseholds.

An Italian and a Romanian had led Petrofina's growth into one of Canada's major oil companies, establishing two separate enterprises that later merged. Sicilian-born Alfredo Felice Mechele Campo established the refining and marketing company in the East, while Trajan Nitescu came from Romania, where the roots of the parent Fina organization had been first planted, to set up an exploration and production company in the West.

Not just Fina, but the entire oil producing industry might perhaps most properly be said to have started in Romania. Here in the foothills of the Carpathian mountains, the first oil wells were dug in 1856, two years

before James Miller Williams dug his well at Oil Springs and three years before Edwin Drake drilled at Titusville. By 1914, Romania was the world's fourth largest oil producer and, aside from Russia, the largest in Europe. Unlike elsewhere, most of Romania's wells had continued to be dug. Workers were lowered down hand-dug holes to depths of hundreds of feet. Piping was used to supply air, but the fatality rate was high. In 1923, Romania reported 777 producing oil wells, of which more than 300 had been dug by hand.

Petrofina — Compagnie FinanciËre Belge des PÈtroles, as it was first officially called — was incorporated in Brussels in 1920 and built on the ashes of the First World War. Its principal assets were three Romanian oil companies, the most important being Concordia Societe Anonyme Roumaine Pour l'Industrie du Petrole, thankfully better known simply as Concordia. Petrofina prospered between the two world wars, with oil wells, pipelines, refineries in Romania and at Dunkirk, France, and service stations throughout much of Europe, thanks in large measure to the drive of Laurent Wolters, the son of one of Petrofina's founders.

Trajan Nitescu began his career with Concordia in July 1926, after graduating from the Polytechnical School of Mining Engineering in Bucharest at the head of his class, and a year of compulsory military training, when he qualified as a flying officer in the reserve section of the Romanian Air Force.

Nitescu's first posting with Concordia was at Busternair, Romania's oldest oilfield. The wells were 100 to 2,500 feet deep, and those that had not been dug by hand had been drilled by the "Canadian system," using cable tools and wooden derricks. Following a three-month tour in the United States to study American oil field practices, Nitescu was appointed field superintendent in charge of Concordia's drilling and producing operations in a number of Romanian oil fields.1

Two other men also working in the Romanian oil industry during the 1930s and who, like Nitescu, would wind up in the Canadian oil patch, were Alfred George Gardyne de Chastelaine, and Walter Leslie Forster.

De Chastelaine had come to Romania in 1927, after obtaining his engineering degree from the University of London, to work in the oil fields for the Romanian subsidiary of a British firm, Phoenix Oil and Transport. He was later posted to Bucharest, where he was responsible for maintaining the company's relations with the Romanian government.

On New Year's Day, 1930, de Chastelaine, by happenstance, joined John Walsh, manager of Standard Oil Company's Romanian subsidiary, Romano-Americana, for a drink in the lounge of the posh Athene Palace hotel. Walsh was accompanied by his 20-year-old daughter, Marion, who

was visiting Bucharest on her Christmas vacation from university in Paris. Three years later, de Chastelaine and Marion married.

De Chastelaine and Nitescu knew each other as young field engineers in the late 1920s. “They used to ride together on horseback to inspect the field operations of their respective companies,” Marion de Chastelaine recalled years later in talking about her late husband. “Chas must have been quite a sight to the rough-and-ready Romanian oil workers. He was a very proper Englishman, attired in impeccable riding habit, with polished black boots and white gloves.”2

Forster, too, arrived in Romania as an English engineer, with Shell’s Romanian subsidiary, Astra Romana. He worked in Romania for two years starting in 1928, and again for seven years starting in 1933.

Romania’s oil was a crucial supply sought by Germany in the opening months of the Second World War, and pressure on British oil men in the country grew until the last of them, including Forster and de Chastelaine, were expelled in the fall of 1940. To deny the oil to Germany, “We were suspected of planning to destroy the oil fields, and they were quite right,” Forster later recalled.3

Ruled by a dictatorship, Romania was at first officially neutral but soon joined Germany in its attack against Russia. German troops essentially occupied the country, and most of Romania’s oil companies, including Concordia, were expropriated by Germany. But there was an active underground resistance against the widely despised Germans, and both Nitescu and de Chastelaine were active in the resistance.

Nitescu became manager of all of Concordia’s operations, reported to a German Nazi whom he intensely disliked, and sought to frustrate oil producing operations where he could. To deny the use of critically short oilfield supplies, he ordered massive amounts of drill pipe, casing and other equipment, and had it all hidden in the Carpathian Mountains, hopefully for post-war use.

De Chastelaine, now a lieutenant colonel, was stationed in Istanbul with the Special Operations Executive, in charge of Britain’s espionage and intelligence activities in the Balkans. (Marion de Chastelaine was also engaged in intelligence service, working for Sir William Stephenson, the Canadian industrialist made famous by the book A Man Called Intrepid, stationed first in Washington and later in London.)

From Istanbul, de Chastelaine was in radio contact with the leader of Romania’s resistance, Julius Maniu, a former prime minister and head of the suppressed National Peasant Party. De Chastelaine made three attempts to parachute into Romania to help Maniu plan a coup d’etat. The first attempt was aborted by bad weather. The second failed when the aircraft was shot down over Italy by a German fighter. De Chastelaine

and the crew managed to bail out, fortunately falling into territory held by Allied forces. On the third attempt, two days before Christmas 1943, de Chastelaine and another SEO officer landed off-target and spent the next eight months in a Romanian prison.

Even in prison, however, he received enough help from the underground resistance to slip out from time to time to hold secret meetings with Maniu. Fate of the planned coup rested largely with Maniu and King Michael, barely in his twenties.

On August 23, 1944, Michael summoned Romania's dictator Marshal (Red Dog) Antonescue to the royal villa to discuss the war situation. The waiting king and two generals were armed with concealed revolvers while armed household guards were posted nearby. When Antonescue refused Michael's demand for an immediate armistice, the guards arrested the dumbfounded dictator and overpowered his drivers and armed escort. In a radio broadcast that evening, Michael declared, "The dictatorship has come to an end, and with it all oppression."

One of King Michael's first actions following the coup was to summon de Chastelaine from prison and send him in a small aircraft to Istanbul with a request for Allied military support in a Romanian offensive against its former German ally. In three years fighting Russia, Romania lost 300,000 troops, and in nine months fighting Germany, another 170,000 Romanian soldiers were lost. Only Russia, Britain, and the United States — each many times larger — suffered greater losses during the Second World War.

After the war, de Chastelaine resumed his petroleum career, as a consultant in Calgary.

Laurent Wolters was also active in the underground resistance during the war. While ostensibly working for the German occupation authorities in Belgium, Wolters made Petrofina's headquarters in Brussels a pseudo bank that helped finance guerrilla forces. By late 1944, when the Germans found out what was happening, Wolters had to escape through company channels, via France and Spain, to Britain where, at age 43, he signed up for training as a paratrooper. The war was over before he was able to parachute back to Belgium, but he was later decorated for his resistance efforts by Belgium with the Medaille de la Resistance and by France with the Croix de Guerre.

The democratic monarchy planned by Maniu and King Michael tragically lasted all too briefly. Russian troops replaced the de facto German occupation. Romania slipped behind the iron curtain. A communist dictatorship even more oppressive than the fascist regime of Antonescu gradually imposed an iron grip.

During the first months of the Red Army occupation — before the first British and American representatives arrived on the Allied Control Commission — Russia confiscated an enormous war booty: the entire Romanian navy, most of the merchant marine fleet, half the rolling stock of the railways, cars, trucks, tractors, and an estimated 51,000 tons of oilfield equipment. This was in addition to $300 million in official reparation payments, in the form of goods to be supplied during an eight-year period.

Colonel Walter Forster — following active service with the British Army in Burma (where he was awarded the CBE), Russia, the Middle East, and North Africa (where he was awarded the U.S. Legion of Merit) — returned to Bucharest in September 1944. Here he served for two years as the British representative for economic matters on the Allied Control Commission, which in reality was Russian controlled. In stormy arguments with the Russians, Forster managed to stop the dismantling of Shell's large Astra Romana refinery and the looting of the oil fields, but not before much of it had been shipped to Russia. "We were ordered to get on with the Russians and we did our damndest to meet them more than halfway, but we had a lot of trouble with them," Forster recalled 40 years later. The British and American representative on the commission, he said, tried "to stop the Russians from making bloody fools of themselves."4

Few suffered more from the Communist takeover than Trajan and Florica Nitescu, who endured six years of harassment, forced hiding, and imprisonment, before escaping to establish a Petrofina oil company in Canada.

Concordia was expropriated by the Soviet government before the war was over and Nitescu resigned. He briefly taught engineering at the Polytechnical Institute in Bucharest before accepting a job as head of Standard Oil of New Jersey's Roman, Americana, but by April 1948, this firm too had been expropriated, as well as the Romanian subsidiaries of Shell and Phoenix.

Many Romanians lived for the day that the British and Americans would intervene to establish the democracy and free elections promised in the brave words of the Atlantic Charter and the Potsdam and Yalta agreements, perhaps hoping even more eagerly for the U.S. Marshall aid that helped avert starvation in other war-ravaged European nations. Some were even secretly plotting for that day. Among them was Trajan Nitescu.

Nitescu was one of eight influential Romanians who headed separate clandestine cells, developing plans to assist the Americans and the British in what they hoped would be their intervention to re-establish a

democratic regime. In March 1948, six of the eight leaders were arrested. Only Nitescu and Vintila Bratianu, son of a former leader of the Liberal Party, managed to escape. Only one of the six arrested, an admiral, survived the prison terms. Nitescu's close friend, Dumitru Gheorghiu, former head of a Romanian-owned oil company, was severely beaten and committed suicide.

The story of how Trajan avoided arrest, and how he and Florica escaped first from Romania and then from Yugoslavia was told much later by Florica.5

Trajan was tipped off that the Romanian authorities may have learned of the existence of his clandestine group. If the tip was right, he knew he would be arrested. He also knew that political arrests were usually made in the middle of the night, so that fewer people would be aware of what was happening.

For five nights after being tipped that the group had been detected, Florica and Trajan did not sleep at their apartment, which was on the top floor of a two-storey building. Each day Trajan went to the Romano-Americana office, returning to the apartment for lunch at noon and in the evening for dinner. Fearing that their apartment was being watched, they made a pretense of following their normal routine. But each evening, at about 11, they slipped out of the apartment by a back door. Florica slept at the home of her mother and aunt. Trajan slept at the house of friends, but Florica did not know which friends he stayed with.

The housekeeper at the apartment did not know what was taking place. Each morning Florica phoned the housekeeper "to see by her voice if everything was all right."

On the sixth morning, the wife of the couple who occupied the ground floor of the apartment building, and who were close friends of the Nitescus, phoned Florica at her mother's place to warn that two police officers had arrived at the apartment and were still there.

Florica's immediate concern was to contact Trajan and warn him. Since she did not know with which friends he was staying, this could involve a number of phone calls. She was also concerned that the phone might be tapped, and decided that the warning would have to be disguised. As Florica told the story:

> It just happened that at the first house I phoned he was there. And so I told him: "Mr. Doctor, my housekeeper is very sick and I had to call several doctors to stay with her and even now she is not well and two doctors are with her." He said, "Go to the office. I will meet you there."

> I arrived first at the office. It was very close to where I was staying and told them at the office what happened. They suggested I contact Trajan and warn him not to come to the office, because maybe they would arrest him at the office.
>
> So I went to the first public telephone and I phoned Trajan. I said, "Mr. Lawyer." I was playing very safe. "My papers are not in order. I would like you to see them before you go to the office. Please wait for me where you are. I will come to show you my papers." From that day we went into hiding.

For the next six months, Trajan and Florica remained in hiding in the homes of acquaintances, first in Bucharest and then throughout Romania. They did not dare stay with relatives or close friends because they knew that these would be the first places the authorities would look for them. They learned later that their apartment in Bucharest remained watched for more than two weeks. Friends who arrived at the apartment to visit them were detained for four days, and released only after it became apparent that they did not know where the Nitescus were.

Romania was surrounded by Communist nations: Yugoslavia, Hungary, Bulgaria, and Czechoslovakia. All but Yugoslavia, where Marshal Tito was said to defy Stalin's orders, were held in the iron grip of Moscow. A total of 243 Romanians had escaped into Yugoslavia by late September 1948, in addition to refugees from Albania, Bulgaria, and Hungary, according to the announcement from the Yugoslavian Ministry of the Interior. Many of the Romanians escaped to Yugoslavia by crossing the Danube River. Among them were Trajan and Florica Nitescu.

The Nitescus swam across the Danube at a point near Turnu Severin at 3 a.m. on September 9. Trajan was a strong swimmer. Florica could not swim. She wore an aircraft pilot's inflatable lifejacket and was tethered to Trajan by a length of rope. Trajan also wore an inner tube from a bicycle tire in which he had placed some money and a few valuables. She wore a white cotton dress; he wore a white shirt and white shorts. That was all the clothing they had.

They landed on the Yugoslav shore, cold, wet, pushed to the limits of endurance by lack of sleep for more than two days and by a two-mile swim against a strong current that taxed all their strength. They found overnight shelter in the home of a welcoming villager, but in the morning, police arrived and arrested them. They joined a group of some 20 fellow Romanian refugees. Their money and other valuables, with the exception of Trajan's wristwatch, were confiscated. After being detained overnight, they were moved first by boat then marched about 10 miles under armed guard to a prison camp.

Trajan and Florica had no shoes. Florica had knit wool slippers because they were easier to take on the swim across the Danube. They marched in their slippers along a dusty road, avoiding walking on gravel and stones as much as possible. At the prison camp, Florica found "some pieces of sack," and was given a needle and thread by another refugee, which she used to sew new soles on their slippers.

The food was terrible. There were no plates. "We found some old cans in a corner which we cleaned up and used for plates," Florica recalled. "A couple of Romanian boys made spoons from scraps of wood." Florica and Trajan shared one wooden spoon. Food consisted of black bread and soup of water, salt, a few peas or beans, and often dead insects. "One day I told Trajan that I could not eat the soup," Florica recounted. "He told me, 'You must. You must go on.'"

They were kept at the camp for a month, then taken to Belgrade, where the government sought to persuade Trajan to work for the state-owned oil company. Yugoslavia's first oil production had been developed by the Germans during the war, and the country had few experienced oil men. Trajan pretended that he had merely been a clerk with Concordia. "He was afraid that if the Yugoslavs knew he was an oil expert he would never be allowed to leave the country," Florica explained.

At Belgrade they were housed for 10 days in a small hotel, and ate at a state canteen, where they had their first decent food since escaping Romania. But for the first week in Belgrade they still had only their escape clothes, until they were given shoes, while Trajan was also given a denim work jacket and a pair of slacks.

At Belgrade, Florica studied the Yugoslavian alphabet until she was able to identify the address of the Belgian Legation in the phone book. Once equipped with better clothes and shoes, they intended to go to the Belgian Legation to seek refuge and release from the country. But when they asked at the hotel for directions to the street on which the Legation was located, their purpose was suspected, and the next morning they were taken to an oil field camp at Kutina, another former prisoner-of-war camp located in the mountains some 50 miles southwest of Zagreb. The camp was surrounded by barbed wire and land mines, with armed guards at the single exit and entry point.

For several months they remained at Kutina while Trajan worked in the nearby oil fields. It soon became apparent to the Yugoslav authorities that Trajan knew much more about the oil business than a simple clerk. Living conditions were at least tolerable.

At Kutina, Trajan suffered from bleeding ulcers, and was taken to the hospital at Zagreb, where he spent a month. Florica was forced to remain at the camp at Kutina. They spent all the money they had to buy

postcards so that they could write to one another each day that Trajan was in the hospital.

From Kutina, they managed to write several letters to Fina officials in Brussels, and to Standard Oil. They wrote to seek the help of these companies in obtaining their release from Yugoslavia, although these messages had to be disguised to get past the Yugoslav censors.

George Delcoigne, head of the Belgian Legation in Belgrade, was instructed by his government to use his influence to seek the release of the Nitescus. Word was somehow got to the Nitescus in Kutina to try to reach Delcoigne in Belgrade. On the pretext of needing to see medical specialists for Trajan's ulcer, they obtained permission to visit Belgrade, where they immediately made for the Belgian Legation.

While the Nitescus stayed at the Legation, Delcoigne made application for authorization for them to leave the country, describing Trajan as a "Belgian engineer." The Yugoslavian minister of oil was notified of the application, and phoned Delcoigne to ask that Trajan visit the Ministry's office to clear up a few questions. Delcoigne said that Trajan was ill in bed and could not leave the Legation. The minister was adamant, and Delcoigne was ultimately compelled to produce Trajan. He told Trajan that he would be taken to the Ministry in a Legation car, and that he was under no circumstances to go out on the street by himself.

As soon as Trajan entered the oil minister's office it was obvious that the oil minister was furious. He punched a button on his desk. Armed guards arrived, and Trajan was arrested.

When Trajan failed to return to the Legation, Delcoigne phoned the oil minister, who said he did not know where Trajan was. After several more phone calls, the minister said that Trajan had been arrested because he had been stopped on the street and it had been found that his papers were not in order.

Florica went to the minister's office to plead for Trajan's release, presenting her case through another official who, it was thought, might be more sympathetic. Florica cried. Eventually she was told that if she returned to the camp at Kutina, Trajan would rejoin her there. She returned to Kutina, but it was four months before Trajan rejoined her. During all but the final two weeks of this period, neither Florica or Delcoigne knew whether Trajan was alive or dead, or whether he had been returned to Romania.

During this four-month period, Trajan was held in eight different prisons, in Belgrade and elsewhere in Yugoslavia. The food in the Belgrade prison was much like that at the first camp at which they spent a month, and exacerbated his ulcer. He traded his wristwatch for a few potatoes. His weight fell from 180 to 140 pounds.

Trajan was eventually returned to the camp at Kutina, and from there he and Florica were transferred to another oil field camp at Lendava.

Some time after Trajan had been returned to work for the state oil company, Delcoigne was on a hunting party with Josip Tito, and persuaded the Yugoslav dictator to allow the Nitescus to leave the country. Months passed and nothing happened. During the second hunting party, Delcoigne chided Tito, telling him, “You have no authority in this country. You authorize people to leave, but nothing happens.” Tito said they would be allowed to leave. “Good,” said Delcoigne. “I have the papers with me. Please sign.”

The authorization allowing the Nitescus to leave Yugoslavia was valid for one week. Delcoigne sent a telegram to the Nitescus, who were once more permitted to leave for Belgrade. That same evening they left Belgrade by train for Paris, where they stayed 24 hours before leaving for Brussels. It was early January 1950. The 22-month odyssey of Trajan and Florica Nitescu was over.

Canadian Fina

Laurent Wolters was still busy rebuilding Petrofina’s war-shattered empire when Nitescu rejoined the organization in Brussels after his escape from Romania and Yugoslavia. Wolters had already decided on his boldest move to date. Fina would launch an attack on the North American market. Nitescu and Camille Bonnami, a senior executive at the Brussels head office, were dispatched to New York to investigate the possibilities, and recommend whether the company’s first North American venture should be in the United States or Canada. They recommended Canada. Nitescu and Bonnami were sent to Calgary to set up operations where Canadian Fina Oil Limited was incorporated on May 20, 1950. It began its operations from a one-room office in Calgary’s Palliser Hotel with two employees, Nitescu and his secretary, Antonette Pineau.

Between May 22 and June 9, Nitescu and Bonnami negotiated five separate deals that got Canadian Fina started in the oil business. The first was the purchase for $583,120 of a 25-percent interest in five well sites on the first Crown leases that Pacific Petroleums, Calvan and their associates had acquired in the Redwater field by successful bids at government auctions.

Several other deals negotiated with Pacific and its partners involved exploratory acreage in northwestern Alberta. In a farmout deal at Coronation in southeastern Alberta, Canadian Fina agreed to undertake an exploratory drilling program in order to earn a half interest in

properties owned by Sun Oil Company and several others. Since Canadian Fina did not yet have an operational staff, Sun agreed to manage the drilling program on behalf of the new company.

Ted Baugh, later executive vice-president in charge of exploration and production for Petrofina, had recently joined Sun Oil as an engineer, and was in charge of the drilling operations at Coronation. It was here that he first met Trajan and Florica Nitescu.

"Trajan spent every weekend in the field," Baugh recalled in a later interview. "He was that kind of oil man. He did his office work in Calgary, and on Friday afternoon he and his wife would drive to the field and stay in whatever hotel or trailer was available."6

Baugh recalled a weekend visit by the Nitescus to a small gas well at Coronation, which was being tested under Baugh's supervision. It was February 1951, and the temperature was -35∞F. Baugh recalled that the well was on a 24-hour test, and they "were up all night, at different times, catching sleep now and again."

> Mr. and Mrs. Nitescu shared my trailer. It had upper and lower bunks on each side. Trajan had the lower bunk on one side and Mrs. Nitescu had the upper bunk. The heating in those old trailers left a lot to be desired. The upper part of the trailer was so hot that condensation dripped off the ceiling. But the lower part of the trailer was so cold that the condensation froze and formed sheet ice on the floor.

In Canadian Fina's first annual report to its parent in Brussels, covering the seven-month period from incorporation to the end of 1950, Nitescu was able to record a busy time. The company's office had been moved from the Palliser Hotel to the Wilson Electric Building on Calgary's 8th Avenue, where a start had been made on assembling a small technical and administrative staff. Production income amounted to more than $48,000, with a net loss of $18,216.21. It was a start.

The man from Sicily

A newspaper reporter once asked Alfredo Campo, executive vice-president and general manager of Petrofina Canada, how much he weighed.

"Well, it's been quite awhile since I weighed myself," Campo responded, "but I usually run around 145 pounds."

"You had better make that 155 pounds," Petrofina's public relations manager quickly interjected: 145 pounds did not seem to suggest a businessman of great stature.

"Just a minute there," said Campo. "If I weigh 145 pounds — that's what I weigh. And I see no special virtue of bulk."8

Sicilian-born Alfredo Campo may have been small in physical stature, but such outspoken candor, together with an abundant supply of energy, tenacity, and a winning personality, gave him a large stature in the oil industry, and wide recognition as probably Canada's top oil salesman.

Those were attributes that Campo had to make full use of when, in 1953, he became the instigator and driving force behind Fina's second venture in North America, another Canadian subsidiary set up to establish refining and marketing operations in Eastern Canada, complementing the exploration and production activities of Canadian Fina Oil in Western Canada. For Campo, Petrofina Canada was the climax of a petroleum marketing career that had started 27 years before in Winnipeg, and the culmination of a dogged, three-year campaign to establish a new contender in Canada's petroleum marketing arena.

Selling oil products was not the career that Campo had originally intended, least of all in Canada. It began in 1926 after he arrived in Winnipeg on what was to have been a three-month visit to meet the parents of his new bride, and turned out to be a 47-year career by the time he retired.

Campo was born at Catel di Lucio near Messina in Sicily in 1905, where his father was one of the last of the feudal landowners in an area of wheat fields and olive groves. Signor Campo, preferring an urban life, sold his estate while Alfredo was in grade school. Campo studied law at the universities of Palermo and Catania, graduating as a Doctor of Jurisprudence in 1925, followed by the University of Florence where he studied economics and political science with a view to a career in the diplomatic service.

After completing his university studies, Campo was called up for compulsory military service, serving with the officers school of the Artillery Corps of the Italian army. But before his military service was completed, Sub-Lieutenant Campo contracted rheumatic fever. There followed months in a hospital, and a lengthy convalescence at a sunny resort on the Taormina coast. It was here that he met and married Thelma Bradburn, a Winnipeg girl who had interrupted a holiday in England to recover from an attack of influenza.

Near the end of his planned three-month visit in Winnipeg, Campo went to the Italian consulate to complete arrangements for his return to Italy. To his great surprise, the honorary Italian consul urged him to stay in Canada, which he said offered the best opportunities for an ambitious and energetic young man. Campo was hesitant: he barely spoke English, and knew no profession or trade he could pursue in this new land, his

training in Italian law being of no value in Canada. But the consul was persuasive, and Campo decided to give Canada a try.

There was, moreover, at least one opportunity available to him through his father-in-law, H.H. Bradburn, vice-president and western regional manager of McColl Brothers Limited, an independent refining and marketing organization that had been in business more than 50 years. Most of the firm's business was in marketing industrial oils and lubricants produced at its Toronto plant, with bulk plants and distribution facilities from coast to coast. It had also recently acquired a number of service stations in Ontario, its products carrying the brand names Red Indian Motor Oils and Marathon Hi-test Gasoline.

Campo was hired to learn the business of selling industrial oils and lubricants, tutored by his brother-in-law, who enjoyed practical jokes at the expense of this gullible Italian. More than half a century later, Campo still rocked with laughter in telling how he had been set up to sell two new products to a crusty hardware store owner in Kenora, Ontario. These were two entirely new products with some amazing properties, Campo had been assured by his brother-in-law. He had almost completed the sale when the store owner asked what these new lubricants were called. But the sale was lost as soon as Campo proudly announced the brand names that he had dutifully jotted down in his note book — Palm Oil and Elbow Grease.9

Despite this failure, Campo was given a chance to try selling lubricating oils in Winnipeg to stores, factories, shops, and other commercial and industrial customers, with the promise that if he did well he would be given a job at a salary of $75 a month. The bitter Winnipeg winter was a shock to the immigrant from sunny Sicily, who trudged each day from streetcar stops to his clients' offices. "I had brought from Italy a coat that I thought would take me to the North Pole," Campo recalled. "Well, in Winnipeg, the wind went through it like it was the skin of an onion."

The year after he joined the firm, McColl Brothers was merged with Frontenac Oil Refineries to form McColl-Frontenac Oil Company, tenuously controlled by the Montreal investment firm of Nesbitt, Thomson & Co. The merger did nothing to slow Campo's budding career as an oil salesman. In rapid succession he was promoted first to sales manager for Winnipeg, then for Manitoba and finally for all of Western Canada, his territory stretching from northern Ontario to the West Coast. By the mid-'30s, McColl-Frontenac had become Canada's third largest petroleum refiner and marketer, with refineries at both Toronto and Montreal.

Selling oil products in Western Canada during the Depression was a formidable challenge, compounded by Campo's own financial plight. When his new career was advancing rapidly, Campo had borrowed heavily to invest in shares, to buy a house, and to furnish it on credit from the Hudson's Bay store. The stock market crash in the fall of 1929 wiped out his savings and left him deeply in debt. He was forced to approach the Bay's credit manager, who told him he could have whatever time was necessary to pay off his debt to the store.

A few years later, in the crunch of the Depression, the credit manager lost his job with the Bay, and was hired by Campo as credit manager at McColl-Frontenac's western regional office in Winnipeg. "He did a magnificent job," Campo recalled. "To clear the accounts of farmers who simply couldn't pay their bills, he accepted chickens, eggs, vegetables, and sold them to our staff, or to whomever he could."

Campo travelled extensively throughout his vast sales territory, to the mining towns of northern Ontario, to prairie farm towns, to Vancouver and Victoria; travelling by train in winter, driving by car the rest of the year, axle-deep in prairie gumbo in the spring, and choking on blowing dust in the summer. A few small-town hotels were so bad that he more than once sat up all night in a straight-back chair rather than share the company of bedbugs. "On the country roads in Saskatchewan you seldom met a car unless there was a horse in front of it," Campo recalled. Few farmers could afford to pay the price of gasoline, and the horse-drawn cars were known as Bennett buggies, after Prime Minister R.B. Bennett. There was little demand for axle grease because the farmers all used butter. It was all they could afford.

Campo extended the McColl-Frontenac network of gasoline distribution centres and service stations, previously confined to central Ontario and Quebec, into his Western territory, particularly northwestern Ontario and Manitoba. Gasoline was imported from Oklahoma, and service station outlets were established through a network of independent dealers. Within five years he had captured one quarter of the gasoline sales in greater Winnipeg.

By 1936, Campo felt ready to make his bid to move up in the organization. He had advanced as far as he could at his base in Winnipeg, but in Quebec and Ontario McColl-Frontenac was bogged down in marketing problems that threatened to torpedo the company. Campo made his proposal to company president John Irwin. He proposed to move from Winnipeg to Montreal at his own expense to act as assistant sales manager, on condition that he be given a free hand for one year to try to resolve the company's marketing problems. At the end of the year, the company could either promote him or dismiss him. Irwin

was so impressed with his audacious proposal that Campo got the opportunity. Net profit on the marketing operations for the year exceeded Campo's projections fourfold. In 1937 he was promoted to general sales manager.

The Texaco takeover

Control of McColl-Frontenac was acquired by the Texas Company in 1938 in a well-publicized proxy battle, and Campo's career advancement ground to a halt.

Texaco had been the principal crude oil supplier for McColl-Frontenac's Montreal and Toronto refineries, and a close relationship had developed between some of the officials of the two companies. In late 1935, Texaco quietly began buying McColl-Frontenac shares on the open market, encouraged by two McColl-Frontenac vice-presidents, J.S. Wales, who was in charge of refining, and J.M. Pritchard, in charge of marketing.

The showdown came at the company's 1938 annual meeting of shareholders, which was twice delayed by procedural wrangles but finally held on June 2. For months, Texaco had been waging a proxy war with Nesbitt, Thomson & Co. for election of opposing slates of directors.

The outcome of the shareholders' meeting was decisive. Texaco had by this time purchased enough shares to give it 35-percent ownership, and with the proxies lined up with the help of Wales and Pritchard, it was able to get its slate of directors elected. John Irwin was out as president, succeeded by Wales, who died a few years later and in turn was succeeded by Pritchard. Texaco, meanwhile, steadily increased its ownership of McColl-Frontenac, which eventually became Texaco Canada.

Texaco's representative on the new McColl-Frontenac board was C.P. Tomlinson, a veteran Texaco employee who was sent from New York to Montreal as senior vice-president of the company's new Canadian subsidiary.

Campo did not get along with the new regime. He and Tomlinson clashed. He resented the extent of control of the company's activities exercised at Texaco's head office in New York. And he was frustrated by lack of promotion. He was promised the position of vice-president for marketing, but during the war years it was suggested to him that it was not expedient for the company to promote someone of Italian birth to vice-president. After the war there was still no promotion, nor any relief from what Campo considered the excessive control exercised in New York. In desperation, Campo suggested to Texaco that he should either

be promoted as promised, or dismissed. He was told that his services were highly valued, but still nothing happened.

The genesis of Petrofina

By 1950, Campo had decided that the only way to resolve the impasse would be to form a new Canadian oil refining and marketing company, headquartered in Montreal. Thus began a discouraging three-year search for the investment capital required to launch his planned enterprise.

Campo figured he would need a minimum of $16 million to build a refinery with a capacity of 10,000 barrels of oil per day, and a distribution and marketing network. Armed with a prospectus showing how he planned to attack the market, Campo began discreetly calling on Canadian investment houses and other potential sources of capital. The most that he was able to raise amounted to little more than polite interest. Who would be so foolish as to invest in an upstart organization that proposed to fight the firmly entrenched multinational oil companies, some of the largest commercial enterprises in the world, for a slice of the petroleum market in Eastern Canada? Certainly no one in Canada seemed prepared to wager their money on the outcome of that sort of battle.

Campo had been unsuccessfully flogging his plan for more than two years when, in mid-1952, he took it to W.C. Pittfield and Company, an aggressive Montreal investment firm. Pittfield president Arthur Torrey was, indeed, interested, and he had just the man to evaluate Campo's plans — Walter Forster.

Following his two-year stint with the Allied Control Commission in Bucharest, Forster had rejoined the Royal Dutch/Shell Group as a general manager of operations in Colombia, and then in Venezuela. He had left Shell in November 1950, and moved to Montreal, quite simply because he and his wife had fallen in love with the city and had decided that this was where they wanted to live. In Montreal he joined a private investment firm as a petroleum consultant, and in May 1952, had joined the Pittfield firm in a similar capacity.

Forster saw two flaws in Campo's plans. With a capacity of only 10,000 barrels of oil a day the refinery would be too small to be economically competitive; the capacities of the new refineries in the postwar era were rapidly expanding to attain previously unprecedented economies of scale. The second flaw in Campo's plan, as Forster saw it, was the lack of an assured supply of crude oil. Without this, a new refining company could, indeed, be squeezed out of business by the major oil companies.

Forster took Campo's plans to two major oil companies which he knew had abundant crude oil supplies, and which he thought might be interested — Standard Oil Company of California, and British Petroleum. As it turned out, Socal had just signed a deal to enter the Eastern Canadian market, forming Irving Oil with K.C. Irving of New Brunswick. British Petroleum was mildly interested, but not yet ready to launch an attack on the North American market. Within a year, Forster would be associated with Campo's ultimate success, but in the meantime Campo seemed further away than ever in completing the toughest sales job he had ever tackled.

Help in finding the required capital finally came from another Montreal investment firm, O'Brien and Williams Ltd., headed by William Patrick O'Brien and his son William L.S. O'Brien. The senior O'Brien had established the stock brokerage firm decades before, and the younger O'Brien was now meeting with considerable success in raising investment capital in Europe. Bill O'Brien had served as an RCAF pilot during the war, had been shot down over the English channel, injured, sent back to Canada to recuperate, and had spent the final war years in Ottawa as aide-de-camp to the governor general. After the war he had established some solid relationships with a number of European financiers and money managers, and had persuaded some of them to put money into numerous Canadian ventures. "I didn't do much to sell any particular ventures," Bill O'Brien later recalled. "What I was really selling was Canada."10

Campo talked over his problems with the two O'Briens. "You're batting your head against a brick wall," the senior O'Brien told him. "You're trying to raise money for an industrial venture, but you have nothing to give it any substance, no bricks or mortar. All you have is an idea based on your knowledge of the industry. You'll never get the money you need." But the younger O'Brien was more hopeful. "I know some people who just might be interested," he said. "Do you mind if I show them your prospectus?" Campo, of course, did not mind in the slightest.11

O'Brien's idea was to try to raise money from a syndicate of European investors from such countries as Britain, France, Switzerland, and Belgium. On his next trip to Europe, O'Brien showed Campo's prospectus first to his contact at Banque Lambert in Brussels, one of the major shareholders of Fina and itself controlled by Societe Generale, the giant Belgian holding firm. Banque Lambert introduced O'Brien to Baron Lambert, who in turn introduced him to Laurent Wolters.

Fina's reception of Campo's proposal was so enthusiastic that O'Brien never did proceed any further with his plans of organizing a syndicate of investors. Wolters was anxious to expand Fina's presence in North

America, beyond the modest exploration operations of Canadian Fina, and this seemed like an opportunity. Campo's thinking, moreover, seemed to accord with his own. While most petroleum enterprises still looked to exploration and production for profits and growth, here was a venture predicated on refining and marketing. Wolters knew from his own experience that refining and marketing could blaze the path to profit and growth in Europe, so why not also in North America?

Refining and marketing experts from Fina's head office in Brussels — Francoise Van den Broek and Francoise Thiers — were dispatched to Montreal for a fortnight to look at the marketing picture in Eastern Canada, to consult with experts such as Walter Forster, to talk to bankers, and to form their recommendations.

Armed with this "Campo dossier," Wolters flew to Montreal for his first visit with Alfredo Campo on Monday, April 13, 1953.

"That meeting with Mr. Wolters remains the most extraordinary encounter of my life," Campo later stated. "I'll always remember the first minutes of our meeting. When I arrived at his hotel suite, Mr. Wolters came towards me and said, 'Mr. Campo, I want to tell you that we are in full accord with your project and that we are prepared to give you all the financial support you need.'"12

Wolters had two suggestions to make. The first was that the initial financing should be increased from the proposed $16.5 million to $25 million. The second suggestion was that initial financing should consist entirely of equity funds, so that additional funds could later be raised through the sale of debt securities.

Campo was staggered. His proposal had called for a total of $16.5 million, including debt and equity. Now he was being offered $25 million, with an implied promise of much more to come. But he was not so staggered that he forgot that he, too, wanted to make some suggestions — conditions, actually. The president of Compagnie Financiére Belge des Pétroles might make suggestions. But Alfredo Campo was going to insist on three conditions.

With Fina set to put up all the equity capital, Campo would still be working for the Canadian subsidiary of a foreign oil company, although based in Brussels instead of New York. His three conditions related to the nature of the Canadian subsidiary that would emerge.

Campo's first condition was that the company had to be run by Canadians. Prospective employees for senior managerial, professional and technical positions would not be considered unless they were Canadians, or intended to become Canadian citizens, or unless no Canadians were available. The only exception that Campo would consider — which, in fact, he insisted on — was the appointment of a

parent-company employee as a vice-president to keep an eye on the parent's interest for an initial period of one or two years; a "watchdog" position, as Campo later described it. Wolters, who preferred decisions to discussions, simply replied, "d'accord."

The second condition was that the Canadian management had to be free to run its own show. Annual budgets would obviously be subject to review and approval by the parent, but within those budget limits the Canadian company would have to be free to make its own decisions without constant head office direction and approvals. Campo was determined to avoid the constraints that he felt had hampered the management of McColl-Frontenac. Again, Wolters agreed.

Campo's third condition proved more difficult. He wanted at least some equity in the new subsidiary to be offered to Canadian investors. Wolters wanted the Canadian venture owned 100 percent by Fina and its principal shareholders, but Campo was insistent. In subsequent discussions with the officials of the Bank of Montreal and the Royal Bank, it was suggested to Wolters that Canadian participation in the ownership of the new venture would be politically astute. But Wolters wanted some mechanism to ensure that Fina would not lose ownership control of its Canadian subsidiary.

The problem was resolved at a meeting at the Mount Royal Club attended by Campo, Wolters, senior executives from the Bank of Montreal and the Royal Bank, and Arthur Torrey and Walter Forster from W.C. Pittfield & Company. Their plan was to issue common shares and participating preferred shares. Each preferred share would be entitled to 10 times the earnings of common shares and would be priced 10 times as much. But common and preferred shares would each carry just one vote. By buying the common shares, Fina and its associates would pay one-tenth as much per vote as the preferred shareholders, and could thereby ensure control.

The new venture became a legal entity barely more than two weeks after Wolters had arrived in Montreal. It was incorporated on May 1, 1953, as Canadian Fina Refineries Limited, although three months later the name was changed to Canadian Petrofina Limited, and much later to Petrofina Canada.

Starting up an oil company

Now that the corporate vehicle had been created, all that remained was to organize a board of directors, build a staff, arrange financing, construct a modern refinery and, by the time the refinery was completed, in order to dispose of the products, build, buy, borrow, or beg a

distribution and marketing network stretching from southwestern Ontario to the Atlantic coast. All as fast as possible.

The skeptics said it could not be done. The smart money bet that Petrofina, an upstart organization backed by an upstart European parent, would fail. But Petrofina accomplished all these goals, and more, in less than three years. Never before in Canada, or possibly anywhere else, had a petroleum refining and marketing organization of this size been built from scratch in such a short time. Moreover, Petrofina accomplished this while operating at a profit almost from the start.

In assembling a largely Canadian board of directors, Fina turned for advice to F.E. Notebaert of Montebello, Quebec, chairman of Sogemines Limited, the diversified Canadian subsidiary of SociÈtÈ GÈnÈrale de Belgique. (Sogemines later became Genstar Financial Corporation.) To head the board as chairman, Fina chose one of the pillars of the Canadian financial establishment, H.W. Howard, a senior partner in one of Canada's largest law firms (McMichael, Common, Howard, Ferr & Cate), chairman of the Montreal Trust Company, and a director of a long list of companies, such as the Royal Bank. Wolters was the first president of the new company, and Campo was executive vice-president and managing director, the person in charge of day-to-day operations. Also on the board, and a consultant to the company, was Walter Forster.

Four of the directors were designated as an executive committee with the authority to deal with issues as they arose and make quick decisions: Campo, Howard, Forster, and Wolters.

The company began business on July 1, its Montreal offices consisting of a small apartment in the Croyden building on CÙte-des-Neiges Road. By mid-August, Petrofina had a total staff of 12, all of them former employees of McColl-Frontenac.

For 18 years, the Fina activities in Canada were conducted as two separate operations, managed by two different people. While Campo was in charge of building the refining and retail marketing business throughout Eastern and Central Canada, Trajan Nitescu was building oil and gas reserves and production in the West. Not until 1971 were all the operations, including subsidiaries Western Leaseholds, Calvan Consolidated and New Superior Oils (acquired in 1960) finally corporately consolidated into Petrofina Canada.

In building the refinery and a network of service stations, Campo faced new problems, some big, some small. When local politicians got wind of the planned site for the refinery in Montreal East, land prices suddenly escalated. In response, Campo switched the site to nearby Pointe-aux-Trembles, but political payola here extended down as far as the level of the construction site's gatekeeper, who was also a local

alderman. The gatekeeper offered to use his influence to obtain work for a small, local contractor who owned a grading machine, for a fee of $300 for each month of resulting work. When the initial contract was completed, the fee went up to $400 per month for more work. The contractor balked. The gatekeeper took the contractor to court, seeking to enforce payments. Judge Deslauries dismissed the action, calling such payola “utterly contemptible” and calling those who collected it “parasites.”

To provide outlets for the new refinery, Petrofina built some 500 newly designed service stations within three years, and Business Week commented that “Petrofina’s service stations are helping to change Canada’s whole marketing pattern by providing sleek designs and modern merchandising in a land where country stores with one pump are still plentiful.” In addition to those it built, Petrofina acquired several hundred more service stations with the purchase of a number of independent marketers.

Before the refinery was completed, however, Petrofina found it difficult to buy gasoline for its new retail outlet from Montreal refiners, which were not exactly eager to help a new upstart, even if at the time they had surplus supplies and idle capacity. Campo leased six idle storage tanks from an independent marketer and imported a shipload of gasoline from the U.S. Gulf Coast. The Montreal refiners got the message, and began selling gasoline to Petrofina.

There was, however, a small problem with the imported gasoline — 100,000 gallons of it were “lost.” When it arrived from the Gulf Coast in the fall of 1953, the temperature of the gasoline was about 70∞F. But after it had set a few days in the cool storage tanks, the temperature shrank, and so did the volume. The purchase contract, unfortunately, had failed to specify a temperature for calculating the volume.

Some 2,500 guests assembled at Pointe-aux-Trembles on June 26, 1956 to mark the official opening of the first Fina refinery in North America. Laurent Wolters was there from Brussels, along with federal works minister Robert Winters, Quebec trade minister Paul Beaulie and nearly 800 new Fina service station dealers, all of whom paraded in front of the grandstand carrying hometown banners, from Moncton to Toronto.

There were, of course, start-up problems. The $30-million refinery had been designed in Belgium, and didn’t provide adequate heating and ground drainage to cope with the Canadian climate. The catalytic reforming unit burned up platinum catalyst at the alarming rate of $6,000 a day — a problem that required two years to fully fix.

But the company was profitable from the start, its initial problems were overcome, its refinery was one of the most modern and largest,

located where it could supply nearly three-quarters of Canada's population, and more than one thousand Fina stations blanketed this region.

Problems and progress in the West

While Alfredo Campo was building a downstream business in the East, Trajan Nitescu was finding both progress and problems in building an upstream business in the West. His most intractable problem was with Eric Harvie, and Don Harvie was caught in the middle, between his father and his boss.

When Western Leaseholds and Calvan Consolidated had been acquired, Canadian Fina also acquired the staffs, giving it a full-fledged operating organization. Don Harvie, who came with Western Leaseholds, soon became general manager of Canadian Fina.

Only 90 to about 95 percent of the two subsidiaries had initially been acquired, and for a few years until the minority shares could be purchased on the open market, Canadian Fina, Western Leaseholds, and Calvan Consolidated had to be operated as separate companies for bookkeeping purposes, involving cumbersome and costly administration problems. Nitescu was president of all three companies, while Eric Harvie was chairman of Western Leaseholds, until shortly before it was fully absorbed into Petrofina Canada.

The problem that arose was who would benefit from the depletion allowances that were available to reduce taxes on oil revenue from nearly 300,000 acres that Western Leaseholds (now the Petrofina subsidiary) had leased for 999 years from Western Minerals (owned by Eric Harvie and a few associates). Millions of dollars were at stake. Harvie maintained that the depletion allowances belonged to Western Minerals; Nitescu was just as adamant that they belonged to Western Leaseholds.

The threat that Eric Harvie held was that if any of the hundreds of leases involved were ever in any way in default, they could be cancelled and any revenue from the production from any cancelled leases would revert to Western Minerals and Eric Harvie. Harvie had earlier taken legal action against Imperial Oil, seeking to cancel a 480-acre lease in the Leduc field on the claim that Imperial had not met its drilling obligations on time. The issue was settled only after Imperial had agreed to pay an additional production royalty of 2.5 percent.

The bitter dispute between Harvie and Nitescu came to a head in November 1959, when Western Minerals advised Western Leaseholds that it was terminating a 999-year lease in the Redwater field, claiming Western Leaseholds was in default.

Nitescu complained about Harvie's action in a memo to Canadian Fina officials:

> We have been forced to create an elaborate, complicated and expensive method to calculate our royalty payments because of the threat that if an accidental error resulted in an under payment of the royalty, we may be obliged to forfeit millions of barrels of oil in the Redwater field. . . .
>
> For over four years I have been working under extreme pressure and continuous inconvenience as a result of the menaces posed by Minerals.I have concluded that there will be no end to their domineering and unreasonable business practices.13

Western Leaseholds responded by preparing a counter-statement of claims which asked for a court order declaring the notice of termination invalid and seeking damages of $850,000.

Alfredo Campo, Laurent Wolters, Walter Forster, and the outside legal counsel for both firms were involved in seeking a solution, which wasn't arrived at until early 1961. It was a compromise agreement that Don Harvie had worked out, giving Western Minerals a share in the depletion allowances, leaving everything else for Western Leaseholds and its Petrofina parent. It was only under pressure from Wolters that Nitescu had acquiesced to the compromise.

While the dispute with Eric Harvie simmered, Canadian Fina pressed on with the task of building oil and gas reserves, partly by buying and developing proven or semi-proven properties, and partly by exploring. Its biggest find was appropriately called Windfall. In 1951, Canadian Fina filed on exploration reservations covering 170,000 square miles — almost one-and-a-half times the size of Belgium — in a rugged area of trackless forest and muskeg centred 150 miles northwest of Edmonton. To spread the costs and risks of exploring such a large area, Canadian Fina sold one-third interests each to Hudson's Bay Oil and Gas and Pan American Petroleum, a subsidiary of Standard Oil of Indiana.

Seismic surveys indicated the possible presence of several large Devonian reefs. A deep and costly wildcat test found what Ted Baugh later described as "one thousand feet of marvellous Devonian reef," chock full of salt water. A second exploratory test, Fina et al. Windfall, penetrated another reef, finding a 250-foot section saturated with sour natural gas — containing 14-percent hydrogen sulphide — and a thin 27-foot oil section, while a third wildcat at Pine Creek found another reef filled with gas that included an incredible 24-percent hydrogen sulphide. By the time the two reefs were delineated by follow-up wells, it was

estimated they would yield 1.6 trillion cubic feet of marketable gas, 50 million barrels of oil and gas liquids, and 10 million tons of sulphur. The unprecedented concentrations of highly toxic and corrosive sour gas required special treatment facilities. It cost $100 million — several times the cost of the Montreal refinery — to drill more producing wells and build a plant to extract the liquids and up to 600 tons per day of sulphur from the wet, sour gas.

In 30 years of exploration, Canadian Fina participated in modest-sized oil and gas discoveries in Saskatchewan, Alberta, and British Columbia, but Windfall was its biggest find.

The final era

The late 1960s and 1970s marked a new era for the Fina presence in Canada, with new management, a new corporate structure, and a disappearance. In 1967 Nitescu retired, 39 years after he had first joined the Fina group. He had been responsible for a large measure of Fina's success, both in Romania and Canada. The separate upstream and downstream companies were merged in 1971 as Petrofina Canada, with Campo as CEO, Don Harvie as senior vice-president, and Ted Baugh as exploration and production vice-president. Two years later, Campo retired as CEO, succeeded by Pierre Nadeau, former head of the James Bay Development Corporation, while at the same time Laurent Wolters, now Baron Wolters, retired as head of the Belgium parent.

The Belgium company had no interest in or intention of selling its 70-percent-owned Canadian subsidiary that by 1980 was spinning net earnings of $100 million a year, from a 100,000-barrels-per-day refinery, 1,120 service stations, and significant oil and gas production. Then suddenly — POOF! — it was gone, in the $1.46-billion 1981 purchase by Petro-Canada. The sale added fuel to the flames of controversy over heavy government presence in the petroleum industry, the contentious National Energy Program, and the purpose and value of a state-owned oil company.

Perhaps the final irony is that the Belgium parent would also soon disappear, acquired in 1999 by France's Total oil company to form TotalFina. Barely months later, TotalFina was merged with French state-controlled Elf Aquitaine in a giant US$54.3-billion deal. The Fina name, already gone from Canada, now disappeared from the rest of the world.

Chapter 13. Ribbons of Oil

The conflict between economics and an interpretation of national policy set in motion nearly a decade of political debate, the major political issue of the day.

On pleasant summer days when thousands of Torontonians visit the city's network of parks that string along the Don Valley, strolling on miles of pathways, picnicking under the spread of giant oaks (from where black squirrels might drop acorns on them), or tossing Frisbees across acres of lawn, there is only a small sign to indicate that under their feet is a large natural gas pipeline. When a householder in Montreal twists a dial to ignite a burner on her kitchen stove, there is nothing to indicate that the blue flame is connected to deeply buried saturated rocks as distant as the Yukon, through an unbroken network of pipelines and processing facilities. Sixty percent of the energy used by Canadians is moved through a network of 430,000 miles of oil and gas pipelines, exceeding the length of the nation's railway trackage by about 15 times. Pipelines carrying Canadian energy stretch from the Pacific to the Atlantic, from the edge of the Arctic Circle, south into the United States as far as Oklahoma, and include the worlds longest oil and gas pipelines. Buried 61D 2 feet below the surface, silent and unseen, pipelines are the safest, most environmentally benign, and lowest-cost mode of overland transportation. The cost of moving one litre of oil from Edmonton through more than 1,800 miles of pipeline to Sarnia is barely one cent.1

The emergence of the Western Canada Sedimentary Basin as a major oil and gas province brought with it the need for pipelines. First came the long-distance oil pipelines, followed by the gas lines.

Politicians were quick to draw an analogy between the railways, which had knit Canada together seven decades earlier, and the pipelines, which were seen as just as vital to the nation's economic future. The Interprovincial (now Enbridge) pipeline to move oil east came first, followed by the Trans Mountain (now Terasen) line to move oil west. They were not built without emotional political debate, the precursor of much stormier debate about the routing of gas pipelines that would soon follow.

"Oil and iron can form the foundation upon which Canada could become a great world power," Howard Green, Progressive Conservative member of Parliament for Vancouver-Quadra, told the House of Commons early in 1949.2

Many politicians also sought to apply to pipelines the same basic national policies that had guided railway construction. The railways were built in defiance of natural economic laws, and the geography of North America which dictates that the principal lines of transportation should

run north and south. Canada wanted to build a nation east to west. The railway lines were built east to west, cutting across the grain of geography, at great expense, and had to be subsidized by the nation. If this was vital to the nation in the case of railways, the reasoning was, then it would be of the same importance in the case of pipelines.

But oil from the new fields of Alberta could be moved more cheaply by a route through the United States, some people counter-argued. “If that argument is sound, then why did we ever build railroads across Canada?” Progressive Conservative leader George Drew demanded in the House of Commons. “We built railway lines in Canada because we wanted our own transportation system for the opening up of our own area.”3

“Surely it is in the national interest, regardless of cost,” Howard Green declared in the Commons, “that the main pipeline carrying Canadian oil should be laid in Canadian soil.” Pipeline routes cutting through the United States, even though achieving lower transportation costs, would represent “a great mistake in national policy.”4

It was this conflict between economics and an interpretation of national policy which set in motion nearly a decade of political debate. It became a raging storm, the great pipeline debate, the major political issue of the day. It helped bring the defeat of the Liberal government after a 22-year term in office.

Pipelines were largely unknown in Canada when Imperial Oil made its Leduc discovery in 1947. There was a crude oil pipeline from Turner Valley to nearby refineries in Calgary, another from Portland, Maine which moved tanker-shipped South American crude to refineries in Montreal, and a third small system feeding U.S. oil into Ontario. The wartime Canol pipeline from Norman Wells to Whitehorse had been the largest pipeline project ever undertaken in Canada, but it lay abandoned. There was a fairly extensive natural gas transmission and distribution system serving Alberta, and another in the southwest corner of Ontario, while other principal Canadian cities were served by small distribution systems supplying high-cost, manufactured coal gas. In 1947 there were 418 miles of oil pipelines in operation in Canada.

With the Leduc discovery and the even larger Redwater discovery the following year, Alberta’s oil producers faced a need for a much larger market than the prairie provinces could provide. Pipelines were the only economic answer. If enough oil reserves were found, Alberta crude might be moved to markets as far as Ontario. By railway, the cost of moving crude from Edmonton to Sarnia, Canada’s largest refining centre, was $3.24 per barrel. The price of U.S. crude laid down in Sarnia was $3.55 per barrel.5 Railways obviously could not do the job.

As an initial step, Imperial Oil planned a 450-mile oil line from Edmonton southeast to Regina to supply refinery demand there. Later, if enough oil were found, the system could be extended farther east. An engineering group was assigned to prepare design, economic, and feasibility studies, working out of Tulsa, Oklahoma. Engineering and economic studies were prepared on the use of varying sizes of pipe, from 16- to 20-inch diameter. Based on the reserves that had been found to that time, the decision was to build a 16-inch line to Regina.

Imperial faced a political problem in Ottawa. Because of the maze of municipal, provincial and federal jurisdictions which would be involved in the construction and operation of pipelines traversing more than one province, such a system would have to operate under federal jurisdiction. Otherwise, construction and operation of such lines could be restricted or even prevented by the legislative action of any province. The federal government had decided that pipeline companies would have to be incorporated by special acts of Parliament, much in the manner that railway charters had been granted. The hang-up was that no enabling legislation existed.

Early in 1949, Imperial applied to the federal government for incorporation of Interprovincial Pipe Line Company. Incorporation of several other firms proposing construction of either oil or gas pipelines was also sought.

Transportation Minister Lionel Chevrier introduced in the House of Commons on April 5, 1949 a bill for the enactment of the Pipe Lines Act, closely patterned after the Railway Act. The bill received wide support from all parties in the House, although during the brief debate a slight hint of what was to come was provided by Howard Green when he declared that “this oil and gas should be used to the greatest possible extent within our own country.”

After a brief examination by the House of Commons Standing Committee on Railways, Canals and Telegraph Lines, the bill was passed April 29 and the Pipe Lines Act of Canada became law. The next day, third and final reading was completed on bills to incorporate, by special acts of Parliament, five pipeline companies: Interprovincial Pipe Line, Westcoast Transmission Company, Trans-Northern Pipe Line Company, Western Pipe Lines, and British American Pipe Line Company. The bills were rushed through with about five minutes’ debate on each and virtually no information presented on the proposed plans of the pipeline companies, as the legislators hurried through their business to concentrate upon a national election. The election, on June 27, returned the Liberals to power under Prime Minister Louis St. Laurent, with 74 percent of elected members.

On June 10, the federal Board of Transport Commissioners, following public hearings, authorized Interprovincial to build its 16-inch, 450-mile pipeline from Edmonton to Regina.

Long before the authorization had been received, before Interprovincial had even been incorporated, Imperial Oil had taken the first step to build the line: obtaining the necessary pipe.

Imperial first started looking for a supply of pipe in 1948, in the hope that the line to Regina could be built the following year. The task of finding 450 miles of pipe was not easy. No pipe mills in the United States could deliver in time, and in Canada there were no pipe mills. Page-Hersey Tubes Ltd., was prepared to build Canada's first pipe mill, a $5-million plant at Welland, Ontario, but there was yet another problem, a supply of the special steel plate required to make the pipe. Finally, with some help from federal Trade and Commerce Minister C.D. Howe, Imperial was able to complete arrangements in December to import some 40,000 tons of steel plate from Britain. This steel would not meet the specifications for making the pipe, but it would meet some of the customer requirements of the Steel Company of Canada, thereby freeing capacity in Stelco's Hamilton plants to make the specification plate from which Page-Hersey could roll the pipe.

By mid-1949 the problems appeared to have been met to allow construction of the line to Regina the following year. Imperial Oil had obtained, by special act of Parliament, a charter for a pipeline company; the Board of Transport Commissioners had authorized construction of the line; Stelco was preparing to roll the steel plate, and Page-Hersey was building Canada's first pipe mill.

There were further complications. Even while it was proceeding with the plans for a 450-mile line to Regina, Imperial had its engineering group in Tulsa working on design and feasibility studies of a much longer system from Edmonton to the head of Lake Superior. From this point, the crude could be moved by tanker during the summer shipping season to refineries at Sarnia. The rapidly growing oil reserves in Alberta, with the attendant requirement for larger market outlets, appeared to make the longer line feasible. "Extension of the Edmonton-Regina pipeline to the head of the lake in the near future is a development which Imperial Oil is actively pursuing," Imperial chairman H.H. Hewetson stated in May in an address to the Regina Chamber of Commerce.6

By that summer, Imperial had decided on construction of the longer pipeline system, had selected a route 1,140 miles from Edmonton to Superior, Wisconsin, and had completed the preliminary design and engineering studies. In August, Lakehead Pipe Line Company Inc., was incorporated as a wholly-owned U.S. subsidiary of Interprovincial to

construct and operate the portion of the pipeline system in the United States. In September, application was made to extend the planned system from Regina to Gretna on the Manitoba-U.S. border; the section from Gretna to Superior would be handled by Lakehead Pipe Line. The application was quickly approved by the Board of Transport Commissioners.

Imperial had selected a route to a U.S. port at the head of Lake Superior rather than a route to Fort William or Port Arthur on the Canadian side for two reasons: The U.S. route was 120 miles shorter and less costly, and would provide greater access to possible future oil deliveries to Chicago refineries. The shorter route offered a saving of $10 million in construction costs and $1 million per year in operating costs.

Decision to extend the line presented some further engineering problems. Greater deliverability capacity would be required, and this could be more economically provided with a larger-diameter pipeline.

But the 16-inch pipe had already been ordered, and had to be used somewhere. Greatest deliverability capacity would be required on the section from Edmonton to Regina, where the line would make its initial deliveries to refineries. The system ultimately designed by IPL engineers was for a line consisting of 450 miles of 20-inch-diameter pipe from Edmonton to Regina, 340 miles of 16-inch pipe from Regina to Gretna, and 360 miles of 18-inch pipe from Gretna to Superior. Because the Page-Hersey mill was designed to make up to only 16-inch pipe, the 18- and 20-inch pipe was supplied by U.S. mills. “Because of steel shortages and because further crude reserves were established during the early planning stage,” IPL later explained, “the system has 16-inch pipe between sections of 20-inch and 18-inch. This may seem incongruous but it works, and works well.”7

Cost of the system was estimated at nearly $90 million. Giant-sized steel storage tanks, capable of holding more than 1.5 million barrels of oil, would be built at Superior to store oil delivered by the line during the five months of the year that Lake Superior is closed to shipping. Orders were placed with shipyards at Port Arthur and Collingwood, Ontario for two, 15,800-ton tankers costing nearly $8 million, at that time the world’s largest lake tankers.

Estimated cost of moving oil from Edmonton to the major Ontario refinery centre at Sarnia was about $1.00 per barrel, a saving of at least $2.50 on the cost by railway.

On September 12, just three months after it had received authority to build its pipeline from Edmonton to Regina, Interprovincial obtained the approval of the Board of Transport Commissioners to extend the

proposed system 340 miles to the U.S. border, with its U.S. subsidiary to construct the remaining 360 miles to Superior.

However economically sound it may have been, the decision to terminate the IPL line at Superior rather than at the twin cities of Port Arthur and Fort William in Ontario raised a political storm of protest.

When the first session of the 21st Parliament of Canada assembled that fall, it was not long before the question of the Interprovincial Pipe Line was raised. Progressive Conservative leader George Drew strongly opposed the U.S. route, declaring, "Our first obligation is to supply our own centres with that vital fluid by means of a pipeline." Other Conservatives picked up the theme, particularly Howard Green with his statement that the main oil line should be entirely within Canada "regardless of cost."

Howe staunchly defended the decision on the U.S. route, pointing out that the higher cost of the Canadian route would penalize Alberta producers in the form of a lower price for their oil. "Certainly the cost of the pipeline must be paid by the oil it transmits; I know of no other source of income for a pipeline," was Howe's blunt analysis of the obvious.

"I think the plan is to sell a great deal of oil in the United States," blurted Howard Green at one point in the debate.9

"Is there anything wrong with that?" asked Howe.

Back in his riding at the twin cities, Howe's stand was anything but popular. Port Arthur Mayor Fred Robinson headed a civic industrial committee organized to fight the issue. The group sent to every member of Parliament and to city councils, chambers of commerce, labour unions, and other organizations across Canada a circular with a strongly worded nationalist line, emblazoned with the Canadian red ensign and the slogan "Put Canada First."

"This pipeline belongs to Canada," it declared.

> American capital has played a part in development and progress of Canada, but at a price. The price is an inferiority complex when it comes to promoting our own welfare. . . . Surely, we are not so shortsighted that we will sell our birthright for a few million dollars. It is your fight as a Canadian! You can keep this pipeline in Canada if you are determined to do so.10

Robinson had the continuing support of George Drew. "If we let everything go [through the United States], we'll be swinging into the U.S. like Scotland was swung to into England," Drew declared.11

But Howe, the practical engineer and builder of business, was not one to be moved by histrionics. He stood firm by his decision to allow the more economic U.S. route.

Financing plans for the $90-million pipeline were completed by Imperial late that year. Of the total, $72 million would be borrowed in the form of 3.5-percent first mortgage bonds, and $18 million would be raised in equity capital consisting of common shares and debentures convertible into common shares, at a price of $50 per share. Imperial bought one-third of the equity; 25 percent was purchased by other oil companies, and 42 percent, or $7.5 million, was offered to the public. Those who subscribed to the public offer found it highly profitable. An investment of $1,000 in1949 after 20 years was worth approximately $25,000.12

IPL has been called “the fastest pipe in the West,” with construction of the 1,129 miles of line from Edmonton to Superior completed between the spring and fall of 1950 in 150 days. No other pipeline as long or large as this had been built in so short a time. Preliminary work had been completed well in advance of the actual construction start. The Tulsa-based engineering task force moved its headquarters to Edmonton in November. Aerial photographic surveys provided stereo and mosaic prints and were used in detailed ground survey work in 1949 to locate the exact route. Property was acquired along the right-of-way, which involved dealing with 2,100 landowners in Canada and 400 in the United States.

In March, six pipeline construction crews with a labour force of 1,500 men kicked off the job. The railways hauled 178,000 tons of high-test steel pipe to sidings near the right-of-way. The big ditching machines dug a trench three feet wide and five deep, across the prairies. Behind the ditchers came the pipe stringers, the welders who joined the 40-foot sections into a continuous line, the crews and machines that cleaned, coated and lowered the pipe into the trench, backfilled the trench, and pressure tested the completed sections; finally came the clean-up crews.

The flat prairies offered relatively easy pipeline construction, but there were tough spots. One involved the crossing of the South Saskatchewan River near Outlook, Saskatchewan. The schedule called for completion of the crossing by the end of March prior to the spring thaw, while the water level was still at its winter low. “A race against time and the elements is in progress on the ice-bound South Saskatchewan River 10 miles south of Outlook,” reported John Howard in the Regina Leader Post.13 “Construction crews are battling the elements at their worst in their efforts to lay 3,144 feet of the Interprovincial oil pipeline eight feet below the riverbed before the ice breaks up. So far the crews have had to

contend with a two-day blizzard, a sandstorm, and biting sub-zero winds."

The plan was to string the pipe in 80-foot lengths across the ice, weld it, coat and wrap it, sheath it with board slats to prevent damage to the pipe, and attach 2,800-pound concrete river clamps every 20 feet. A four-foot swath would be cut through the ice, drag lines would dig a six-foot trench through the river bottom, and the pipe would be rolled off the ice into the trench. But the spring thaw had already started to swell the river and when the ice was cut the water burst through and flooded the operation, forcing the crews to retreat and make a second attempt at a new location. This second attempt was too late. The ice was starting to thaw, and in one day four Caterpillar tractors broke through into six feet of water and had to be yarded out. The attempt to cross the river while it was still frozen had to be abandoned, and a new set of engineering plans drawn up to lay the pipe across the open river.14

At a ceremony in Edmonton on October 4, Alberta Premier Ernest Manning turned the valve which started Alberta oil flowing on its two-month journey to refineries across the prairies and into Sarnia. The IPL line, noted C.D. Howe, "will stop a drain on our economy of at least $150 million U.S. dollars a year which we are now spending for foreign crude." He described it as "an essential factor in our preparedness for the defence of Canada."15

Before the line was in operation, however, it was evident that additional capacity was required, and the following year marked the start of five decades of almost continuous expansion and growth of the IPL system. Work in 1951 and 1952 involved the initial looping of the IPL system, the laying of 100 miles of 16-inch line beside the original line in sections between Regina and the U.S. border crossing at Gretna, and additional pumping horsepower, to increase the throughput capacity.

The system of winter storage of crude at Superior and summer shipments by tanker to Sarnia soon became inadequate to handle the rapidly growing volume of oil. The decision was made to scrap the terminal at Superior and extend the system to Sarnia. In 1953, additional looping was done along the line between Edmonton and Superior and 645 miles of 30-inch pipe (at the time North America's largest-diameter crude oil pipe) was laid from Superior across Wisconsin and Michigan to Sarnia. The extension involved the crossing of the Straits of Mackinac between Lakes Michigan and Huron, the deepest underwater pipeline crossing ever attempted, and one of the world's major pipeline construction feats. At the crossing the Straits are nearly 45 miles wide and up to 240 feet deep. Two 20-inch lines made of steel one-inch thick were laid across the Straits.

Looping of the system between Edmonton and Superior continued year by year to provide steadily increasing capacity. In 1956, the line was extended another 156 miles from Sarnia to the outskirts of Toronto where additional refineries could be supplied with western oil. With this extension, the main line of the IPL system stretched 1,930 miles, with an additional 92-mile spur to Buffalo, New York. It was the longest crude oil pipeline in the free world.

By 1967 IPL required still more delivery capacity for markets east of Superior. In addition to the Ontario refineries, it was moving a growing volume of crude oil to U.S. refineries at Buffalo, Detroit, Toledo, and other U.S. points. The 30-inch line east of Superior was powered with pumping capacity up to the engineering limit. The line between Superior and Sarnia would have to be looped.

In providing additional capacity east of Superior, IPL faced two alternatives. It could lay a loop — a second line beside its existing system — along the northern edge of Wisconsin, across the Mackinac Straits, and down through Michigan. Or it could lay a loop around the southern end, rather than the northern end, of Lake Michigan, through the Chicago area, and up to Sarnia. This southern route, at 754 miles, was more than 100 miles longer than the route of the existing line through Mackinac Straits, but there were two advantages. It would avoid the expensive underwater crossing of the Straits, offsetting at least part of the cost of the extra length. More importantly, it would make Canadian oil accessible for the first time to the big Chicago refinery centre, which consumed oil at a rate of nearly 700,000 barrels a day. Ever since the IPL line had been conceived in 1948, the Chicago market had been considered a possible outlet for Canadian oil, but not one barrel had yet been sold there.

IPL's decision was to build 464 miles of 34-inch pipe from Superior to Chicago and an additional 290 miles of 30-inch from Chicago to Sarnia. Looping on the original line had already resulted in two complete lines between Edmonton and Superior, and work was well advanced on a third 34-inch line. The plans envisioned one of the world's largest crude oil transmission systems. From Edmonton to Superior it would embrace three separate lines from 16 to 34 inches; from Superior east there would be two lines, the 30-inch northern system through Mackinac Straits and the 34- and 30-inch line through Chicago.

IPL's plans, however, ran into a political roadblock in Washington. Planned expansion required a U.S. presidential certificate of public convenience and necessity in order to allow a third pipeline crossing of the international boundary. Similar certificates for the first two pipeline

crossings had been obtained without difficulty, but this time the going was rough.

U.S. independent oil producers were alarmed at the growing volume of Canadian oil being imported into the United States, and at the fact that Canadian crude undersold U.S. crude at refineries in the Great Lakes region by a range of 40 to 60 cents per barrel. IPL's plans for a big-inch line to Chicago posed the threat of a further flood of Canadian oil. Led by the politically powerful Independent Petroleum Association of America, U.S. producers strongly opposed the IPL loop.

An informal agreement between the Canadian and U.S. governments finally resulted in the issuance, in January 1968, of the presidential permit allowing the third pipeline border crossing and construction of IPL's Chicago loop. The Superior-Chicago section was built in 1968. Tied in with smaller, existing lines, it permitted increased deliveries to Ontario and U.S. refineries at Detroit and Toledo. The remaining Chicago-Sarnia section was built in 1969.

Even with its loop, IPL was still unable to immediately deliver crude to Chicago refineries, despite the fact that several Chicago-area refineries were eager to buy the lower-priced Canadian oil. Terms of the informal agreement reached between the U.S. and Canadian governments late in 1967 were not disclosed until a year and a half later, and then only after a Chicago refiner, Clark Oil & Refining, filed a suit before the U.S. Interstate Commerce Commission. Clark's suit maintained that IPL's refusal to deliver Canadian crude to its Chicago refinery represented an illegal restraint of trade.

It was this action by Clark that smoked out the terms of the governmental agreement. Canada's oil producers were both shocked and distressed when they found out the details. In return for the U.S. presidential permit allowing IPL to build the loop, the Canadian government had agreed that it would limit the Canadian oil deliveries to U.S. refineries east of the Rocky Mountains to an annual increase of 27,000 barrels a day during a three-year term, and that no Canadian crude would be delivered to the Chicago area prior to 1970.

On to Montreal

The 1970s brought a crisis-inspired major extension of the IPL system from Sarnia to Montreal. The government-mandated extension was intended to provide consumers in Quebec and Eastern Canada with Alberta oil as a measure of protection against shortages or disruptions to supplies of imported crude oil. Instead, the extension soon provided a 520-mile conduit for imported oil into Ontario, previously supplied almost entirely by Alberta oil.

The extension was triggered by the 1973 embargo of the Organization of Petroleum Exporting Countries on oil deliveries to the United States and several other Western nations. With the OPEC embargo, the price of imported oil laid down in Montreal had exploded from an average $2.45 per barrel in 1970 to $10.50 in 1973 and $44.66 by 1980,16 shortages were feared, and Canadians were urged to reduce their energy consumption (which they did, but probably more in response to price increases than to government exhortation). The announcement that the line would be extended from Sarnia to Montreal — even if the government had to build it — was made by Prime Minister Pierre Trudeau in the House of Commons on September 4, 1973. In the end, it was built by IPL, with financing help from the government. It was to cost $140 million and was to start delivering the Alberta oil before the end of 1974. It cost $247 million and deliveries did not start until June 1976, having been financed with the assistance of a government deficiency guarantee, which basically meant the government would pay for resulting losses suffered by Interprovincial.

The Montreal extension had come two decades after independent oil companies in Alberta had clamoured for a pipeline to capture the big Montreal refining market for their wells, then producing at less than half capacity. But before the line was built, Alberta producers had more demand for their market than they could meet. Two years before the extension was announced by Trudeau, Oilweek had warned that it wasn't needed since "Western Canada hasn't any surplus production capacity available."17 Only by cutting back deliveries to closer markets in the U.S. Midwest was Alberta able to supply oil to the more distant market in Montreal — at the expense of higher transportation costs, lower producer prices and less reward for the use of Canadian energy resources, and a taxpayer subsidy.

Built to deliver Canadian oil farther east, the flow in the pipeline extension was reversed, to deliver imported oil west as far as Sarnia. Nearly all of Ontario's oil needs had been supplied by Canadian oil for almost four decades, now it was being supplied entirely by imported oil. And Alberta producers, freed from the need to supply Ontario, could reap greater rewards from the closer U.S. markets.

There were more big extensions to the IPL system still to come. In 1985, the system was extended 525 miles north to the historic Norman Wells field, as described earlier, and then in 2003 it was extended 630 miles south from Chicago to Cushing, Oklahoma, with the purchase of an existing oil line. Originally built to move U.S. midcontinent oil to Chicago, Enbridge planned to reverse the flow, providing Canadian oil to supplement the declining midcontinent supply.

Can an Enbridge oil pipeline stretching from the Mackenzie River Delta on the Arctic Coast to the Mississippi River Delta on the U.S. Gulf Coast be far behind? The northern section of a line along the entire length of North America seems almost certain early in the 21st century's second decade. It needs only a relatively short extension north from Norman Wells to move gas liquids and crude oil from the Mackenzie Delta-Beaufort Sea region where, in 1999 and 2000, oil companies made commitments to the federal government to spend more than half a billion dollars exploring for oil and gas on newly issued permits.

Half a century after its first pipe was laid in the ground, Interprovincial Pipe Line Company has undergone a corporate metamorphosis, emerging as Enbridge Inc. A widely held public company no longer a creature of the big oil companies, it still operates the world's longest crude oil and petroleum liquids pipeline, now longer than ever.

Enbridge is now much more than just an oil pipeline. In the 1980s, Interprovincial went through a wringer of corporate name, business, and ownership changes wrought by pressure of the National Energy Program — detailed elsewhere — to emerge as an international energy transportation, distribution, and services company, embracing both oil and gas. Its interests range from a one-third interest in one of Canada's smallest gas utilities, the first in the Arctic, distributing gas for power and heating in Inuvik, to full ownership of the country's largest gas utility, the former Consumers' Gas Company founded in 1848 to light Toronto street lamps with coal gas and now supplying 1.6 million customers in parts of Ontario, Quebec, and New York state. Among others, additional interests include the big Alliance and Vector gas pipeline system from northeastern British Columbia to Sarnia; a quarter interest, with partners Hydro-Quebec and Gaz de France (which in turn owns 10 percent of Enbridge) in Gaz Metropolitain serving Quebec and the northeast United States; a gas distribution system under construction in New Brunswick; electric power distribution; fuel cells; and an oil pipeline in Colombia.

Under the direction first of CEO Brian MacNeill and then Pat Daniel, Enbridge has spectacularly achieved in Canada the type of diversified energy company that Enron so disastrously failed to achieve in the United States.

Oil West

While construction crews in 1950 were building the Interprovincial Pipe Line east to the Great Lakes, oil producers in Alberta had already turned their eyes west to possible market outlets in British Columbia and the U.S. Pacific Northwest. Their vehicle would be Trans Mountains

Oil Pipe Line Company, now a subsidiary of Terasen Inc., like Enbridge, a diversified energy transportation and supply business.

In an area embracing Vancouver, Seattle, Portland, and Spokane, demand for petroleum products amounted to a quarter of a million barrels a day, virtually all of it moved into the region by tankers. Refinery capacity amounted to less than 15 percent of this demand, with most of the refinery capacity at Vancouver. Bulk of the demand was supplied by refined products shipped by tanker from California. Studies indicated that by 1960 California reserves would no longer be adequate to supply even that state's oil demand, let alone export to other markets.

The Pacific Northwest was the only major oil consuming area in the United States which was not connected by pipeline to continental petroleum supplies. This region, together with British Columbia, was considered to be in an "exceedingly vulnerable military position."18 With the Second World War over just five years ago and now the United States, Canada, and others involved in another war in Korea, military security was regarded with a sense of urgency.

A crude oil pipeline from Alberta to the West Coast could alleviate what the U.S. Petroleum Administration for Defense called this "exceedingly vulnerable military position." It would also create market outlets for the rapidly growing supplies of Canadian oil. But it was strategic considerations that allowed construction of the line to the West Coast during the Korean war years. So important were the military aspects considered that the U.S. Petroleum Administration for Defense and the Canadian Department of National Defence eventually allocated 154,000 tons of steel for construction of the line at a time when steel supplies were tight and urgently required for military needs. Without these steel allocations, construction of the line would have to wait.

It was late 1950 when a group of representatives of U.S. and Canadian oil companies approached S.D. Bechtel, head of the Bechtel Corporation in San Francisco, with a request that his firm act as the operating vehicle for companies interested in the possibility of building such a line. The Bechtel organization was one of the world's largest pipeline construction firms, and as part of a consortium of contractors had been involved in the wartime construction of the Canol line.19

Bechtel engineers studied two possible routes. One was from Edmonton 275 miles south before turning west to cross the Rocky Mountains over the Crowsnest Pass, to Spokane, Portland, Seattle, and Vancouver. The other route crossed the Rockies via the Yellowhead Pass in Jasper National Park, through Kamloops to Vancouver and south to the Seattle area in Puget Sound. The Yellowhead route was chosen

because it was 100 miles shorter and 700 feet lower at its maximum elevation.

Representatives of seven major companies were working with the Bechtel Corporation and investment houses on the preliminary plans for the line by early 1951. A feasibility report on the project prepared that year by the Stanford Research Institute projected Alberta oil production capacity by 1951 at 325,000 barrels a day, of which some 140,000 barrels a day could be available to the proposed West Coast line. By 1954, nearly 200,000 barrels a day of Alberta oil would be available to the line. Application was made to Parliament for incorporation by special act of Parliament. Initial shareholders were Imperial Oil and Canadian Bechtel Limited, while other companies later joined in.

By late 1951 the project was taking shape. Preliminary survey of the route had been completed, financing had been planned; application for the steel had been filed with the Petroleum Division of the Department of National Defence. Trans Mountain's application for a permit to build the line was heard by the Board of Transport Commissioners in Ottawa on December 10. Four other firms had also applied to build oil lines from Alberta to the West Coast, but withdrew their applications. Trans Mountain was the only one in a position to proceed. Three days after the hearing, its permit was issued.

Cost of the 718-mile 24-inch pipeline was estimated at $82 million. Of this, $65 million would be borrowed by first mortgage bonds and the remaining $17 million raised through the sale of 1.5 million common shares. Twenty oil companies subscribed to 800,000 of the common shares and the remaining 700,000 were offered in a public issue. Design engineering, and detailed aerial and ground surveys were completed in 1951.

The route of the Trans Mountain line from Edmonton to its terminal near Vancouver was anything but a pipeliner's dream, crossing 400 miles of rugged mountains filled with canyons, roaring streams, rock slides, avalanches and spring floods. A total of 72 rivers and streams were crossed, the widest being the 2,250-foot crossing of the Fraser River at Port Mann, B.C. Contractors used sections of 24-inch line pipe, sealed the ends, and made rafts to float trucks, tractors, and other machinery across rivers. Much of the route was in isolated, inaccessible areas. It followed the line of the Canadian National Railway for 510 miles as far as Kamloops, then followed the Canadian Pacific Railway for 55 miles. But the presence of the railway lines, which in some areas took up most of the available space through mountain passes, often proved as much of a hindrance as a help. The right-of-way passed through mountain valleys where the winter snowfall was more than 500 feet, and stands of timber

where trees 10 feet in diameter had to be felled and their roots grubbed out.

At Edmonton, the route starts out at an elevation of 2,200 feet and after passing through wheat land and rolling timber, rises to a maximum of 3,920 feet in Jasper National Park. The Rocky Mountains are crossed at an elevation of 3,760 feet in the Yellowhead Pass. From here the line drops gently on the western slope of the Rockies to 1,125 feet then rises abruptly to 3,900 feet on a plateau south of Kamloops. The coastal mountains are crossed through the Coquihalla Pass to Hope, dropping 3,640 feet in 28 miles.

Working on steep mountain sides, giant tractors several times ran out of control and plunged as far as 600 feet to valley bottoms. In other areas, tractors were buried in sand and rock slides. Miraculously the catskinners managed to escape relatively unscathed. Laying the pipe down the Coquihalla Canyon presented particular problems, described in a company history of the line's construction:

A 400-foot section of pipe remained to be placed in the 'jump-off' at the top of Coquihalla Canyon. About 700 feet of pipe had yet to be placed at the Iago slide area farther down the canyon. At these two points it was necessary to carve a trench for the pipe down rock inclines so steep that small D-3 bulldozers were let down and dragged up by cable and winch like toy yo-yos on a string. Over the brink of the Coquihalla jump-off the line was then lowered again over the steep point at Iago. The pipe itself was sheathed in wooden slats to withstand the abrasion of lowering. Where necessary, the trench was heavily sandbagged into steps and terraces, after backfilling, to withstand rock slides, the wash of waters, and the pull of avalanching snows.

Coating, wrapping, welding and backfilling in Coquihalla were feats of skill and nerve. At the bottom, the Coquihalla River was crossed, and this meant trenching under a rushing mountain stream. Dozers and trucks splashed, bumped, bogged and all but shook themselves like wet dogs as they emerged. Passing railroad crews looked from their mountainside shelf with awe as they watched catskinners, welders and other pipeliners battle it out with nature and gravity.20

"Damn fools, but I guess they've built it," a passing trainman is quoted as having stated.

Construction of the line started in June 1952, employing up to 2,500 pipeliners, and halted temporarily during the winter when the mountains filled with snow. Work resumed the following spring, and on August 23, 1953, the first crude started on its way from Edmonton to reach

Vancouver two months later. A short lateral was later built to deliver oil to the Puget Sound region.

Refinery expansion quickly followed completion of the Trans Mountain line. In a 15-year period after the line was placed on stream, three refineries with a combined capacity of 200,000 barrels a day were built at Puget Sound while refinery capacity at Vancouver was boosted from 27,000 to 100,000 barrels a day.

But contraction followed expansion in the early 1990s when the Vancouver-area refineries of Imperial Oil, Shell, and Petro-Canada were all shut down, leaving Chevron's 60,000-barrels-a-day plant the only refinery in the area. The Vancouver closings were part of a national rationalization of refining capacity that came in the wake of an economic recession, a decline in petroleum product sales, excess refining capacity, and a profit pinch. Seeking economies of scale, the industry turned to fewer but much bigger plants. Imperial Oil, which once had refineries at Calgary, Edmonton, Regina, and Winnipeg in addition to Vancouver, now has only one refinery throughout Western Canada, its 184,000 barrels-a-day Strathcona facility in Edmonton, and only four refineries in all of Canada.

With the refinery closings, Terasen's Trans Mountain pipeline, like Enbridge's, has increasingly become both a crude oil and products pipeline, moving batches of refined petroleum products to B.C. market centres.

Terasen is the product of a tangled merger between a gas utility and an oil pipeline. When Frank McMahon built the Westcoast Transmission gas pipeline down the spine of British Columbia in the 1950s, brother John McMahon built Inland Natural Gas to distribute gas to communities in the interior of the province. In the 1980s, Trans Mountain purchased Inland but when the B.C. government prohibited that ownership, Inland then acquired a stake in Trans Mountain and in 1994 increased this to full ownership. Four years later, Inland paid $741 million to buy the gas utility business of B.C. government-owned BC Hydro in the Vancouver and lower mainland area of the province, quadrupling the number of Inland customers. The company's name was changed to BC Gas, and then changed again in late 2003 to Terasen Inc.

Terasen now distributes natural gas in 90 percent of British Columbia's communities, serving some 850,000 customers. In addition to Trans Mountain, Terasen has a 1,800-mile pipeline system carrying synthetic oil from the Alberta oil sands south to Casper, Wyoming and across the northern United States to Illinois. Other Terasen subsidiaries provide gas-fuelled electric power generation, water services and related products, and international consulting services.

Although it started more than half a century ago, construction of Canada's grid of big-inch oil pipelines is probably not over. Current exploration efforts in the Mackenzie Delta-Beaufort Sea basin, aided by finding technology early wildcatters could never conceive of, is almost certain to lead to a need for an oil pipeline from the Arctic. And more pipelines will be needed to carry the growing volume of production from the oil sands. A study in late 2003 by the Canadian Association of Petroleum Producers concluded that a major new oil sands pipeline will be needed as early as 2006.21 CAPP rated a $1.7-billion, 675-mile, 30-inch pipeline from Edmonton to Prince Rupert for tanker shipment to California and Asia as the most attractive of three possibilities. The other two options examined in the study were a $2.5-billion pipeline to California and a similarly costly new oil pipeline to Chicago. Terasen, meanwhile, was looking at a fourth option: twinning its Trans Mountain Edmonton-to-Vancouver pipeline at a cost of $1.5 billion over three stages.

Chapter 14. Westcoast

The final authorization for the Westcoast pipeline would take an astouding 357 days of public hearings over four years.

Political skirmishes about the route of Interprovincial's oil pipeline were Sunday school debates compared with the ruckus over gas pipelines that would rock Parliament like an earthquake and bring down Louis's Liberal government.

Frank McMahon, with his dream of moving Peace River gas down the spine of British Columbia, was in the thick of the fray with competitors who fought like the railroad barons of old, but for a newer form of transportation. It was a fight to supply gas to the Vancouver region and the U.S. Pacific Northwest, the only area of the United States that didn't have any. His main competitors were Faison Dixon and Ray Fish. Dixon's Northwest Natural Gas Company wanted to move gas from the big Pincher Creek field in southwestern Alberta through Idaho and Montana to Seattle and then up north to Vancouver. Ray Fish's Pacific Northwest Pipeline Corporation wanted to move gas from the San Juan gas fields in the northwest corner of New Mexico some 1,200 miles to Seattle and Vancouver.

Dixon — whose backers included Eric Harvie — had the shortest route and the lowest costs for delivering the gas. But McMahon's scheme had four advantages that trumped this. It would provide an outlet for Peace

River gas that might otherwise be bottled up for decades. It would supply gas to communities throughout most of British Columbia, which the alternative proposals could not. It would escape the supposed political and regulatory perils of having Canadian consumers rely on the stub-end of a pipeline through the United States and subject to U.S. jurisdiction. And it would free gas reserves in central and southern Alberta for delivery east to markets in the U.S. Midwest, or to consumers in Ontario and Quebec, proposals that were shaping up as McMahon sought to move gas west.

While Pacific Petroleums, Sunray, Peace River Natural Gas and Bear Oil were searching for gas and oil, McMahon was plotting his pipeline plans from cramped quarters in Calgary's General Trust Building, where three engineers from the New York firm of Ford, Bacon & Davis Incorporated arrived in January 1948. They were C.S. Whittelsey, Charles Hetherington, and George White. Whittelsey was soon to become president of Ford, Bacon & Davis, Hetherington was chief engineer, and White was in charge of a pipeline construction subsidiary. They had come to take a look at McMahon's pipeline plans, and possibly take a piece of the action.

"Frank's office was up this flight of steps," Hetherington later recalled. "At the entrance there was a list of oil companies as long as your arm. We had to walk past Pat Bowsher's desk, past the desk of his assistant, Len Youell, and the last desk was Frank's. And that was the whole organization."1

As Alberta's gas reserves grew and pipeline proposals to move it east and west mounted, the pressure grew on Ernest Manning's government to come up with a policy. This hot potato was handed to Calgary businessman Robert J. Dinning, president of Burns and Company Ltd., as chairman of a commission charged with assessing Alberta's gas supply and requirements. Public hearings started in Calgary in December 1948 and McMahon and Faison Dixon both argued their cases.

"There was no route whereby it would be possible, except at prohibitive cost, to construct a pipeline entirely across British Columbia to the coast," Dixon exclaimed, "nor would it be certain, if such a pipeline were built, that it could be maintained in repair throughout the winter months."2

"It is our firm conviction that in the export of gas from this province, a Canada-first policy should be adopted," McMahon responded. As to the suggestion it couldn't be done, McMahon said he had a simple answer: "We are prepared to do it."3

Other than the pipeline proponents, nearly everyone who appeared before the Dinning commission argued that no gas should be exported until Alberta had enough reserves to meet its anticipated needs for 50 years. Albertans expressed concerns about possible future shortages and higher prices and advanced the dubious theory that if all the gas were kept within the province, industry would be compelled to set up in Alberta. The upshot of the Dinning hearings was an initial policy that Alberta would permit only the export of gas surplus to an estimated 50-year rolling requirement of its own needs. Predictably, the Dinning hearings concluded that in 1949, Alberta had no such surplus. Exports, whether to American or other Canadian consumers, would have to wait a little longer.

The would-be exporters, however, were not waiting until that day before seeking to advance their proposals in Ottawa. Three days of debate on the Pipe Lines Act opened in the House of Commons on April 6, 1949. The act stipulated that any company proposing to construct a pipeline that would cross provincial boundaries, or enter the United States, had first to be incorporated by a special act of Parliament. They could then apply to the Board of Transport Commissioners for certificates to build their lines, and the board would hold public hearings to consider each application.

As the debate began, six putative companies were waiting to seek incorporation, including Interprovincial and three others seeking oil pipelines, plus the three gas pipeline companies: Westcoast, Alberta Natural Gas Company, a subsidiary of Faison Dixon's Northwest Natural Gas, and Western Pipe Lines, which wanted to move Alberta gas east as far as Winnipeg then south into the U.S. Midwest.

The opposition parties attacked Dixon's plan. "The oil and gas should be used in Canada as much as possible," argued Howard Green of Vancouver. The "main purpose" of Dixon's plan, he said, "is not to pipe gas to Vancouver but to pipe it to Seattle and Portland," a scheme "primarily for the Western United States rather than for British Columbia."4

After the Pipe Lines Act was approved, five of the six applicants were duly incorporated on April 30. Only Dixon's Alberta Natural Gas failed to win approval.

With its incorporation, Westcoast now looked for funding for its design studies and the regulatory process to its primary sponsors, Pacific Petroleums, Sunray Oil Corporation, the investment firm of Eastman, Dillon and Company, Frank McMahon, and A.E. Parkford. To steer it through the regulatory maze — which would require nearly six years in Canada and the United States — Westcoast retained as its general

counsel the brilliant, scrappy lawyer, Peter Douglas McDonald. Like McMahon, the 44-year-old McDonald was a man from the Kootenays. Better known to his associates as D.P., he was born in Rossland where his father had been a carpenter working in the mines, later a union leader, and mayor of the small mining town before the family moved to Trail.

McDonald would lead Westcoast's long legal battles with the competitive drive of an athlete. At Trail he had played hockey, baseball, and lacrosse. At the University of Alberta in Edmonton he saw his first football game, then played right end on the school's team for five years, while also playing on the hockey team. After university, McDonald played semi-professional football for one year and semi-pro hockey for five years. After hanging up his sticks and goalie pads he served as president of the Alberta Amateur Hockey Association for two years and president of the Western Canada Senior Amateur Hockey League for six years.

McDonald had been involved in the oil business since 1929, working for Bill Fisher's Model Oils and other small firms in their fight to keep flaring Turner Valley gas and producing naphtha (later more commonly called condensate). In the mid-1940s he was associated with Frank and George McMahon as secretary of Princess Petroleums and he had served as general counsel for Dinning's Natural Gas Commission.

Hearings on Westcoast's application for a permit to build a gas pipeline to Vancouver opened before the transport commissioners on June 21, and lasted 10 minutes. Westcoast didn't have a permit to remove gas from Alberta, and until it had, crusty chief commissioner Mr. Justice M. Archibald was not about to hear the application.

Six weeks after its first 10-minute hearing, Westcoast was again before the Board of Transport Commissioners, hoping to continue its pursuit of a pipeline permit. Even though its required Alberta permit was nowhere in sight, Westcoast had brought its big guns to Ottawa: Frank McMahon, Whittelsey and Hetherington from Ford, Bacon & Davis, and Senator John Wallace deBegue Ferris. Chief Commissioner Archibald was as insistent as before that the hearing could not go ahead until Westcoast had its Alberta permit. Senator Ferris, who had come all the way from Vancouver, was upset at the thought that he might not get to present his prepared opening argument. Ferris was an example of McMahon's policy to always seek the best-acknowledged, highest-priced help he could find. Ferris was a former member of the B.C. legislature, one of the province's leading lawyers, and a brother of B.C.'s chief justice. "I have been practicing law a long time," the senator told Commissioner Archibald. "I have never had this experience before."

"Well, of course, experience comes first to all of us," Archibald responded. "I suppose, Senator Ferris, you can make your statement," Archibald continued, but added that until the Alberta permit was obtained, "we will not hear any evidence."5

The Senator made his speech and that was the end of the second hearing on Westcoast's bid for a pipeline permit.

Manning's Social Credit government, meanwhile, was moving gingerly through a political minefield. In July, a special session of the legislature passed the Gas Resources Preservation Act limiting any permits to remove gas from the province to volumes deemed surplus to the province's foreseeable needs. To retain the interests of the pipeline companies but to cool their ardour until more gas was found, Manning provided assurance that when it was, the surplus "would be made available for use outside the province." Then he added: "This condition definitely does not exist at the present time and is not likely to exist for some time to come."6

McMahon was not about to let this temper his optimism. In a letter to Henry Judd of Standard Oil Company of California in San Francisco, McMahon revealed he was thinking not of a gas pipeline just to Seattle but as far as California. "Our own geologists . . . do not think there is any question about there being enough gas to supply the line to California," he wrote. His vision didn't end there, however; he was also thinking about an oil pipeline to Seattle. "Our route again lends itself to such a plan both politically and economically," he told Judd.7 But when the major oil companies threw their weight behind the Trans Mountain pipeline, Westcoast withdrew a preliminary application for an oil line, and Pacific Petroleums became one of Trans Mountains' sponsors.

More horses in the race

Before the year was over, national elections had returned the Liberals to power in Ottawa, more horses were lined up for the gas pipeline race, and Parliament was once more debating bills to incorporate not only the new contenders but the previously rejected bill to incorporate Dixon's Alberta Natural Gas. The new contenders were Trans-Canada Pipe Lines (later called TransCanada PipeLines) backed by Texas oil tycoon Clinton Murchison, and Prairie Transmission Pipe Line, which was soon acquired from its original backers by Ray Fish of Fish Engineering Corporation in Houston. (Eponymously enough, the senior vice-president of Fish Engineering was Robert Herring, who would later testify before Alberta's Conservation Board in Calgary.)

Murchison's Trans-Canada was in the race with Western Pipe Lines to move gas east, as will be recounted in the next chapter. Ray Fish's Prairie Transmission was the northern end of a two-prong system to

move gas to the West Coast from southern Alberta. The other prong was the proposed 1,200-mile line from New Mexico's San Juan gas fields.

The government's position, argued by Trade and Commerce Minister C.D. Howe, was that all the would-be pipeline companies should be incorporated and the transport commissioners would hold hearings to determine which lines should be approved. But if no other gas pipeline companies were incorporated, Westcoast and Western Pipe Lines would, in effect, be given the go-ahead without any examination of alternatives.

That's not the way the opposition parties saw it in the House of Commons. The matter was "far too important a question to be settled by any board set up by the government," according to Howard Green. George Drew added that if it had been left up to the transport board, the Canadian Pacific Railway would never have been built across Canada.

The Conservatives, CCF members, and numerous Liberals too, were adamant that gas pipeline routes had to be all-Canadian. So intense was the debate that one member, carried away by the emotion of it all, described a recent visit to Vancouver during a shortage of sawdust fuel when he saw a woman wheeling a 50-pound sack of coal in a baby carriage. "These are the conditions with respect to fuel that can exist today in the great cities of British Columbia; yet we are going to let our gas go down to the United States and give it to the people of Seattle, letting mothers in British Columbia push coal instead of babies in the baby carriages."8

The debate dragged on, much to the annoyance of the impatient C.D. Howe, who had once blurted out in the House: "Don't let this degenerate into a debate."

It took more than a year from the time the bill to incorporate Dixon's Northwest Natural Gas was first introduced until it was finally passed by Parliament on May 22, 1950. The bill to incorporate Ray Fish's Prairie Transmission was passed at the same time.

Howe and the Liberal government by now were also firmly committed to the all-Canadian route policy. Where Howe had once championed the shortest, most economic route partly through the United States for the eastward movement of oil, it was an entirely different matter for natural gas. The length that Howe went to ensure this policy would later lead to his political demise and the defeat of the Liberals.

The first public hearings on an application to export natural gas from Alberta opened with a prediction that Albertans would soon be swamped with so much gas that it would be running out of their ears.

The export applicant was Westcoast Transmission, and hearings opened on Monday, January 30, 1950, in Calgary's three-storey sandstone courthouse building before Alberta's Oil and Gas Conservation

Board. Behind the bench overlooking the courtroom with its rows of dark oak benches jammed with lawyers, engineers, and newspaper reporters, sat the three members of the board. The chairman was a somber Scot, Ian McKinnon. He had joined Alberta's Department of Lands and Mines as an accountant when the province acquired ownership of its mineral resources from the federal government in 1930, and he had risen to become deputy minister, as well as chairman of the Conservation Board. Later, he would become the first chairman of the National Energy Board. On McKinnon's right sat D.P. Goodall, one of the board's first petroleum engineers. Red Goodall had been in the forefront of efforts to establish oil and gas conservation in Turner Valley almost from the start. On McKinnon's left sat dapper Dr. George Govier, the board's third member and professor of chemical engineering at the University of Alberta. Born in Turner Valley, Govier had been a consultant to the board since its establishment. In the hands of these three rested many of the hopes of those lining up to ship Alberta gas across nearly the width of the country.

Two days after the hearings opened, Westcoast witness Dr. John F. Dodge, a former petroleum consulting engineer for the State of California, predicted that Alberta would soon "have more gas than you will know what to do with. . . . You will have gas coming out of your ears."

Nearly two years later, the board was still holding public hearings to determine whether there was enough surplus gas to permit export, and H.R. Milner, chairman of the province's two major gas utilities, was still concerned about the future supplies for his customers. The export plans of the applicants, Milner told Northwest Natural Gas counsel H.G. Nolan, may "have changed a little bit since those halcyon days when gas was flowing out of their ears."

"What was flowing out of their ears?" Nolan asked.

Milner: "Gas."

Nolan: "I have known it to flow from other orifices."

Throughout 1950, the board held hearings on the applications of Westcoast, Prairie Transmission, Northwest Natural Gas, Western Pipe Lines, and Trans-Canada Pipe Lines.

Howe, ramrodding Canada's post-war industrial development, was as eager as the pipeline companies to wrest gas removal permits from Manning's cautious government. On September 16, Howe wrote to Eldon Tanner saying he had heard from the head of the U.S. Munitions Board that it was "seriously concerned about the lack of fuel in the Pacific Northwest," and wanted some Alberta gas. If that wasn't soon available, "immediate steps will be taken to supply the area from Texas sources of natural gas," Howe warned. "There would seem to be great urgency for a

decision one way or the other . . . I see little prospect of a line being built from Alberta and the Canadian northwest unless that line can be extended from Vancouver southward to serve the Pacific coast markets."9

Despite Howe's sense of "great urgency," Alberta was not about to rush. The Conservation Board's recommendations on the gas removal applications was tabled in the legislature by Manning on January 25, 1951. The board found that there was still not enough gas to meet the province's anticipated 30-year needs (which had been reduced from an earlier stipulated 50-year supply), and the government concurred that none of the applications should be approved at that time. But Manning added a note of encouragement: "As soon as additional reserves are established it will be in the best interests of the people of Alberta to make surplus gas available for sale outside the province."10 The five applications were deferred until September 4, 1951, when the board would again consider them at resumed hearings. That left eight months to find more gas.

While Westcoast pressed ahead on detailed pipeline planning and preliminary engineering, the Pacific group of oil companies was rushing to find the needed gas reserves. There was not yet enough in the Peace River country, and Westcoast advanced plans for several routes, including a Y-shaped system to draw gas from both central Alberta as well as the north country, before settling on the original concept for a single route from Peace River. By early 1951, the five Westcoast sponsors had spent half a million dollars on planning and regulatory procedures. If they failed in their endeavour — and few were willing to bet they would succeed — it would be money down the drain. But if they succeeded, a stock option agreement dated April 30, 1951 would reward them for the gamble. The five sponsors were given options — exercised two years later — to buy 500,000 Westcoast shares at slightly less than five cents each. McMahon, Pacific, Sunray, and the partners of Eastman, Dillon were each allotted 118,750 shares, while E.A. Parkford was granted 25,000 shares for his role in bringing the partners together. Some six years later Westcoast shares would be offered for sale to the public at a price 100 times greater than the sponsors had paid, and the five-cent shares would create a political storm.

Meanwhile, the gas to fill the contemplated pipeline still had to be found. Westcoast's application requested only two trillion cubic feet of gas from the Alberta side of the Peace River country, half enough to fill the line. The rest would have to come from the B.C. side. After the hearings on the deferred application were resumed before the Conservation Board in Calgary, George McMahon told the board about

the efforts to find that gas. Pacific, Sunray, Peace River Natural Gas, and Canadian Atlantic had six rigs drilling wildcats on 5.5 million acres of permits in the Peace River country, where they had drilled 16 gas wells and 20 dry holes. “We certainly believe that the area can and will produce, under export stimulus, almost limitless gas reserves,” George McMahon told the board.11 Encouragement came the following month when Pacific found gas near Fort St. John. The Fort St. John field would provide the backbone of Westcoast’s initial gas supplies. The large plants that would ultimately be built here to process gas from this and other northern fields would make Fort St. John the hub for deliveries of B.C. gas over the next half century to markets as far as San Francisco, Chicago, and Toronto.

The recommendations of the Conservation Board following the resumed hearings of the five applicants were, as before, tabled in the legislature, on April 2, 1952. All of the applications to move gas out of Alberta were rejected — except that of Westcoast, where the board found there was now a small surplus of just 300 billion cubic feet of natural gas. “No other gas is now estimated as surplus to the 1952-1981 requirements of the province,” the board’s report stated. The board found that this gas could safely be exported because “the Peace River area is remote from other settled areas in the province and does not lend itself to an integrated province-wide gathering and distribution system.”12

Westcoast’s victory was not greeted with acclaim. “The day the government’s motion is passed will be one of the saddest days in this province’s history,” Liberal leader J. Harper Prowse declared. “We may be getting a little chicken feed in the treasury, but look at what is being taken away from us and our children.”13 Gulf Oil, which had hoped to sell gas to Faison Dixon’s line from its big Pincher Creek field in the southwest corner of the province, warned that the decision would be costly. Shutting in Pincher Creek, Gulf claimed, would shut in natural gas sales worth some $65 million, preclude sales of by-product sulphur and gas liquids worth some $300 million, and cost the Alberta government more than $200 million in lost revenues.14 Frank McMahon, of course, had a different take. Writing to Eldon Tanner, he claimed that “had an export permit been granted to the Northwest Company to take gas from Pincher Creek to the Pacific Coast markets, the Dominion Government would have lost millions and millions in income tax, and I am sure it would have retarded the development in Northern Alberta and British Columbia for a long and indefinite period.”15

But there were hooks in the approval Westcoast had won. Its permit said it could remove gas from Alberta’s side of the Peace River area for 22 years, but allowed only the volume of gas required for the first five years.

Moreover, the Alberta government retained the right to divert that gas at any time that it was urgently needed in the province.

Because of these catches and the sparse reserves available to it, H.G. Nolan, the counsel for Dixon's line, commented to D.P. McDonald that Westcoast had "just won a permit to commit suicide."16

The Ottawa and Washington hurdles

Westcoast didn't commit suicide but it was very nearly killed — and, indeed, at one point seemed to be dead — during almost another four years of hearings in Ottawa and Washington.

The hold up was certainly not in Ottawa. Only three more days of hearings before the transport commissioners, June 11 to 13, were required. Westcoast, by now, had firmed up the design of its system: 683 miles of mainline to Vancouver and the border crossing at Sumas; 277 miles in the United States to Seattle; a small lateral line through the Okanagan Valley to Trail and another border crossing for sales to the U.S. Inland Empire area centred on Spokane.

On October 10, after further gas reserve studies by the GSC's George Hume and Alex Ignatieff, the board granted Westcoast its certificate to build the pipeline and Trade Minister Howe then issued the export permit under the Electricity and Fluids Exportation Act.

The board's licence gave Westcoast more than three years, until December 1, 1955, to win U.S. approval to import the gas from Canada and start construction of the line. If that seemed like ample time, it was an assessment that would prove to be more than just a little optimistic.

In applying to the FPC, Westcoast was entering a ferocious arena. D.P. McDonald got a hint of that on a visit to Washington when he happened to leaf through an issue of Life magazine. "The interstate transporters of natural gas are probably the most tempestuous and discontented lot in U.S. industry," the article claimed:

> They bawl and they brawl (one of them licked an FPC official to the floor last October and is now being sued in a federal court). They are suspicious of each other and some of them maintain elaborate spy systems to keep tabs on rivals. . . . Brutal fights are waged for gas reserves, for access to new markets or for favored positions within markets too big for one supplier. A high proportion of top executives in the business are Texans; and even if they were not born with an aptitude for cutting throats they perforce acquire it.17

Even before it had its Ottawa permits, Westcoast had filed its applications with the FPC, joining rival bidders Faison Dixon with his not-yet-quite-dead proposal for a line from Pincher Creek, and Ray Fish

with his planned Pacific Northwest line from New Mexico. The adequacy of Fish's gas supply was suspect as was the economics of a route twice as long as that from the Peace River. But Fish had a couple of advantages. If McMahon could play to nationalist interests in Canada, Fish could play the same card in the United States. Also, Fish had signed up the Seattle market. Henry Gellert, president of Seattle Gas Company (which, like B.C. Electric, had relied on coal gas) had been waiting for more than four years to get natural gas from Pincher Creek with Dixon's proposed line. Now that was dead, Gellert had signed up to buy San Juan gas from Ray Fish. Of course, in the end, Gellert would buy gas from whoever ultimately built a line to Seattle, but in the meantime he was one more Westcoast opponent in the bitter battle before the FPC.

Hearings on the competing applications opened in Washington on June 16 before FPC presiding examiner Glen R. Law. The three main horses in the race were all there: Westcoast, Pacific Northwest, and Northwest Natural Gas. There were three other applications as well. Trans-Northwest Gas Inc. sought to import gas for the Spokane-Inland Empire area from Westcoast through a spur to its main line. Western Pipe Lines sought a permit to import Canadian gas from a delivery point south of Winnipeg. Tennessee Gas Transmission (TGT) wanted to export gas from southern Louisiana for sale to Consumers' Gas Company in Toronto.

There were dozens of intervenors, each supporting or opposing whatever their interests dictated. The coal companies, the railways, and their unions were fighting rearguard actions opposing anything involving the use of natural gas: the more they could delay the inevitable, the longer they could mine and haul coal. Trans-Canada Pipe Lines was there to oppose the plan of rival Western Pipe Lines to deliver Alberta gas to the U.S. Midwest: Trans-Canada wanted to deliver that gas to Ontario and Quebec.

The barbs attached to Westcoast's Alberta and Canadian authorizations soon tore into its flesh in the American hearings. There was the power Alberta had retained to cut off Westcoast's gas from its side of the Peace River if it was needed in the province. Even though 80 percent of the supply Westcoast had lined up came from the B.C. side, the Alberta provision did not play well in Washington. Worse was the provision in the Electricity and Fluids Exportation Act which required any export authorizations to be renewed every year. Financing a major gas pipeline required minimum 20-year contracts for both the purchase and sale of the gas.

Everyone opposed to the importation of Canadian gas used these conditions as a club to hammer Westcoast, especially the lawyers for

Faison Dixon, Ray Fish, and even Clint Murchison's Trans-Canada Pipe Lines.

Arthur Logan, counsel for Dixon's Northwest Natural Gas, noted that the Westcoast line had been developed and advertised on the basis that it will develop the wastelands of northern British Columbia. "I don't think this commission should be concerned with the development of the wastelands of Northern British Columbia. I think they should consider only the welfare of the people who are going to buy 80 percent of the gas and who are residents south of the border."18

Binford Arney said his client, Fish's Pacific Northwest, had no intention of making any further requests for Canadian gas and would supply the market entirely with U.S. gas. "It is our firm belief that the market area desires to have a supply of gas that is not dependent upon future orders or conditions of administrative agencies of a foreign government."19

Trans-Canada counsel George Horning unleashed an attack not only on Westcoast but on Canada, claiming that "if Canada desires to export its natural gas into the United States, then there must be some basic change in the law of Canada." He continued in stronger words: "They have no concept of any rules, laws, orders-in-council, impairing the obligations of contracts. Every instrument and every exhibit which has been introduced in this proceeding can be varied, can be changed at any time in the future, can be wholly rescinded, without any opportunity for review."20

If Horning wasn't shooting himself in the foot, he was at least shooting his client. Trans-Canada needed Ottawa's, and specifically C.D. Howe's, support, and Howe strongly supported Westcoast's bid to export Peace River gas. As well, Trans-Canada would soon be as dependent as Westcoast on gas sales to American buyers to finance its line. Attacking the dependability of Canada was no way to advance Trans-Canada's cause. McMahon was quick to let Howe know what was being said in Washington. Howe put a bug in the ear of his good friend Clinton W. Murchison, Trans-Canada's Texas wheeler-dealer sponsor. Horning changed his tack before the FPC.

The Washington proceedings were underway barely more than a month before hearing examiner Glen Law deferred them, ruling that none of the applicants had adequate gas supplies, firm sales contracts, nor Canadian authorizations. They were invited to come back when they had complete applications. That turned out to be another seven months.

President Eisenhower is our sort of folks

As the off-and-on hearings proceeded, Clint Murchison became C.D. Howe's and Westcoast's best ally in Washington, writing innumerable folksy and helpful notes to "Dear C.D." On April 9, 1953, he wrote to provide "extremely confidential" information that the FPC "propose at this present time to turn the Westcoast down and to give Pacific Northwest a permit with a lot of strings tied to it."21 Murchison's note continued:

> It will probably be 30 days before they come to a definite ruling, so we should have 10 or 15 days in which to act. In my opinion, through your diplomatic sources you are going to have to go to the FPC and give them ample and absolute assurances that both the Parliament of the central government as well as the Parliament of British Columbia will be called for the purpose of enacting a law which would guarantee to that area a 20-year gas supply.

Howe wrote back telling Murchison that "anything you can do to delay a ruling" would be "very helpful . . . it is most important to Canada that the Westcoast application be approved."22

Getting assurances on new laws by the legislatures of Canada and British Columbia was an almost impossible task, but Howe had a quicker and simpler solution. At his instigation the cabinet issued an order-in-council amending the regulations under the Electricity and Fluids Exportation Act, and with this amendment Westcoast was issued with a new permit that authorized exports for a period of 22 years, eliminating any need for annual renewals.

On April 16, Murchison wrote another folksy note to C.D. about the appointment of Jerome Kuykendall, former chairman of the Washington Public Service Commission, as FPC chairman, and about the difficulties Ottawa was experiencing in negotiating U.S. participation in the planned St. Lawrence Seaway and Power Project:

> I think you should write Kuykendall and President Eisenhower and tell them you have this Westcoast matter as well as the seaway on your mind and ask them for a contemporaneous date, because I know that you can use your sagacity and turn on your personal charm and get any damn thing you want out of either of them. While I have not met Mr. Kuykendall personally . . . after checking very carefully on him and his past operations I have come to the firm conclusion that he is our sort of folks, and I know the President is.23

As FPC hearings resumed in Washington on February 16 and dragged on into 1954 the horses in the race jockeyed furiously for position in terms perhaps best described with mixed metaphors. Murchison wrote another note that month to C.D. saying he had cooked Ray Fish's goose by arranging for another pipeline to swipe the Denver market from Pacific Northwest. "So you can tell Mr. McMahon that Mr. Fish is laid away in a barrel," Murchison wrote.24 It didn't turn out quite that way.

A feud between the two main coal gas utilities in the U.S. Pacific Northwest became very public. Charles Gueffroy's Portland Gas and Coke Company, in Portland, Oregon, the largest gas utility in the region, had signed up to buy natural gas from Westcoast. Henry Gellert's Seattle Gas Company had signed up with Pacific Northwest.

Gellert used full-page newspaper ads and radio broadcasts to campaign against importing Canadian gas. The Westcoast line, asserted Gellert, "would serve Vancouver and all other Canadian markets first. The American market — our Pacific Northwest — would dangle at the end of the Canadian pipeline after all Canadian needs were satisfied. . . . We, an American utility, would actually become an economic vassal of a foreign power."25

"Blatant nonsense," responded Gueffroy. "Are we economic vassals of Canada because we're dependent upon that thriving young nation for 90 per cent of our nickel, 75 percent of our wood pulp, and 80 percent of our newsprint. . . . If Mr. Gellert wishes to expectorate in the eyes of America's best customer, so far as I'm concerned, he can spit alone."26

Frank McMahon testified before the FPC in February 1954, shortly after the hearings had been resumed. He was grilled by Pacific Northwest counsel Leon Payne about Westcoast literature that had intimated that Canadian consumers would receive priority over U.S. consumers and that "all questions of pipeline rates, safety regulations, and in fact all control would be under the provision of Canadian authorities."27 It was not exactly the type of evidence that Westcoast would choose to emphasize before the FPC.

"This was the propaganda that we put out" to thwart the plans of the Fish and Dixon proposals, McMahon candidly explained. "It is straight propaganda."

Payne: "Well, in other words, what you are telling me, Mr. McMahon, is that this is the propaganda you put out to the Canadians?"

McMahon: "That is exactly right. Just the same way that you have been putting it out to the Americans."

Payne continued to quote from the Westcoast propaganda: "Our minerals, our water power, our forests, and our oil and gas land must be developed and utilized before we can reap the benefits they hold in store.

We have everything to gain from the application of sound common sense in the development of all our natural resources."

Payne: "That statement would still be true, I take it."

McMahon: "Yes sir. I can hardly believe I wrote it, it's so good."28

The FPC hearings at last came to a close with the presentation of final arguments on June 1 and 2, 1954. The transcript of two years of public hearings ran to 28,460 pages. Nearly all observers agreed that Westcoast had the strongest case.

Black Friday

As the end of the hearings approached, and in the first week or so after, McMahon offered $500 bets to his business associates that Westcoast had won. There were no takers, at first. But by mid-June during telephone calls to Houston, he found a number of people now willing to take him up on his bet.

The bad news came on June 18, in what for years to come was known in the offices of Pacific Petroleum's tower on Calgary's 9th Avenue as "Black Friday." McMahon got the message while he was sitting in the barber's chair in the Hotel Pierre in New York. Westcoast had been rejected and Ray Fish's pipeline from New Mexico had been approved.

Frank McMahon's big pipe dream had apparently vanished like a fantasy in the rude awakening of reality. Yet somehow he maintained a sense of humour, consoling friends with a story in which he compared himself to a prairie farmer. On a bitterly cold winter night, the farmer resisted the call of nature as long as possible, rather than run the 150-foot dash through a blinding blizzard to the outhouse in the backyard. When he could wait no longer, the farmer made a fast dash for it, but tripped and fell over the clothes line. By the time he picked himself up, the farmer found that he had already wet his pants. "Well," said the farmer, "I guess I just wasn't going to make it anyway." McMahon paused, and repeated: "I guess I just wasn't going to make it anyway."29

The main reason for the rejection of Westcoast's bid was the belief of the FPC commissioners that no region of the United States should be dependent on a foreign country for its only supply of natural gas; U.S. consumers must be protected with secure supplies. The commissioners wrote:

> Such protection would not be afforded to any segment of the American people if its sole source of essential natural gas were through imports from a foreign country without some intergovernmental agreement assuring the continued adequacy of its supply. Otherwise, all control over the production, allocation,

> and transportation to our border of such natural gas would be in the hands of agencies of foreign governments, whose primary interest would of necessity always be in the needs and advantages of their own people, and whose judgment and actions would be essentially dependent upon public opinion within that country, rather than upon the interests of American consumers.30_

McMahon soon bounced back from his "I guess I wasn't going to make it anyway" despair to his customary optimism. "It's been a setback," he conceded to reporters. "But we are not too concerned since we have worked on plans to export gas to California for some time."31

Westcoast had, indeed, been working on the possibility of a 30-inch, $200-million gas pipeline from Peace River all the way to San Francisco, and Pacific Gas & Electric, the giant utility that served the northern part of the state, was at least interested. The conviction that Ray Fish really did not have enough gas in the San Juan area to fill his pipeline also helped kindle some hope.

To buy some time while they scrambled to keep their project alive, Westcoast and its sponsors launched a number of delaying legal and political actions. Charles Gueffroy refused to sign a contract under which his Portland Gas utility would buy gas from Pacific Northwest, and without that, Ray Fish wouldn't be able to raise the $160 million he needed for his pipeline.

The most effective action to bottle up Fish's plans came from Paul Graves, the Spokane lawyer whose Trans-Northwest had contracted to buy gas from Westcoast for use in the Inland Empire region. Trans-Northwest held certificates from the Idaho Public Utilities Commission authorizing construction of a pipeline grid to distribute gas in seven Idaho counties, and franchises in 14 counties in the eastern part of Washington state. Fish's FPC certificate would seem to give it the power to override Trans-Northwest's local authorizations. Paul Graves was not about to accept this invasion of a foreign agency — the Government of the United States — over local sovereignty. Trans-Northwest filed an application for an FPC rehearing, claiming that with its decision "the commission has assumed authority with respect to the conduct of international affairs which it has not been given and could not be given under the Constitution." For good measure it added that the decision was "an abuse of discretion, arbitrary, capricious, contrary to the weight of evidence adduced, and constitutes error of law." This application was summarily dismissed by the FPC, whereupon Trans-Northwest appealed to a federal court. Spurning Washington where FPC court appeals were customarily filed, Trans-Northwest looked for a court that might be more

sympathetic, selecting the Third Appellant District of the Federal Court in Philadelphia to file its appeal. The Philadelphia court upheld the appeal, creating another roadblock on Ray Fish's path._

Perhaps Fish this time had been "laid away in a barrel," but neither was McMahon's cause going along swimmingly. Talks with PG&E to build a bigger pipe to San Francisco had hit a wall. The big utility wanted Canadian gas, alright, but it wanted to own and build the pipeline that moved it. It was already dependent on gas brought in from Texas and other states by the pipelines of El Paso Natural Gas Company, and it didn't want to be dependent on another pipeline controlled by someone else. Moreover, it was apprehensive that both Westcoast and Pacific Northwest would ultimately wind up under the control of El Paso's dynamic president, Paul Kayser. PG&E was planning its own pipeline to bring in Canadian gas, not from the Peace River country but from the closer fields of southern and central Alberta. As a PG&E spokesman later testified, it wanted control "as distinguished from dealing with a pipeline company . . . which might have different interests from ours."32

McMahon was also talking to Paul Kayser and his El Paso officials, who were indeed interested in gas supplies from the Peace River and even farther north in British Columbia on the borders of the Yukon and Northwest Territories where El Paso had acquired permits on which to search for oil and gas. But Kayser's interest in Westcoast was in the possibility of buying control. El Paso wanted to control the whole movement of natural gas west of the Rocky Mountains, from the Yukon to Mexico.

This was stalemate, and the man who broke it was K.S. (Boots) Adams, chairman of Phillips Petroleum Company, number 18 on the list of big U.S. companies, and the largest natural gas producer. Phillips Petroleum had been founded by "Uncle Frank" Phillips who dressed in cowboy boots and wide brimmed hats, on Oklahoma leases he and his two brothers had acquired in 1903 from the Osage Indian Nation. The Phillips brothers drilled two unsuccessful wildcats, then brought in 80 producing oil wells without a miss. Adams had dropped out of college in 1920 to work for Phillips Petroleum as a warehouse clerk at the company's headquarters in the quiet town of Bartlesville, Oklahoma, and 18 years later headed the company when founder Frank Phillips retired.

Phillips was interested in both pipelines because at the southern end it had gas to sell in the San Juan area and in the north it had gas to sell in the Peace River country, where, as we have seen, in 1947 it had taken out B.C. exploration permits 4, 5, and 6, following Frank McMahon who had taken out permits 1, 2, and 3 the same day. Adams decided the best way to break the log jam was to somehow get McMahon, Fish, and

Kayser to stop fighting and join forces to build both pipelines. And that's just what they agreed to when, after some preliminary discussions, the three principals and their aides met in the Tulsa, Oklahoma offices of Sunray Oil Corporation.

Clarence Wright played a key role in reaching an agreement. Ray Fish had demanded the right to acquire a half interest in Westcoast. With Sunray's option to acquire a quarter interest, that would have just about squeezed out the McMahon group. A compromise was reached after Wright agreed to turn over Sunray's option and Fish agreed to settle for one-quarter, rather than half ownership of Westcoast. That made Pacific Northwest the largest owner of Westcoast, for a very brief period. The Tulsa agreement also called on Pacific Northwest to buy gas from Westcoast at the Sumas border delivery point south of Vancouver at a price of 22 cents per thousand cubic feet. This was based on the competitive price of gas at San Francisco less an estimate of what it would cost for delivery charges from Sumas. This assumed that some of the Peace River and San Juan gas would wind up in San Francisco, which never happened because PG&E did build its own pipeline from Alberta. It was not an attractive price for Westcoast, barely enough to cover costs if all went well, and it would be a bone of contention in Canadian-American relations for years, but it was all that McMahon could get. It was take it or leave it, and leaving it would mean no Westcoast pipeline.

The agreement was signed in Sunray's offices. A tongue-in-cheek news release issued by Sunray reported that Wright and Adams "take pleasure in jointly announcing the wedding of their prodigal children, Pacific Northwest Pipeline Corporation, Houston, and Westcoast Transmission Company Limited, Calgary." The signing reportedly took place in Wright's office, number 1313, in the 13-storey Sunray Building, on December 13, 1954, at 9:13 a.m. "Thirteen has always been my lucky number," Wright said.

The Oil and Gas Journal described it as the "biggest gas deal in history," one that would "form a grid of transmission lines linking all major consuming areas west of the Rockies with all big gas-producing areas in the western half of the continent."33 It involved the construction of 3,500 miles of big-inch gas pipelines at a cost of half a billion dollars.

The Westcoast shares earmarked at the Tulsa meeting for Pacific Northwest were obtained two years later by El Paso when it — as PG&E had anticipated — acquired Pacific Northwest on a share swap (netting $12 million for Ray Fish). The U.S. Justice Department, however, promptly started legal action under antitrust legislation seeking to compel El Paso to divest its Pacific Northwest holdings. It took 16 years

of litigation, the longest antitrust case in U.S. history, before El Paso finally disposed of its Pacific Northwest shares. Long before that, Pacific had emerged as Westcoast's largest shareholder.

Following the Tulsa agreement, more five-cent Westcoast shares were sold to the sponsors, bringing the total to 625,000 purchased by Pacific, Sunray, by Eastman, Dillon Company, and McMahon and his associates. Of the 150,000 five-cent shares purchased by McMahon and his associates, Frank took slightly less than half while the rest were picked by brother George, Norman Whittall, D.P. McDonald, and others. Both the five-cent shares and the low price paid by El Paso for the B.C. gas delivered by Westcoast were later subjects of sharp public controversy.

With McMahon and Fish now happy allies, Pacific Northwest in the fall of 1955 was back before the FPC, which after a brief hearing issued it a permit to import the Canadian gas. The final authorization for the Westcoast pipeline had been achieved. It had taken an astounding 357 days of public hearings over four years, including 217 days before the FPC in Washington, 136 days before Alberta's Petroleum and Natural Gas Conservation Board in Calgary, and four days before the Board of Transport Commissioners in Ottawa.

With certificates in hand, Westcoast raised some $22 million from a public sale of shares at $5 each and borrowed from insurance companies more than $150 million to cover the cost of the pipeline and gas processing facilities. The first two sections of pipe were welded in September while construction started on a complex of three large plants at Taylor Flats, a short distance south of Fort St. John. The complex included Westcoast's $13-million scrubbing plant that removed condensate, propane, and butanes from the gas; a Pacific Petroleums refinery to turn these liquids into gasoline, aviation fuel, and other products; and a plant built by Jefferson Lake Sulphur Company to remove hydrogen sulphide from the gas and convert it into as much as 600 tons per day of sulphur.

A month before financing for the Westcoast line was completed, McMahon had set his sights on an even bigger prize: an unwelcome bid to take over the stalled Trans-Canada pipeline to move gas east to Ontario and Quebec. It was an audacious bid to control essentially all of Canada's long-distance gas transportation, but this time it would earn him only a sharp rebuke, as we will see later.

Early Monday morning, October 7, 1957, hundreds of Westcoast guests flown in from Toronto, New York, Los Angeles, and Houston gathered at Calgary's airport where five aircraft chartered from Air Canada and CP Air were waiting to fly them to Fort St. John for a visit to the complex of plants about to officially start delivering gas through the

Westcoast pipeline to consumers in British Columbia and the U.S. Northwest. They were greeted at the airport by a grinning Frank McMahon, staggering under an arm-load of fleece-lined coats which he dispensed with the warning that, “It might be cold up there.” Another flight brought more guests from Vancouver.

After champagne flights and a tour of the plants, it was on to Vancouver, where the following day 500 guests assembled for a luncheon in the ballroom of the Hotel Vancouver. “I am now going to turn on the gas,” Premier W.A.C. Bennett announced, then pulled a lever.

It had been planned that the sound of gas roaring through the pipe would be picked up by radio and broadcast over the amplifiers in the ballroom. The gas was flowing, but no noise was coming over the amplifiers. Behind the control panel, Westcoast technician Terry Lynch quickly turned up the “squelch” on the VHF radio creating a noise that, as far as anyone could tell, sounded like gas flowing through a pipeline.

“This is the greatest event for British Columbia since completion of the Canadian Pacific Railway united the province with the rest of Canada,” Bennett beamed.

Squabbles over pennies

Energy was flowing through Canada’s first big, long-distance natural gas pipeline, but there was half a century of progress, profit, controversy, and turbulence ahead for Westcoast Transmission — later renamed Westcoast Energy — that would end with its takeover by a U.S. energy conglomerate, marking Westcoast’s demise as a corporate entity and the breakup of some prized assets.

The first controversies involved those five-cent shares and the price at which Westcoast sold Canadian gas to a U.S. pipeline for American consumers, both of which were aired at Henry Borden’s 1958 Royal Commission on Energy.

“We are of the view that the financing of Westcoast . . . was done in a manner which has resulted in those few who were associated in the venture receiving potential capital profits beyond any amount which, in our opinion, could be considered as reasonable or adequate compensation for the risks involved,” wrote Borden, the head of giant Brazilian Light and Traction (later Brascan).34

Spoken like a true utility executive, with a regulated monopoly, no-risk, guaranteed rate of return, as remote as night-and-day from the vicissitudes of a wildcatter risen from the sweat and grime of a derrick floor in a desperate down-to-the-last-dime search for fortune in the Flathead Valley graveyard of shattered hopes. Actually, the payoff was far from what the five-cent shares might have suggested. True, McMahon

and his close associates had purchased 150,000 shares for five cents each, but in 1956 they had bought another 250,000 at $5 each, the same price as the public offering, and an additional 200,000 at $6 each. That brought their average purchase price to $4.65 — not that much less than the $5 the public was offered. Certainly those who bought shares at $5 didn't seem to complain — within months, the market price had zoomed to a peak of $57, although it soon dropped back to half that level.35

The second, more complicated controversy was the price El Paso paid for Canadian gas. A clause in the 1955 Exportation of Power and Fluids and Gas Importation Act stipulated that the export price could not be less than that paid for "similar quantities under similar conditions for sales for consumption in Canada." The price that B.C. Electric paid for gas for Vancouver and the B.C. Lower Mainland area was 32 cents per thousand cubic feet, while the price that El Paso paid at the nearby Sumas border crossing was 22 cents.

Clearly, it seemed that the sales price was in violation of Canadian law and that Canadian consumers were subsidizing American consumers. But by the time all the factors were weighed, even Henry Borden's energy commission could not quite figure out who was subsidizing whom. McMahon had an explanation for the problem: "This whole thing," he said, "was based on the economics to supply gas in Portland, Seattle, and Vancouver at a postage stamp rate." Just as the price of a postage stamp is the same whether a letter is mailed across town or across Canada, so Westcoast's rates were based on providing gas at the same price to Fort St. John a stone's throw from the processing plants or to Vancouver, or Portland. From the meter station at which B.C. Electric picked up gas from Westcoast it was only a 40-mile delivery to the Vancouver city gate, while from Sumas on the B.C.-Washington border gas had to be delivered more than 400 miles to reach Portland. Which changed everything, according to Westcoast.

To sort matters out, Henry Borden ordered a study by the Boston consulting firm of Stone and Webster, which concluded that B.C. consumers were subsidizing the Americans. Westcoast ordered a study by three other large consulting outfits, which concluded that it was the Americans subsidizing the Canadians.

Borden and McMahon were agreed on one point: the 22-cent price was too low. Increasing it wasn't easy. In 1966, Westcoast inked a contract to double its sales to El Paso with a price increase from 22 to 27 cents, for the entire doubled volume. Canada's new National Energy Board was happy to approve that, but in Washington the Federal Power Commission ruled that the price had to remain at 22 cents. Ottawa and Washington

squabbled over the price for two years before it was finally settled at 26 cents.36 Little more than a decade later, the price for natural gas had increased 25-fold to more than $6 per thousand cubic feet.

Westcoast's obituary

Westcoast Transmission was not a smashing success. Beset by problems, it was 10 years after the pipeline was in operation before it could start paying dividends. In its first few years of operation, it had to sell more shares just to pay the interest on its debt. B.C.'s Peace River gas reserves were not as big as had been thought and new discoveries were slower to arrive than had been hoped. Westcoast staggered from crisis to crisis, with gas supplies, gas sales, and gas prices all too low. When a promising Devonian reef gas discovery was found near Fort Nelson, some 170 miles north of Fort St. John, McMahon vowed to build a $58-million pipeline extension and an $11-million gas processing plant to tap this huge resource before the end of 1961. When Westcoast's gas supply manager Peter Kutney admitted to Oilweek37 that the extension might have to be delayed a couple of years pending the development of additional reserves, Westcoast vice-president Doug Owen warned Kutney, "You better not let Frank see that article. You might get fired."38 It was four years later before the Fort Nelson extension and processing plant were completed. Two years after that, another $6.5-million, 42-mile lateral to connect more new gas finds to the Fort Nelson plant ran into trouble when the pipe kept rupturing. It blew up 46 times. After spending $1 million trying to patch up the broken sections, the entire lateral had to be replaced.

A more disastrous supply problem emerged with a pair of gas discoveries by Amoco Canada Petroleum (a subsidiary of Standard Oil of Indiana which was later merged into BP Amoco), at Beaver River just south of the Yukon, and Pointed Mountain, just inside the Northwest Territories. These Devonian reef discoveries were expected to yield up to 3.5 trillion cubic feet of gas, and Westcoast spent $235 million to extend its system another 110 miles farther north and expanded the capacity of its entire system in order to sell more gas to El Paso at significantly higher prices. But the gas wells at Beaver River and Pointed Mountain produced barely more than a year before they began sucking up water, causing gas production to be slashed by two-thirds, and cutting Westcoast's gas supplies by 20 percent. For six years, Westcoast was unable to provide all the gas it had contracted to sell.

Then there were the management problems. To overcome every obstacle and build a system like Westcoast required the vision, tenacity, determination, and daring of a Frank McMahon. To operate a regulated utility once the line was built called for a cautious, prudent executive

with great management skills and even a penny-pinching attitude. That was not Frank McMahon. Even McMahon's buddy Boots Adams recognized the problem and in 1963 brought in Bob Stewart, an 26-year veteran of Phillips Petroleum, as president and CEO of Westcoast. McMahon became chairman. Stewart and McMahon clashed. Stewart insisted that the company's jet aircraft had to go. McMahon insisted it had to stay. The jet stayed. Stewart left. He was gone months after he had arrived. McMahon reclaimed his title of CEO as well as chairman.

There came a succession of more presidents, starting with Stewart's successor, Doug Owen, a former executive assistant to C.D. Howe whom McMahon had hired at Pacific in 1957 and who later moved to Westcoast as vice-president and treasurer. In 1970 it was Ed Phillips, former president of air conditioning manufacturer Trane Canada who in 1947 had worked for Consumers' Gas in Toronto studying the feasibility of importing gas from Louisiana. In 1982, it was John Anderson, who had worked his way through the legal departments of Imperial Oil and Pacific Pete before joining Westcoast as vice-president and legal counsel. He was the nephew of another John Anderson, manager of British Properties, the English investors who built the Lion's Gate bridge across Burrard Inlet so they could sell exclusive residential properties that climbed up the mountain side above West Vancouver. During the Dirty '30s, the senior John Anderson had been one of McMahon's backers in the ill-fated quest for oil in the Flathead Valley. The younger John Anderson died prematurely of cancer in 1979 and was succeeded by Michael Phelps, who would lead Westcoast's most explosive growth period for 13 years, until it was absorbed into the maw of a financially troubled U.S. energy giant.

Control of Westcoast changed hands almost as often as presidents. When financing of the line had been completed, McMahon and his close associates wound up with less than seven percent of the stock, but six trustees held two-thirds of the voting rights, allowing McMahon to exercise a form of control. That changed in 1960 when Phillips Petroleum acquired a stake in Pacific Pete that quickly grew to nearly half ownership, while Pacific in turn owned a third of Westcoast. Phillips promoted Kelly Gibson to president of Pacific and chairman of Westcoast, and CEO of both. A no-nonsense oil man from Broken Arrow, Oklahoma, Gibson had started in the oil business hand-digging pipeline ditches at 50 cents an hour in Kansas for Gulf Oil during the Dirty '30s. Gulf moved him to Alberta in 1949 to straighten out some drilling problems at Pincher Creek. McMahon had hired Gibson in 1957 to manage Pacific's drilling and producing operations, where he quickly cut

out frills. “I just worked country-boy style,” Gibson later recalled. “We spent less money. Where we had three people, we used one.”39

Control changed again with Petro-Canada’s 1978 $1.5-billion purchase of Pacific, and it was Bill Hopper’s turn to be chairman and CEO. That ended 14 years later when, needing money, Petro-Canada sold its one-third share of Westcoast for $342 million in a public offering. That left Westcoast in 1991 free to make its own way in the world under the driving ambition of Michael Phelps.

Phelps was a lawyer and political animal with powerful connections who had entered the oil business under a bit of a cloud. Born in Shawbridge, 28 miles north of Montreal where his father managed a hardware business, Phelps was the only Anglo kid in the village school when he started. After the family moved to Winnipeg, Phelps earned his law degree at the University of Manitoba followed by a master’s degree at the London School of Economics. With his freshly minted legal and economic degrees, Phelps in 1978 joined the justice department in Ottawa where he was special advisor to a succession of justice ministers, Ronald Basford, Otto Lang, and Marc Lalonde. When the Liberals lost the May 1979 national elections, Phelps returned to Winnipeg where he worked for the Canadian Grain Commission. Nine months after being booted out, the Liberals were back in power, Marc Lalonde, now energy minister, was planning the controversial National Energy Program, and he wanted Mike Phelps back as his executive assistant. Phelps, however, wanted more than the maximum $35,000 cap for executive assistants. Petro-Canada’s Bill Hopper solved the problem. He hired Phelps on Petro-Canada’s payroll. Petro-Canada topped Phelps’ salary to an acceptable amount, gave him a five-year, interest-free loan and a third mortgage to help him buy a suitable house in Ottawa’s nabob Rockcliffe Park, and then seconded him for a two-year period to work as Lalonde’s special assistant. The arrangement raised eyebrows in Ottawa and among oil executives, and there were muttered suggestions of a conflict of interest.40

When his two-year stint with Lalonde was over, Hopper introduced Phelps to Westcoast, where he was hired as vice-president in charge of strategic planning, and plucked as president in 1988 after John Anderson’s untimely death. Phelps brought impressive assets to Westcoast: talent, energy, ambition, flawless bilingualism, and, most importantly, his powerful connections. “I work very hard at my friendships,” he told establishment writer Peter Newman. “I prefer to do business with friends.”41

Westcoast’s assets grew about 30-fold — from roughly half a billion dollars to $15 billion — from the time Phelps joined the company in 1983

until it was sold 18 years later. Some of the big acquisitions and projects included $1 billion to acquire the gas utility business of Intercity Gas in northern Alberta and Manitoba; purchase of the century-old Union Gas, with gas customers from the outskirts of Toronto to Windsor; $429 million for almost a quarter interest in the 2,228-mile Alliance gas line from Fort St. John to Chicago; half a billion dollars for a pipeline that brought gas across the Straits of Georgia to Vancouver Island; a 37.5-percent stake in the $2-billion pipeline that moves gas from fields offshore from Nova Scotia across that province and New Brunswick to Boston; and half a billion dollars for a Mexican project to produce nitrogen and pump it down a big offshore oil field in the Gulf of Mexico to increase recoverable reserves.

While assets grew 30-fold, the value of Westcoast shares during the same period increased little more than two-fold, hardly a spectacular rate of growth for an 18-year period. Most of the assets had been bought with or financed by the sale of shares, rather than by earnings. Westcoast had fewer than five million shares outstanding when it completed its initial public financing in 1956 and more than 129 million when the company was sold in 2001.

Charlotte, North Carolina, Tuesday, September 11, 2001, head office of Duke Energy Corp. CEO Richard Priory is huddled with other top executives for a last-minute review of a bid to buy Westcoast Energy when a secretary slips him a note: an aircraft has just slammed into New York's World Trade Centre. The meeting stops as the executives watch the horror scenes on television, and the company scrambles to place its nuclear power plants on high alert. When they later reconvene, one of the first questions facing Priory and his executives was whether or not, in view of a world scrambled by the terrorist attacks, to proceed with the Westcoast bid, which had been two years in the making. They decide to proceed. Ten days later, the offer was jointly announced by Duke and Westcoast. The price was more than $13 billion, half in cash and half in Duke Energy shares.

The merger was hailed by Peter Newman in a commissioned history of Westcoast Energy's recent decades as "the deal of a life time," in which "Duke Energy Ltd. [sic] emerged as the largest and strongest energy transmission, power generation and energy services company on the continent" and "the only member of its class with pipeline and power assets across the continent, including an inside track on future pipelines and gas storage needed to bring Alaska's North Slope gas to markets."

But by the time the acquisition was completed, six months after the announcement, Duke Energy was in such serious trouble that it would be forced to sell some US$4 billion in assets, including its newly acquired

cross-continent pipeline interest and its inside track on the future movement of Alaskan gas. Part of the trouble came from energy trading, the activity that played a big role in the corporate scandal and bankruptcy of Enron Corporation. Duke's energy-trading sins amounted to penny-ante stuff compared with Enron, but it had to cough up a $28-million penalty to settle U.S. government charges of "round tripping," selling power to wholesale buyers then buying it back at the same price to create an illusion of greater market demand, thereby boosting prices. The State of California launched claims against Duke and four other big power producers seeking refunds of $9 billion for alleged overcharges for electricity during the state's 2000-2001 energy crisis.

The biggest blow came from all the gas-fired power plants that Duke and others rushed to build for the unregulated wholesale power market at a time when producers acted as if there were no limits to demand or prices in sight. Duke wound up with enough capacity at its nuclear, hydro, coal and gas-fired plants to power 20 million homes. But prices collapsed in the face of an economic slump and excess capacity. Duke's salvation, ironically, appeared to be its large presence in the staid and scorned regulated electric power sector where prices and profits are, if not spectacular, at least assured.

This was the upshot: Duke's credit was crunched; its share prices fell by two-thirds; its profits collapsed from $1.8 billion in 2001 to a loss of $1.3 billion in 2003; the energy-trading business was shut down; Priory was replaced as CEO by a former president, Paul Anderson, a corporate turnaround specialist who had just finished resuscitating Australia's largest company, Broken Hill Proprietary; and major assets were up for sale. In March 2003, Duke's cross-continent pipeline link, its quarter interest in Alliance's Fort St. John-to-Chicago line was bought by Enbridge and Fort Chicago Energy Partners for $406 million, boosting the combined ownership of the two Calgary firms to 50 percent. Five months later, TransCanada PipeLines paid $259 million to buy Duke's stake in Foothills Pipelines with its inside track for the movement of Alaskan gas and its inverted Y-shaped system that meanwhile delivers Alberta gas to connecting U.S. lines that extend to San Francisco and the U.S. Midwest.

Westcoast Energy, nÈe Westcoast Transmission, was no more. What had been hailed as two of its most promising assets were gone. What was left was a cog in a financially recovering U.S. energy conglomerate.

The final obituary belongs to Frank McMahon, who died at his Bermuda estate in 1986, 16 years after he had retired as a chairman, CEO and a director of Westcoast. He had gambled on wildcatting, pipelining, whisky-making, pipe-making (a mill in Edmonton), horse

racing and Broadway musicals (backing smash hits including Pajama Game, Damn Yankees, West Side Story, and Plain and Fancy). His vision, tenacity, and daring had founded two great enterprises. He worked hard, played hard, drank hard, lived lavishly with homes and apartments in Vancouver, Palm Beach, Palm Springs, New York, Mexico, and Bermuda. The fortune he left behind fell far short of founding a dynasty.

Chapter 15. The Great Pipeline Debate and Trans-Canada

However questionable may have the methods and tactics which the Liberals used to ram their pipeline bill through Parliament, subsequent events vindicated C.D. Howe's decision to back the Trans-Canada Pipe Lines project.

Not since the founding of the Canadian Pacific Railway nearly a century before had Canada seen such a political maelstrom involving a private corporation as that which centred on the founding of Trans-Canada Pipe Lines Ltd. in the 1950s. It reached its climax in the most bitter, tumultuous political debate that has ever rocked the Parliament of Canada, and left in its wake shattered careers and broken lives. Shouts, jeers, angry insults, desk thumping, and rowdy singing reverberated throughout the House of Commons. Parliament was likened to the Reichstag in the days of Hitler's Nazi Germany. Men who had been elected to lead the nation and settle national policy by reasoned debate, grew white with rage and shook clenched fists. So impassioned were the feelings that some men fainted, others were left fatigued and in broken health, and one member of Parliament died of a heart attack. Never had Parliamentary democracy in Canada been so severely tested.

There were charges that the government of the day sought to use public funds for the benefit of U.S. corporate interests; of a "sell-out" of Canadian interests to Texas oil "buccaneers;" that Canadians would lose control of their own resources; that the gas reserves would be exploited for American use and benefit. The government was accused of denying the rights of Parliament. The opposition parties were accused of thwarting the will of the majority and obstructing development vital to the national welfare in order to impose their own will and gain political advantage.

There was an air of unreality about it all. Men of sincere convictions and possessing a common purpose and motivation to serve the interests of their country, instead of working to their common goals, found

themselves seething with rage at each other. Facts became distorted. They went further than they wanted. They were in a labyrinth with no way out, and every step led deeper into the pit.

Half a century later, it is almost difficult to discern what the Great Pipeline Debate was all about. All the participants wanted the same things. They wanted development of the shut-in natural gas resources in Western Canada; they wanted Canadian control of its transportation of this gas; they wanted to ensure that the gas would be available first to serve Canadian requirements; they wanted Canadian ownership of Trans-Canada Pipe Lines. And that is what was achieved.

The leading players in this drama were Clarence Decatur Howe, Nathan Eldon Tanner, and Clinton W. Murchison.

Howe was a self-made millionaire by age 39 when in 1935 he left business for a 23-year career as a federal cabinet minister. His engineering firm had built $100 million worth of prairie grain elevators, bridges, docks, and factories. It had designed the great wheat terminals that line the waterfront at Buenos Aires. As cabinet minister, his efforts were equally successful in helping build Canada, leading both the wartime and post-war industrial development that transformed the economy. He looked on the challenge of championing a gas pipeline to Montreal as the climax of his career, and he was impatient and short-tempered with anything or anyone that stood in the way. In a rare moment of public self-analysis during the heat of the pipeline debate, Howe confessed:

> Perhaps I get over-enthusiastic about a project. I have been working on sizable projects all my life, and somehow I reach a point in the development when I think a project is important; and if it is a serious enough project, I begin to think it is the most important thing in the world, and it does seem to me that it is important that we do not lose a year in the undertaking of this pipeline.

Eldon Tanner, too, had achieved stunning success during the 18 years he managed Alberta's petroleum resources as minister of mines. The Manning government implemented the world's best set of petroleum conservation regulations, attracted investment capital like a magnet, captured the lion's share of oil riches for the province, and transformed Alberta from Canada's most impoverished and debt-ridden province to its most prosperous. Never before had so much money flowed so quickly into government coffers without a whiff of scandal or malfeasance. Having helped make millions for the Alberta government, Tanner set out late in 1952 to accumulate his own fortune, leaving the Alberta

government to head Merrill Petroleums, a new independent oil company backed by the world's largest investment firm, Merrill, Lynch, Pierce, Fenner and Beane. He would soon be called on to see the Trans-Canada pipeline through to completion.

Clint Murchison was the prototypical Texas oil wheeler-dealer, from the tiny town of Athens. Spreading his oil money into everything from newspapers to candy companies, Murchison amassed a fortune of more than $350 million, when a million dollars was still a lot of money. His most ambitious effort was to build the world's longest natural gas pipeline, from Alberta to Montreal.

A stocky, gregarious man, afire with energy and ideas, Murchison was described as "a natural-born horse trader" by his friends. "It's a challenge," Murchison is quoted as having said. "And if you trade in peanuts, you can trade in watermelons, too. We buy anything that adds up."

Many things added up for Murchison, and by the late '50s he had important holdings in some 50 companies embracing oil and gas production, pipelines, an airline, banks, motels, drive-in theatres, a publishing house, a railway, insurance companies, a candy company, a steamship company, several bus and taxi firms, a supermarket chain, and several manufacturing firms. Many of these he controlled.

Murchison made Dallas his headquarters and family home. For recreation and the entertainment of business and political associates, he had a 75,000-acre ranch in the Sierra Madre Mountains of Mexico where guests included the Duke and Duchess of Windsor and, on one occasion, C.D. Howe, much to Howe's later political embarrassment. It was in the late 1940s, well before Murchison had any interests in Canada. Howe, at the time minister of transport, and several other Canadians, were on a holiday tour as guests of American Airlines, and had stopped off for a couple of days at the Murchison ranch, "where we shot turkeys," as Howe later recalled. It was this brief association which years later led to insinuations that Howe, in attempting to push the Trans-Canada Pipe Lines project through Parliament, was simply trying to help his Texas oil friend, Clint Murchison.

Murchison had started in the oil business in 1916 trading oil and gas leases in West Texas, and did so well that he was able to sell out his holding in 1925 for a reported $5 million, and retire at a youthful age 30. He was soon bored with "retirement," and set out wildcatting. His first big strike found gas instead of oil. There was so little interest in natural gas in those days that most of the producers were flaring it off, as at Turner Valley, or dropping their gas leases to continue the search for oil.

Murchison had a habit of holding on to whatever he acquired, often waiting patiently for years until it assumed significance, and was often rewarded handsomely for his patience and foresight. He reckoned there would someday be a substantial market for natural gas, and not only held on to his strike, but aggressively searched for more gas. His principal company, Delhi Oil, eventually had gas-producing and gas pipeline operations that overshadowed the oil interests.

In the rush of American oil operators who moved north into Alberta following Imperial's Leduc discovery in 1947 came Murchison, forming Canadian Delhi Oil Ltd., initially as a wholly owned subsidiary of the U.S. firm. Murchison saw in Alberta an opportunity to duplicate his U.S. gas success. Where most companies were intent on the search for oil, Canadian Delhi focused its efforts on the search for natural gas on the plains of eastern Alberta. In less than three years, Canadian Delhi had drilled 12 wildcat prospects and made eight significant gas discoveries.

These discoveries provided the base for the most ambitious project Murchison had ever tackled, the $375-million natural gas pipeline from Alberta to Montreal.

If Murchison's plan was staggering in concept, it was also trimmed to the prevailing political winds. Canadian Delhi was not the first in the field for approval to pipe gas from Alberta when it filed an application before the Alberta Oil and Gas Conservation Board September 29, 1950, revealing plans for 1,800 miles of 30-inch pipe from Alberta to Toronto and a further 332 miles of 22-inch pipe from Toronto to Montreal. Its competitor, Western Pipe Lines, had actually been first in the field, with its proposed pipeline to Winnipeg and then south to cross the U.S. border at Emerson, to deliver gas to Northern Natural Gas Company of Omaha, Nebraska.

Political opposition to plans to move Alberta gas to U.S. markets without first fully serving Canadian markets had already been well established and loudly proclaimed in the House of Commons when members' bills to incorporate companies not committed to Canada-first pipeline routes met strong opposition. Western Pipe Lines had escaped this because it had been among the first five pipeline firms to be incorporated by Parliament on April 30, 1949, just 25 days after Parliament had passed the Pipe Lines Act providing for incorporation of such firms by special acts. The "Canada first" pipeline principal had not yet arisen. Western obtained its federal incorporation with almost no questions asked, and in 1950 was outlining its application to the Alberta board.

Western was backed principally by Osler, Hammond and Nanton Limited of Winnipeg, one of the oldest investment firms in Western

Canada, established in 1883. Osler, Hammond and Nanton had participated in building several regional railways in the West, and as a result held control of nearly three million acres of freehold mineral rights in the three prairie provinces. Primarily through two subsidiaries, the Calgary and Edmonton Corporation and Security Freehold Petroleums, it had spent several million dollars in the search for oil and gas in Western Canada, and held an overriding gross royalty interest in the big Pincher Creek gas field, discovered by Gulf Oil in the southern Alberta foothills. Other backers of Western were the Calgary and Edmonton gas utilities headed by Ray Milner, and two of Canada's largest investment dealers, Wood, Gundy and Company of Toronto and Nesbitt, Thomson and Company of Montreal.

Lionel D.M. Baxter, president of Osler, Hammond and Nanton, appeared before the Alberta board as Western's chief policy witness. He told the board: "I was asked over a year ago to look into the question of taking gas to Ontario and I could not be convinced that it was economically feasible to take a line across a thousand miles of rock and muskeg and make it pay at the other end."

But that is exactly what Clint Murchison proposed to do.

His vehicle was to be Trans-Canada Pipe Lines Limited. First reading of the private member's bill to incorporate Trans-Canada, then a wholly owned subsidiary of Canadian Delhi Oil, under the Pipe Lines Act, was introduced in the House of Commons on February 26, 1951. Frank A. Schultz, vice-president of Canadian Delhi, appeared before the Standing House Committee on Railways, Canals and Telegraph Lines to outline Trans-Canada's plan to move Alberta gas as far east as Montreal. Schultz told the committee:

> We had to be able to supply gas to the consuming areas at a price which they could afford to pay for it. Now we feel that we can supply this gas at a price which is cheaper than the corresponding charge for coal or oil.

The second consideration was that it should be an all-Canadian project, that it would be Canadian gas transported over an all-Canadian line, and that one hundred percent of the consumption would be in Canadian cities. It would be a project over which the Canadian government would have complete jurisdiction, both as to the projected line and, ultimately, as far as the prices which are realized are concerned.

The third consideration was that the project had to be economically feasible. . . . We are satisfied, at this stage, that the line is entirely feasible.1

When members of the committee suggested an amendment to Trans-Canada's charter to provide "that the main pipeline or lines, either for transmission or transportation of gas or oil, shall be located entirely within Canada," the backers of the project readily agreed. With this, Trans-Canada was quickly incorporated by special act of Parliament on March 21.

Murchison now had, on paper, a Canadian pipeline company. Where others had fought for as long as a year and a half to obtain incorporation, Trans-Canada had obtained it in less than one month. Murchison had gauged the political winds accurately. He had not, however, so accurately gauged the economics or financial sense of his bold project.

The first hurdle in implementing the Trans-Canada project was to obtain a permit from the Alberta government to export the required volumes of gas from the province. This took four years and cost millions of dollars for engineering studies, market surveys, contract negotiations, reserve estimates, and months of public hearings before the Alberta Oil and Gas Conservation Board. In the meantime, millions more were spent on exploration for gas reserves to be dedicated to the proposed pipeline. It was a straight gamble. If the bid succeeded, the investment could return generous profits; if it failed, the entire investment could be lost. Even when the first hurdle was cleared and Trans-Canada became the authorized vehicle to export Alberta gas to Eastern markets, success was still anything but assured.

The efforts of Trans-Canada and others to obtain Alberta export permits were rejected time and again, as the provincial government grimly withheld its authorization until it was completely convinced that there was enough gas to provide for Alberta's own requirements for at least the next 30 years, and still leave an exportable surplus. The chronology of principal events affecting Trans-Canada's bid was as follows:

September 29, 1950. Canadian Delhi Oil files formal application with the Conservation Board for a gas export permit to serve its proposed 2,300-mile pipeline to Montreal.

January 8, 1951. Opening of public hearings on Canadian Delhi's application postponed until May 7 at request of applicant, which was not yet ready to proceed.

January 20, 1951. Alberta Conservation Board report to the provincial government recommends rejection of all applications but suggests they might be reconsidered in the fall.

March 26, 1951. Trans-Canada Pipe Lines incorporated by special act of Parliament, takes over application filed by parent Canadian Delhi before Alberta board.

May 7, 1951. Public hearings on Trans-Canada's application open before the Alberta board, and last for three days before being deferred until September to be considered in consolidated hearing of all applicants.

September 10 to December 14, 1951. Consolidated hearings of all oil and gas export applications.

March 29, 1952. Conservation Board report to government recommends approval of gas export to British Columbia and U.S. West Coast markets by Westcoast Transmission, and deferral of all other applications. This left only two principal contenders in the running, Western Pipe Lines and Trans-Canada, with its "all-Canadian" scheme.

May 11 to September 21, 1953. More public hearings before Alberta board on renewed applications by Western and Trans-Canada. Western had amended its application to add "phase two," an extension of its proposed line to Eastern Canada, which it said would be built within three years after the line to Winnipeg and the U.S. markets had been completed.

November 24, 1953. Another report from the board again recommended rejection of both applications. This time the board found that although there was enough gas it was not satisfied with the economic feasibility of either project. It intimated that the price at which Western proposed to export gas to Northern Natural Gas Company for sale in Minnesota and North Dakota was too low, while the Trans-Canada project did not appear to be economically viable unless it had some export sales to add to its revenues and reduce the cost to the potential consumers in Ontario and Quebec.

There was one more team in this play, with an idea for a continental approach to energy supplies that in economic terms made the most sense, but was three decades ahead of its time. The team leaders were Okah Jones, head of Toronto's venerable Consumers' Gas Company, and Gardiner Symonds, head of Tennessee Gas Transmission. Jones wanted natural gas to replace Consumers' costly coal gas, and Louisiana looked like the closest available supply. Symonds liked the idea of pipelining it to Ontario. The basic idea was outlined by TGT's counsel during FPC hearings in 1953 on the Westcoast Transmission and Pacific Northwest Pipeline applications: "If Westcoast supplies the Pacific Northwest with Canadian gas, and Tennessee supplies Eastern Canada and Ontario with American gas, the two nations have, in effect, swapped reserves, the

advantages to each lying in the fact that its own market is supplied out of the nearest accessible and available reserves.2"

This is exactly the type of continental energy strategy that would emerge in the 1980s on the heels of energy deregulation and the North American Free Trade Agreement, but which was political anathema and a threat to an all-Canadian pipeline in the 1950s. It became an immediate and unexpected problem for Howe, when the FPC in August 1953 authorized TGT to export gas with a pipeline crossing of the Niagara River a short distance downstream from the Niagara Falls, where it would be picked up by a pipeline to Toronto to be built by Consumers' Gas. The problem was that while the government had legislation to control the export of gas, it had no legislation to curb the import of gas. Trans-Canada's lawyer Ross Tolmie suggested there might be a mechanism: the Navigable Waters Protection Act. Thus it was with shock and anger that Consumers' and TGT learned that the need to safeguard shipping where the Maid of the Mist that carries spray-soaked tourists to the foot of the falls is almost the only vessel in sight, precluded their pipeline permit. For a more formal means of controlling gas imports, Ottawa hastened to pass the 1955 Exportation of Power and Fluids and Gas Importation Act.

There was an ironic sequel. Eight months after denying TGT and Consumers', the Board of Transport Commissioners granted Trans-Canada a permit to build a 20-inch line from Niagara Falls to Toronto to deliver the Louisiana gas from TGT. But the conditions were different, and intended to help, not hinder the all-Canadian line. The link to Toronto would be owned by Trans-Canada but leased to Consumers' for three years, after which it was intended to be part of the Alberta-to-Montreal system. In the meantime, gas imports for this limited time would help build up the demand for the later arrival of Alberta gas.

While Trans-Canada and Western Pipe Lines did their public tango before the regulatory bodies in Calgary and Ottawa, behind the scenes there was intense political action intended to prevent the two fighting camps from knocking each other out of the ring. The Western Pipe Lines project was the preference of Alberta and the producers who held the gas: its market was closer, the producer prices would thus be higher, and its project looked feasible. Montreal was a long way off, it would yield lower prices at the wellhead, and Trans-Canada's line didn't look nearly as feasible.

But when it was clear that the political imperatives were not to be denied, Manning swung behind an idea urged by Howe: push the two contenders into a merger with a single project that might be doable. Writing to confirm what he had already told both Manning and Ontario

Premier Leslie Frost, Howe told Manning on January 2, 1953 that Ottawa "would not permit [gas] export unless prior provision is made for serving Ontario and Quebec." Then Howe added his idea of how this might be accomplished. "It seems to me," he wrote, "that there may be a plan which would carry both projects while consumption in Canada is being built up. This plan would combine the two projects into one."3

Manning followed up this lead by calling on Murchison and Alan Williamson of Wood Gundy for a meeting in Vancouver later that month to explore the possibility of a merger. When the parties failed to reach an agreement, Manning wrote to Williamson:

> We should not regard the breakdown in negotiations between your group and Trans-Canada as final, but that further efforts should be made to arrive at a mutually acceptable arrangement that will enable the interested parties to appear before Regulatory Boards concerned on behalf of one comprehensive joint project emphasizing the use of Canadian resources for Canadian people with export to the United States [a] secondary rather than the major consideration on which the project rests.4

In March, Howe made the all-Canadian policy abundantly clear in a statement in the House: "The policy of the Government of Canada is to refuse permits for moving natural gas by pipeline across an international boundary until such time as we are convinced that there can be no economic use, present or future, for that natural gas within Canada."5

The opposition parties were delighted. "It was almost like the return of the Prodigal Son to hear him saying these things," exclaimed the Conservative's J.M. Macdonnell. Bert Herridge said it vindicated the stand the CCF had taken four years earlier when "some people felt we were a bit dippy."

The amalgamation squeeze was kept up. In a letter in December to Prime Minister Louis St. Laurent, with similar letters the same day to the two applicants, Manning promised Alberta's speedy approval once a merger was achieved. "The immediate urgent step is to bring about a satisfactory amalgamation . . . to make possible the speedy completion of one sound overall economically feasible project," Manning told the prime minister. Given a merger, evidence of financeability, and "equitable prices to Alberta producers," Manning said he was "quite certain the Board will recommend to the government that a permit be issued and the government most certainly will approve such a recommendation."6

Next it was Howe's turn. He invited the two camps to meet with him in Ottawa where he could apply the screws. It was a bitterly cold day in

Ottawa, but hardly any colder than the relationships of the two groups of men who checked into the Chateau Laurier in early January, in response to the invitation — or command summons — from Howe. The Western Pipe Lines group included Ray Milner, Charles Gundy, and Alan Williamson of Wood Gundy, Deane Nesbitt of Nesbitt Thomson, and their experts. The Trans-Canada group included Murchison, his senior lieutenant, Frank Schultz, and John Fell of New York investment dealer Lehman Brothers.7

That morning the two groups met separately with C.D. Howe, who intimated that if they couldn't agree on a merger, the government itself might build the pipeline. They were given a deadline: 9 a.m. the next morning.

The two groups repaired to the hotel to plot their bargaining positions. Western wanted a 50-50 deal. Murchison wanted a 90-10 deal: his Canadian Delhi Oil to own 90 percent of any merged company. It was obvious the negotiations wouldn't be easy. Deane Nesbitt noted that they were marked by "considerable, and sometimes violent, argument."8 It was the investment dealers — Williamson, Nesbitt, and Fell — who finally hammered out a deal. It was 7 a.m. before Fell managed to persuade Murchison and Schultz to accept the deal and advise the Western people. It was just two hours before Howe's deadline. The deal was a 50-50 merger.9

The merger was announced in the House by Howe, who said in the discussions leading to the agreement he had acted "as an honest broker." Conservative Opposition leader George Drew greeted the plan with approval, expressing hope that "we might proceed as rapidly as possible to do anything that might be necessary to expedite this important venture. I would point out that we have already indicated our support of the general plan that is involved." That was just about the last word of support for the project that was to come from the opposition benches in the House.

Having effected the merger, the next step was to find a president for Trans-Canada Pipe Lines who would be acceptable to both groups of original backers, between whom no love had been lost during four years of intense competition before the Alberta board. Tanner was picked for the job, attracted from his position as president of Merrill Petroleums by a salary of $37,000 per year, plus an option to purchase a sizable block of Trans-Canada shares. The option could be highly valuable if the project succeeded; worthless if it failed. Tanner accepted the challenge and was appointed president of Trans-Canada Pipe Lines in March.

The hearing which followed a few weeks later was little more than a formality. On May 14, the Alberta government authorized Trans-Canada

to remove a total of 4.2 trillion cubic feet of natural gas from the province over a 25-year period. Approval by the federal Board of Transport Commissioners two months later, on July 26, to construct the proposed line, was also little more than a formality.

Trans-Canada now had all its required Canadian authorization from both the Alberta and federal governments. It still required financing that would amount to nearly $400 million, a new sales contract to export gas south of Winnipeg to Northern Natural Gas Company, and approval by the U.S. Federal Power Commission for Northern Natural to import the Canadian gas. Anyone who thought that Trans-Canada was at last off and running was soon rudely disappointed. Trans-Canada's real troubles had not even started.

Trans-Canada's authorizations from the federal and Alberta governments stipulated that financing was to be completed no later than the end of 1954 with construction to start early in 1955 with completion to Montreal in 1956. The difficulty was that neither sellers nor buyers wanted to contract with Trans-Canada which they figured couldn't be financed, and without those purchase and sales contracts it certainly couldn't.

Howe hoped to overcome the financing hurdle with a government deficiency guarantee that would backstop Trans-Canada's bonds. In a letter to Finance Minister Walter Harris he pointed out that "all pipe lines into new **END** markets" require such guarantees; Imperial had provided the guarantee for the Interprovincial oil line "but no sponsorship other than the Canadian government exists which can assume the type of responsibility for so large a project as Trans-Canada Pipe Lines."10 Howe's letter continued:

> In my opinion the government is committed to the hilt to seeing that natural gas is brought to Eastern Canada. I am convinced that a guarantee in any form will not cost the government anything, as my studies indicate that the line can be made self-sustaining after the first year of operation. I am also of the opinion that a transcontinental pipe line wholly within Canada is a national project that warrants government assistance, and that the project is comparable in importance to our transcontinental railways. In my opinion if the project is allowed to collapse, the use of Western gas in East Canada will be a dead issue for all time, and any natural gas used in Eastern Canada will be supplied from the United States with no real gain in the direction of a Canadian fuel policy.11

Harris, however, feared that any government guarantee would open the gates to all sorts of requests for financial help, and convinced his cabinet colleagues to deny Howe's request. Howe suffered one of his rare cabinet defeats, and Trans-Canada suffered its first financing setback.

An alternative possibility was a loan from the government's Industrial Development Bank, which led to 10 weeks of tough negotiations. The culmination of this came on Sunday evening, March 13, 1955, when the company's top five guns — Murchison, Tanner, Milner, Nesbitt, and Williamson — had assembled in Ottawa at the offices of the Bank of Canada to hear the final terms under which the bank's governor, James Coyne, was willing to offer help. The Industrial Development Bank was prepared to invest $5 million in TCPL shares and lend $60 million in the form of bonds that could later be converted into common shares. A public share offering was to raise $32 million while the remaining $245 million would be raised by the sale of first mortgage bonds. The shares that the sponsors had purchased to finance TCPL to date were to be placed in escrow until the line was completed. The hooker in the deal was Coyne's insistence that the bonds the bank proposed to buy must be convertible, at the bank's pleasure, into common shares. That could make the government Trans-Canada's largest shareholders. None of the pipeliners were happy with that provision, but it was a final take-it-or-leave deal, and there seemed no option but to take it.12

Another condition of the bank's help was the completion of the long-sought gas purchase contracts, and that's where things fell apart the very next day. The man who put the kibosh on things was Gulf Oil's head, William K. Whiteford. No stranger to the Canadian oil scene, Whiteford had been hired in 1935 by British American Oil, then Canada's second largest oil company, to head its U.S. production subsidiary, with oil wells in East Texas and Oklahoma. Seven years later Whitehall was moved to BA's head office in Toronto as executive vice-president and then president, despite the fact that BA founder Leroy Ellsworth "never wanted an American in charge of his Canadian company."13 In 1951, Whiteford had left BA and Toronto for Pittsburgh to join Gulf, first as executive vice-president and two years later as president, while Gulf slowly gobbled up BA.

Whiteford was in Vancouver on business and it was Monday afternoon before Williamson was able to track him down at his hotel. Whiteford had earlier indicated that Gulf was ready to sign up as soon as TC's financing could be assured, but when he learned about the hooker that Coyne had insisted on — the possibility of government ownership of Trans-Canada — Gulf's signature was adamantly denied. Gulf and other U.S. producers were already highly upset by the U.S. government over the FPC's price

controls of natural gas and wanted no part of a pipeline that might be controlled by the Government of Canada.

In a news release issued three days later, Trans-Canada announced that "it will be unable to make a start this year on construction" because it had "been unable to negotiate a type of financial assistance which does not result in an agency of the Government of Canada being in a position to control the company, and such an arrangement makes it impossible for the company to purchase its gas requirements."14

Alberta producers were never really happy with the all-Canadian route and the failure to secure financing in 1955 brought calls for a second look at the shorter route to Eastern Canada south of the Great Lakes and through the United States, which it was claimed could cut the cost by as much as $40 million. Alex Bailey, head of Bailey Selburn Oil and Gas and a former chairman of Alberta's Conservation Board, claimed that the failure would even prove beneficial, resulting in higher prices for producers and making it easier to secure sales contracts and financing.15

For Trans-Canada, however, it was just the first of many delays. Before it was finished, the financing deadline had to be extended five times: from December 31, 1954 to April 30, 1955; then to October 30, 1955; then to May 1, 1956; to November 1, 1956, and finally to March 31, 1957. In the end, financing of the $375-million cost of the initial system was secured only with the aid of $180 million — nearly half the total — in funds from the federal government. Construction did not start until the summer of 1956, with completion in the fall of 1958.

While the government insisted there could be no exports until Canadian buyers were served, and Canadian buyers declined to buy, Trans-Canada's first sales contract was, ironically, an export contract. Signed in October 1954, it was a contract to deliver gas at Emerson, on the Manitoba-North Dakota border south of Winnipeg, to Northern Natural Gas Company. This replaced the contract which Western Pipe Lines had previously held to deliver gas to Northern Natural. With the failure to secure financing in 1955, this contract also expired. Trans-Canada was back at square one: no adequate purchase contracts, no sales contracts, no financing. The company backers had spent $8 million on the project (excluding the $5-million line from Niagara to Toronto and exploration expenditures in Alberta) but seemed little further ahead than when they had started five years earlier.

The possibility of government assistance, however, was still alive, as indicated in an address by Tanner in Calgary in May. The Calgary Herald quoted Tanner: "C.D. Howe had told him to go ahead as rapidly as

possible, as the government wanted the line built in 1955. 'What help you need will be forthcoming,' he quoted Howe as saying."16

This proved to be most indiscreet on Tanner's part, since the government had continued to refuse information to Parliament on discussions with the company on the grounds that it might embarrass Trans-Canada in private negotiations. Tanner's statement raised demands in both the press and in the House for information on just what help the government had in mind for Trans-Canada.

Negotiations, meanwhile, were resumed for a new sales contract to supply markets in the U.S. Midwest, but this time the discussions were not limited to Northern Natural. Tennessee Gas Transmission Company, whose pipeline system moved gas from the southwest United States to markets in the northeast and Great Lakes regions, saw an opportunity to enter the U.S. Midwest market if a deal could be negotiated to buy gas from Trans-Canada. The contemplated arrangement also provided for additional short term U.S. gas supplies for the Ontario market, pending completion of the Trans-Canada line.

The major gas firms in the U.S. Midwest were not particularly pleased at the prospect of further competition in the general region they served. Three of these firms — Northern Natural of Omaha, Nebraska, People's Gas, Light and Coke Company of Chicago, and American Natural Gas Company of Detroit — combined to offer a proposal to Trans-Canada. The proposal was outlined in a letter July 21 from Northern Natural president John Merriman to Tanner, a copy of which was sent to Howe:

> Our three companies are the only ones who can either build a major pipeline all the way from the Winnipeg border to Eastern Canada for maximum volumes, or build piecemeal in small steps to handle maximum volumes. No one else can do this. We are prepared to extend to you and the Canadian authorities the full co-operation of our companies in working out the program of handling the gas supply question in the best possible manner for the public interest of our two countries.

The three-company combine must have been most encouraged by the response to this letter which Merriman received from the Canadian minister of trade and commerce. Wrote Howe:

> I had a talk with Mr. Tanner and some of his associates this morning and understand that he will have a discussion with you shortly. I am hopeful that a program can be worked out with you and your group that will make it unnecessary to deal with others

> proposing to serve your territory. I will let you know if there would be any purpose in your group coming to Ottawa for further discussions.

This "group," however, must have been pressing Trans-Canada for a favourable decision. On August 8, Tanner sent the following telegram to Merriman: "Am unable to advise more definitely at this time. Use your best judgment regarding proposed study. Eldon."

Three days later, on August 11, Trans-Canada signed a gas sales contract with Tennessee Gas Transmission, cutting out the Northern Natural group that Howe had encouraged. The TGT deal called for the delivery of 200 million cubic feet a day to TGT at Emerson, with an option to double this rate if and when additional gas became available. A subsidiary of TGT, Midwestern Gas Transmission, would build a 1,000-mile pipeline system from Emerson to take delivery of the gas. At the same time, the contract provided for TGT to deliver 90 million cubic feet of gas per day to Trans-Canada for use in Ontario until the Trans-Canada main line was completed.

On August 15, Tanner wired Merriman: "Further to my wire to you on August 8, Trans-Canada has executed a contract which meets its requirements." This telegram was not signed "Eldon" but "N. E. Tanner."

Although they had lost out in their negotiations with Trans-Canada, this was not the last to be heard of this group. Later they were to offer their plan to Frank McMahon, much to the embarrassment of Trans-Canada and C.D. Howe. And later yet, the group was to be indicted by a U.S. court under antitrust legislation.

Trans-Canada's next break came in October when, at long last, it was able to conclude a contract with Gulf for the purchase of gas from the Pincher Creek field at rates up to 170 million cubic feet per day. Combined with other purchases, Trans-Canada now had a gas supply of 315 million cubic feet daily, two-thirds of its initial requirements. "This has broken the back of the supply problem," noted Oilweek.17

The back of the financing problem was still to be broken. It was the all-Canadian pipeline policy — endorsed not only by the government but also by the opposition parties and the province of Ontario — which obviously presented the stumbling block. By requiring the longer, more costly route through northern Ontario, this policy so impaired the economics of the project that it could not be financed. A study for the Ontario government by chartered accountants Clarkson, Gordon & Co., confirmed that there was little chance that Trans-Canada would ever be able to finance this all-Canadian line without substantial assistance. Yet Ontario was unwilling to consider any alternate route. "A pipeline

running through Northern Ontario would make a very desirable form of fuel and source of power available which would be of the utmost assistance in development of our natural resources and our industry," a provincial government press statement noted. "For all of Ontario it would supplement power resources and for the whole nation would contribute to our economic self-sufficiency. From the Canadian standpoint, therefore, the reasons for an all-Canadian pipeline are unassailable. It is a prime national necessity."18 The statement also recognized that "the span across Northern Ontario presents an added difficulty, which means that the line could become self-sustaining only after a number of years."

What if "the span across Northern Ontario" were to be built by government? This would eliminate the handicap which appeared to be preventing financing (a handicap, however, which Trans-Canada had at the start imposed upon itself in order to win authorization). Howe and Ontario Premier Leslie Frost discussed how the two governments might join forces to build this section of the line. The results were announced in a government statement November 21.19

Howe announced that he would ask Parliament to approve the incorporation of a Crown company, Northern Ontario Pipe Line Corporation. The Crown firm would build the 675-mile section of the line from the Manitoba-Ontario border to Kapuskasing, at an estimated cost of $118 million. The Ontario government would contribute up to $35 million of this, and the federal government would contribute the balance (in the end, the federal government provided the entire financing). The line would be leased to Trans-Canada under a rental formula which would cover the cost to the governments and provide some return on its investment. Trans-Canada would undertake to purchase the section of the line from the Crown company (at cost, plus interest) as soon as it could. Trans-Canada would have until May 1, 1956, to secure the financing for the construction of the balance of its system.

"What the Canadian government is here providing is essentially a bridge in time," Howe commented.20 The Ontario government cautiously observed that Trans-Canada still had problems. "The participation of the federal-provincial partnership, however, is predicated upon the solution of these difficulties," the Ontario statement said. "If these difficulties are not resolved, a new approach will be necessary to make this project a reality, as we believe it must be."21

Trans-Canada gained further support for its project with the sale of 51-percent interest in the company to Tennessee Gas Transmission, Gulf, and Hudson's Bay Oil and Gas, leaving Canadian Delhi and the original sponsors of Western Pipe Lines with the remaining 49 percent. (Ownership was to change further with the completion of public

financing, and change even more as control, over the years, passed through a succession of hands.)

In Washington, hearings before the U.S. Federal Power Commission on the application by Tennessee Gas to import the gas from Trans-Canada were proceeding on schedule (which meant not very fast), despite the determined opposition of Northern Natural and others.

In Calgary, Oilweek asked Howe if he thought the bill providing the financing of the line would be passed by Parliament. Howe's reply: "If they don't ratify it there will be new governments in Ottawa and Ontario."22

On March 15, 1956, Howe rose in the House to introduce his first resolution to create the Northern Ontario Pipe Line Corporation.23 In a masterful presentation, Howe outlined this great undertaking in glowing terms that would swell the heart of every Canadian with national pride. It was a gigantic undertaking, involving $375 million for construction of the pipeline; $250 million for drilling more gas wells, for processing plants and gathering lines in Alberta; and additional large sums for customer distribution lines in urban centres from Saskatchewan to Quebec, and the manufacture and installation of gas appliances. Altogether, more than a billion dollars would be pumped into the Canadian economy.

There were problems, too. "Once again, as in the days of railway building, the difficult and sparsely populated pre-Cambrian shield appeared to present an almost insuperable barrier to economic transportation between Western and Central Canada," Howe told the House. "Once again, this special problem of Canadian geography has called forth a unique solution."24

Yet Howe had his worries. The agreement with Trans-Canada had been signed on November 21, four months previously. It called upon Trans-Canada to complete its financing arrangements by May 1. There were only six weeks left, and little indication that Trans-Canada had been able to make any progress.

"It has now become clearly improbable that Trans-Canada will be able to complete its financing arrangements by May l," Howe admitted. "Officers of the company expect, however, to arrange and carry out a substantial amount of construction this year under interim financing."

Howe forgot to mention that the "interim financing" with which Trans-Canada would carry out its 1956 construction would also come from the government. Parliament was to be asked not only to provide $118 million for the northern Ontario line, but also to lend Trans-Canada up to $80 million to help finance the balance of the system.

Howe had just completed the staging for the Great Pipeline Debate.

John Diefenbaker, the firebrand Conservative from Prince Albert, Saskatchewan, who later became prime minister, warned that the battle was coming. In a radio address he recalled the 11-day filibuster which the opposition parties had mounted the year before against extending Howe's sweeping powers under the Defence Production Act, and which caused the government to backtrack. "The fight we put on then will appear but a skirmish beside the battle we will wage" when the Trans-Canada bill comes before the House, Diefenbaker declared. And the CCF's Hazen Argue, in an interview, warned that his party would filibuster the bill to the finish.

The Liberals knew at the outset that they had a fight on their hands, and they were in a hurry to get the bill through. Delay would have at least postponed construction of the gas line for a full year. After so many delays, one more might wreck the entire project. Howe knew that there was no time to be lost if construction was to start in 1956; if the entire Trans-Canada project was not to be scrapped; if the hopes for a national gas line system were not to be dependent on the prospects of an entirely new venture, starting out all over again from the position Trans-Canada had started from six years before. In their urgent rush, and faced with a determined opposition, the Liberals rammed their bill through. It was exactly this manner in which the bill was rushed through Parliament that became the central factor in the Great Pipeline Debate.

Howe had no sooner introduced the resolution on March 15, than the position of the Conservative and CCF parties was made clear. "We are being asked to set up a Crown corporation which will use public funds to assist financial interests in establishing effective control over one of our major resources," George Drew declared. "A proposal of this kind should be laughed out of the house." CCF leader M.J. Coldwell described it as "a proposition which will send the bulk of the gas to the United States via Emerson and transport the rest through a spur line to Eastern Canada; via a spur line, let it be said, which Canada and Ontario are going to build with public funds for a company under foreign control."25

Business proceeds through Parliament by fits and starts. Legislation is brought before the House and set over for weeks or even months before advancing to the next stage, while Parliament turns its attention to other matters. Thus it was nearly two months from the time that Howe introduced his first resolution on the Northern Ontario Pipe Line Corporation, until it came before the House again. Meanwhile, there were other developments in the affairs of Trans-Canada, both behind the scenes and before the House.

There was the offer of Frank McMahon to build an all-Canadian gas line from Alberta to Montreal without any government assistance, save

for the remission of import duty and sales tax on materials to be used in construction of the line.26 It was a “secret” offer, which everyone knew about; an offer which Howe denied had ever been made to the government, an offer which was abruptly withdrawn the day on which it eventually was disclosed in the House; an offer which later involved McMahon in antitrust action in the United States.

March 27 marked the start of the case which could be called “the offer that never was.” That was the day on which McMahon met with the minister of trade and commerce to express serious misgivings about the ability of Trans-Canada Pipe Lines to complete its project, and to suggest an alternate proposal which, McMahon said, he could effect without any government assistance. McMahon left with Howe an outline of his proposal marked “private and confidential” and followed this up with further “private and confidential” letters and memoranda to Howe dated April 4, 13, 16, and 24.

In his memorandum to Howe dated April 4, McMahon wrote:

> I will finance and construct an economically feasible pipeline in Alberta to Montreal and complete the same by 1958 without federal or provincial ownership or debt guarantee. . . . I will place sufficient equity money and arrange for interim loans to permit the construction of the 34-inch pipeline from the closest gas fields in Alberta to Winnipeg to supply gas to Saskatchewan and Manitoba by late 1956 or early 1957.

McMahon said that his proposed pipeline would be at least 70-percent Canadian-owned and that it would be financed without government ownership or debt guarantee. He claimed that Trans-Canada was “dominated by Tennessee Gas Transmission,” and “proposed an uneconomic plan to favour Tennessee Gas to the detriment of Canada and at the same time requests the governments of Canada and Ontario to subsidize the $122-million pipeline ‘bridge’ across Northern Ontario in order to make it possible to put the proposal into effect.”

Finally, McMahon disclosed that his proposed line would export gas at Emerson at a rate of 400 million cubic feet per day to Northern Natural Gas Company, American Natural Gas Company, and People’s Gas, Light and Coke Company. “These companies are in a position to pay the best price for surplus Canadian gas to supplement their supplies,” McMahon said, since their existing facilities obviated the need to build new, unnecessary lines in the U.S. region. “The best market for Canadian gas in the United States as well as the most logical one is the existing

pipeline companies and distributing utilities in the great plains-Midwest area."

Somehow, the McMahon offer didn't stay "private and confidential" very long. Almost complete details of the proposal were outlined in the Financial Post on April 4, just eight days after McMahon's visit to Howe.

There were, of course, some questions in the House. On April 13, Diefenbaker asked Howe if he would table offers made by Gairdner and Company, a Toronto investment firm, and by Frank McMahon, for alternatives to the Trans-Canada project. Howe said he would table the Gairdner documents but that he had received no documents from McMahon. (The Gairdner documents were tabled, and that was the last that was ever heard of them. The plan under which Gairdner hoped to scoop up the pipeline, after Trans-Canada's sponsors had spent some $8 million, was clearly not feasible, and even the opposition parties gave it no serious consideration.) Diefenbaker made a second attempt on April 16 and again Howe replied that there were no McMahon documents; and a third attempt on April 25, asking for copies of "any memoranda taken or made since March 25th . . . of any discussion or discussions with Mr. Frank McMahon . . . relative to any offer to construct a gas pipeline between the Alberta-Saskatchewan border and Eastern Canada." Howe retorted that "when it comes to tabling memoranda of talks with persons or telephone conversations, I must take exception."27 Diefenbaker again pressed the question on May 2, asking both Prime Minister St. Laurent and then Howe if they had received a proposal from McMahon. Howe weakened this time, replying that he had "received no letter that I am free to table in this House." On being pressured, he added that "if I have received a letter it is marked personal and confidential and that being the case I am not prepared to do anything about it."28

The following day, Howe announced in the House that he had been in touch with McMahon by telephone and that McMahon had "agreed to allow me to remove the 'private and confidential' from his letters." This being the case, Howe said he was tabling all the McMahon correspondence. By this time, however, the offer was academic. Within an hour of the telephone conversation, McMahon had wired Howe withdrawing his offer to build the pipeline.

The Opposition parties, led by Diefenbaker, moved in to nail Howe, charging him with having misled the House. Howe's defence was that he had no documents or offers to the government from McMahon since he considered that letters to him marked "private and confidential" were neither offers to the government, nor documents. Howe's argument may have been somewhat strained, but he stuck to it, severely criticized, both in the House and in the press.

Mrs. Ann Shipley, the Liberal member for Temiskaming, was one of the few to rise to Howe's support over the McMahon correspondence:

> There is something rather peculiar about that proposal. Here is correspondence, marked personal and confidential, in the hands of our minister concerned. But what happens in the meantime? Members of the opposition obviously have complete copies of that document. The newspapers in Canada obviously have full copies of that information. There is something peculiar about that. When it became evident that the confidential information had been given freely to everyone else, our minister said it must be released. What happened? Within five minutes the offer was withdrawn . . . it seems extremely peculiar to me.29

Whether Howe's argument that it would have been a breach of trust to acknowledge the proposal, was his real motivation in declaring that there were no McMahon "documents" to table, or whether he simply wanted to keep the proposal hidden, may always be a matter of conjecture. There were compelling reasons why Howe may not have given McMahon's offer serious consideration. Only Trans-Canada had the necessary government authorizations from both Alberta and Canada, purchase contracts from the producers, sales contracts with the utility customers, a U.S. export customer with a pending application well-advanced before the U.S. Federal Power Commission, a supply of pipe under contract at a time when there was a severe shortage, and detailed engineering work completed. McMahon had none of these. To obtain them would have taken at least a year, and possibly two years, if he could obtain them at all. The government of Ontario had concluded that there were no alternatives to the Trans-Canada project which could be put into effect without great delay.

Before McMahon's proposal had run its course, Howe was confronted with the next problem in the saga of Trans-Canada Pipe Lines. Once again there was speculation in the newspapers, this time to the effect that the government was planning to lend $70 million or more to Trans-Canada. On May 1, Diefenbaker asked the prime minister if there was any truth in these reports, "and on what constitutional basis such an arrangement could be made without legislative authority of Parliament." Prime Minister St. Laurent replied that no such arrangements could be made without Parliamentary authority, and that when there was anything of substance to communicate, Parliament would hear of it from the government. Hon. Earl Rowe demanded: "Is the report in the paper true, or not?" The prime minister replied: "I am not going to say anything

one way or the other to encourage such speculation in the newspapers."30

Speculation or not, the newspapers had the correct story. Despite the fact that the government had undertaken to build the $118-million "bridge" across northern Ontario, Trans-Canada had still not been able to raise the interim financing with which to pay for that year's construction from Alberta at least as far east as Winnipeg. The problem was the slow progress which Tennessee Gas was encountering in its application before the U.S. authorities to import gas from Trans-Canada at Emerson. Without this sales outlet, the money markets were reluctant to advance the funds.

Howe's solution was to have the proposed Northern Ontario Pipe Line Crown corporation advance a loan to Trans-Canada of up to $80 million or 90 percent of the construction cost. The loan was to be repayable in less than a year. The Crown corporation would not complete construction of its segment of the line in Ontario until 1957, and by that time Trans-Canada would have paid back the $80 million. In this manner, assuming all went well, the Crown corporation would not require more funds than had originally been anticipated, but Parliament's approval to make the loan would still be required. If Trans-Canada failed to complete the line as far as Winnipeg by the end of 1956, or to repay the loan by March 31, 1957, the government would take over the entire project, lock, stock, and compressor stations. Trans-Canada's backers, in that event, would be completely out of the picture, and out of pocket to the extent of perhaps $20 million.

Howe disclosed his plan in a statement immediately after the opening of Parliament on May 8. He then tabled a resolution concerning the incorporation of the Crown company. It was couched in "somewhat broader terms" than that of March 15, to provide the authority for the Crown corporation to advance the money to Trans-Canada under the terms just outlined. In its haste, the government had made a minor slip, upon which the opposition was quick to pounce. The CCF and Conservatives argued that the amended resolution was in fact a new resolution which duplicated the earlier one introduced by Howe on March 16, and that the earlier resolution must be acted upon first. The result was a fight over procedures which lasted a week, a delaying action which everyone had recognized as such. The filibuster had started.

A prolonged filibuster could thwart the planned 1956 construction program on the Trans-Canada line. Howe and the government of Canada felt it urgent that construction get underway that year, and the Alberta, Manitoba, and Ontario governments felt the same way. Alberta Premier Ernest Manning had written to the prime minister to express concern

"over the serious threat to the whole national gas development and gas utilization program occasioned by the repeated frustrations and delays that have attended the proposed Trans-Canada pipeline project . . . any further delay in commencing at least the western portion of the line may well prove disastrous to the entire project." Manitoba Premier Douglas Campbell, in a letter to the prime minister, had declared that "it is imperative that construction of the pipeline between Alberta and Winnipeg be completed this year." Ontario Provincial Treasurer Dana Porter, writing to Howe, claimed that "further delays in the construction of this project would have very adverse consequences. Time has become of the essence. Every day's delay invites the most serious consequences to the development of Ontario, and to the national economy. In these circumstances, it would appear essential that the western section of the line be completed during the year 1956."31

To complete the line to Winnipeg in 1956, Trans-Canada had said that it would need to start construction not later than July 1. In order to get construction actually started by that date, it would need to have the proposals which Howe had before Parliament completed and approved by June 7. It was mid-May. That left three weeks in which to have the act incorporating the Northern Ontario Pipe Line Corporation cleared through the House. Social Credit, with its Alberta members, was the only party which supported the government's proposal. The Conservatives and CCF were determined to do all in their power to delay passage of the act. These were the circumstances under which the Liberal government used the most extraordinary measures ever employed in the House of Commons to ram its legislation through in the shortest possible time and with the least possible debate.

It was 3 p.m. on May 15 and the clerk of the House had just completed reading a resolution providing for the creation of the Northern Ontario Pipe Line Corporation with power to lend up to $80 million to Trans-Canada Pipe Lines. C.D. Howe rose to move "that at this sitting of the committee of the whole on the resolution respecting the constitution of a corporation to be known as Northern Ontario Pipe Line Corporation, the further consideration of the said resolution shall be the first business of the committee and that the consideration of the same shall not be further postponed."32

In the history of Canada's Parliament, closure, a device for limiting the time that may be spent on debate of a measure, had previously been invoked to secure the passage of only seven measures. Never before had closure been invoked before debate had even started. In the three weeks of the pipeline debate, the bill was carried under closure through all four stages: resolution, second reading, committee, and third reading. Never

before had this occurred. In the committee stage, closure was applied to each separate clause of the bill, another unheard-of practice. In addition to use of closure on an unprecedented scale, there were repeated incidents of what one observer has charitably called “strained interpretation of the rules,” which seriously imputed the position of the Speaker of the House whose primary responsibility is the correct and impartial application of the Parliamentary rules.

“As a result of the use of closure at every stage, the virtual circumvention of the committee stage, and the strained interpretation of the rules by the Chair,” noted H.G. Thorburn in The Canadian Journal of Economics and Political Science, “the bill was passed by the government’s declared deadline of June 7; and it was passed in exactly the form in which the government had brought it down.”33 Debate on the bill occupied 16 days, much of which time was spent in debate upon procedural matters rather than upon the measure itself.

Howe’s motion meant that each member would be allowed no more than 20 minutes of debate time during the resolution stage, that the debate would have to terminate at 1 a.m. and that the vote on the resolution would have to be taken at that time.

Conservative and CCF members greeted Howe’s motion with cries of “shame,” “the club,” and “the guillotine.” Stanley Knowles declared that by the government action “this free and independent Parliament of a sovereign nation is bound by a commitment that the government of this country had made to a private company.” Another CCF member, Alistair Stewart of Winnipeg North, called the scheme “a Colombo plan for Texas Tycoons.” Donald Fleming, the Conservative member for Toronto-Eglinton, claimed that “the House of Commons has been gagged and fettered in this debate by a despotic government. This is indeed a black day in Canadian Parliamentary history.”34

Only the Social Credit party stood in solid support of the government. “Both the Conservatives and the CCF served warning before this measure ever came on the floor of the House that they were going to filibuster and completely destroy it if they possibly could,” said Solon Low. “Now . . . let nobody say the Conservatives and CCF did not bring what has happened upon themselves.” So staunch was the Social Credit support that the Reverend E.G. Hansell was moved to assert that anyone who voted against the bill was following the “communist line.”

The most important development of the day was a speech by Calgary Conservative member Carl Nickle in which he announced that he was going to break with his party and vote for the government measure, “not because I believe it to be the best solution but because the only other politically possible alternatives to it would involve more long delays,

higher cost, a further denial of industrial and population growth, particularly in Western Canada, and a far heavier burden upon the whole Canadian economy than the present plan."

As early as 1953 he had taken public issue with the all-Canadian route policy, endorsed not only by the Conservatives but also the Liberals and CCF. Now, however, the all-Canadian line was at least preferable to further delay.

The closure motion may have reduced the time available for debate, but did not preclude the Conservative and CCF members from rising with as many points of order as they could find. Each point of order was defeated by Liberal and Social Credit members, but the process took time. The House sat throughout the night of May 16 and into the dawn of the next day. By the time first reading on Howe's bill had passed, it was 4:42 a.m.

Second reading of the bill was moved by Howe May 17, but following limited debate and further procedural delays, it was not passed until 3:17 a.m., May 22, after Liberal House Leader Walter Harris had moved the closure motion again.

The following afternoon the House went into committee, the stage at which a bill, having been approved in principal although not in detail, is normally debated and voted on clause by clause, with each member free to suggest specific amendments. Davie Fulton, Conservative member for Kamloops, moved an amendment to stipulate that the Crown corporation could not lend money to Trans-Canada "unless the majority of its issued shares were owned by Canadians." Speaker Rene Beaudoin, citing precedents and procedures, ruled Fulton's amendment out of order. Stanley Knowles then moved another amendment, framed to conform with the procedures which the Speaker had just outlined as proper. "How long am I going to act as if the minister of trade and commerce should not have his motion put forward from the chair?" the Speaker plaintively asked.35

Raising his voice to be heard over the government benches which tried to shout him down, CCF leader M.J. Coldwell demanded a ruling on Knowles' motion. "I am wondering whether we are in the old German Reichstag or the Canadian Parliament," cried an angry Coldwell.

The Speaker ruled against the motion, and his ruling was upheld by the Liberals and Social Crediters.

Speaker Beaudoin by this time was clearly seen in the eyes of the opposition parties to be acting in support of the government measure, rather than administering rules with impartiality as required under Parliamentary tradition. (Dr. Eugene Forsey, an eminent Parliamentary authority, later wrote: "What would anyone think of a hockey referee who

asked, 'How long am I to allow the visiting team to score goals? How many goals must I allow them to try before I let the home team have a chance?'"36) "I think the Speaker of the House is being placed in a most invidious position [by the government]," stated Alistair Stewart. Before the debate was over, the Speaker's position was to become far more strained.

On May 24, as soon as he was given the floor, Howe moved that further consideration of the first clause of the bill be postponed, an unprecedented closure-within-closure motion, which caught a breathless opposition by surprise and resulted in quick approval of the first clause. Attempts by Knowles, Diefenbaker, and Drew to block the same technique a second time failed, and the second clause was passed. "What is taking place now is the rape of our liberties," cried Davie Fulton.

Passage of the third clause took a little longer, as opposition members led by Knowles, the United Church minister and former printer who displayed a superb mastery of Parliamentary procedure, stepped up the questioning of the Speaker's rulings. Rulings, points of order, questions of privilege and appeals from rulings, piled one upon the other to turn the scene into one of confusion and delayed passage of the third clause for four days.

Tension and bitterness increased on May 25 when Donald Fleming defied the chairman and was expelled from the House for the balance of the day. The fight had been headlined across the country and there was standing room only in the public galleries on that Friday afternoon when Fleming, Howe, and others were on their feet, demanding that committee chairman William Robinson give them the floor. As he had previously, Robinson recognized only Howe, and allowed him to proceed with another closure motion.

Fleming remained on his feet, demanding the right to raise a question of privilege. "If you do not hear me now, Mr. Chairman, you are . . . making a farce out of these proceedings and destroying the usefulness of this House," Fleming warned. Repeatedly, Robinson directed Fleming to resume his seat. Fleming kept demanding that he be heard. "This is not any way to run a peanut stand, let alone Parliament," Fleming remarked with disgust.

Robinson summoned Mr. Speaker to report the incident. A white-faced, tight-lipped Walter Harris, as House Leader, had the duty of moving Fleming's suspension. It was exactly the dramatic incident that the Conservatives wanted. "I knew I was ending my own career," Harris is quoted later as having said.

Fleming walked slowly to the door. "Farewell, John Hampden," shouted Diefenbaker, referring to the British statesman who had fought

Parliament's battle against Charles I. Ellen Fairclough, Conservative member for Hamilton, draped the Union Jack over Fleming's desk. Fleming flew home to Toronto for the weekend, greeted at the airport by hundreds of his constituents who cheered him as a champion of freedom.

The fight continued in the House that night. Drew moved a motion of censure against Robinson. Diefenbaker called it the "sorriest day in Canada's history." Howard Green fainted in the Parliamentary dining room, the first of five MPs whose health was impaired by the strain and emotion of the debate and the long hours of sitting.

It was much the same through the following week. On Monday, Prime Minister St. Laurent announced that once the third clause had been passed, the government was prepared to allow debate on clauses four through seven during the remainder of the week. It was a sincere attempt to reach a compromise with the opposition and revert to normal Parliamentary procedure. The offer was angrily rejected. "Freedom which is granted only by way of sufferance is not really freedom," said Knowles, quoting to the prime minister the words of an earlier Liberal leader from Quebec, Lapointe, spoken in 1913.

Throughout most of the proceedings the prime minister had remained aloof, spending much of his time with a book. Distraught at the shambles which had been made of Parliamentary procedure, he had no liking for this particular battle, and he was accused by the Conservatives and CCF as having abdicated his leadership responsibilities. "Through all this hubbub, the most arresting figure on the government side of the House was Prime Minister St. Laurent," wrote Grant Dexter in the Winnipeg Free Press. "He sat, impassive, expressionless, chin on hand, an open book on his desk, silent. His aloofness is almost unbelievable. Especially at a time of high controversy, prime ministers, regardless of who the house leader may be, always dominate proceedings and lead their own party. Mr. St. Laurent does neither."

The afternoon of May 31 was one of the rare occasions when the prime minister did break from his aloofness. Final reading of the bill had not gone beyond clause three when St. Laurent rose to move closure on clauses one through seven. It was closure with a vengeance.

Progress on the bill was delayed that evening when Colin Cameron, the CCF member for Nanaimo, B.C., rose on a question of privilege, and set the stage for the dramatic climax of the debate which was to occur the following day. Cameron had read into the record two letters which had that day appeared in the Ottawa Journal. The first, from Eugene Forsey, complained of the partisan behaviour of the Speaker and declared that if the rules "are to be interpreted to allow only such

procedure, or so many motions, as the government sees fit to put up with, then we shall indeed have said farewell, a long farewell, to parliamentary government." The second letter, from a Marjorie LeLacheur, declared that the "debate in the house has long been a farce, with the cat-calls and jeers of the Liberals, and the systematic garroting of the opposition by Mr. Speaker, making a mockery of this democracy."

Cameron maintained that the letters represented an attack not only on the Speaker but on the dignity of Parliament (as though there was still much dignity left in Parliament) and demanded a debate on this question of privilege. Beaudoin, increasingly feeling the attacks on his position as Speaker, was also eager for a debate in order to have these charges resolved, once and for all. He not only ruled that he would allow the debate, but went so far as to guide Cameron as to how to properly bring the matter before the House.

The Liberals were aghast. A debate on this could last for weeks, completely destroying any hope of having the pipeline bill passed in time to meet Trans-Canada's construction schedule. Harris stated that the debate on this question of privilege should not be proceeded with until after the House had completed dealing with the pipeline bill. For once the Speaker ignored the government's position and declared that "if members care to debate this matter . . . I am not going to object."

When the sitting ended that evening, the Conservatives and CCF were overjoyed. They had set out to kill the pipeline bill by delay and filibuster. Now, against all odds, it seemed that victory was within their grasp. In the ranks of the Liberals, there was confusion and panic.

The following day, June 1, has been recorded in the press as "Black Friday" in the history of Canada's Parliament. As the House met, the Conservatives and CCFers were jubilant — until the Speaker smashed their mood in one of the strangest developments ever seen in Parliament.

Drew rose first to speak. He uttered two words: "Mr. Speaker." The Speaker rose and interrupted him. "I have read carefully the articles complained of," the Speaker announced:

> And I have come to the conclusion that because of the unprecedented circumstances surrounding this pipeline debate, and because of the remarks that were made in the House by the members themselves, it was and is impossible, if we are to consider freedom of the press as we should, to take these two articles as breaches of our privileges. Therefore I rule the motion made by the Honourable Member for Nanaimo out of order.

The Speaker summarily rejected demands to hear further discussion on the matter, and a vote was called on appeals to his ruling. Pandemonium broke out on both sides of the House. While the bells rang to summon the members for the vote, the back benches of the Liberal party exploded in noise. They banged desks, shouted, and sang several choruses of "Onward Christian Soldiers," "Hail, Hail the Gang's All Here," and "I've Been Working On the Pipeline."

Opposition members stormed into the centre aisles. Coldwell and Knowles advanced into the forbidden territory at the foot of the Speaker's dais, where Drew and others joined them. Coldwell shook a finger at the Speaker, others shook their fists.

"Why don't you throw away the Mace," roared a Conservative MP, referring to the Speaker's symbol of office. "What took place in the dark? demanded Earl Rowe, later lieutenant governor of Ontario. "We shall never know what sordid means were used to lure you from your path of duty," exclaimed George Pearkes to Beaudoin.

"I am prepared to take the responsibility before this House and the country for what I do," declared the Speaker. He then proceeded to advance a proposition which he admitted was "absolutely unprecedented." He stated:

> I consider — and I have thought very seriously about this — that yesterday around 5:15, when I was called back to the chair for the purpose of receiving the chairman's report, I made a very serious mistake in allowing the point of order and other dilatory motions; and I feel the House should not suffer any prejudice or detriment on my account . . . I intend at the moment to submit to the House that, in my view, the House should revert to the position where it was yesterday . . . at 5:15.

The effect of the Speaker's proposition was to wipe out all that had taken place in the House of Commons on the previous evening. It was still all recorded in Hansard, but it was as though it had never happened. It was described by Arthur Blakeley in the Montreal Gazette as "the time that never was." The House adopted the Speaker's motion by a vote 142 to 0; the Conservatives and CCF declined to vote because they held that there was no question properly before the House. "There is no House," exclaimed Knowles. "I protest against this," cried Coldwell. "Parliament has ceased to function."

Cold fury was maintained throughout the balance of the pipeline debate, but it was anti-climactic and efforts to delay the bill proved futile. The first motion of censure ever made against a Speaker in a

Commonwealth Parliament was moved by Drew, but the Speaker was upheld by the Liberal majority. The pipeline bill passed Parliament on June 5 and received Senate approval two days later, just in time to meet the deadline by which the funds for the 1956 construction were to be advanced to Trans-Canada Pipe Lines.

The pipeline debate marked the end of an era in Canadian political history, and the election the following year which turned out the Liberals after a 22-year unbroken period in office, merely confirmed it. The Liberals lost 66 seats in that election. One post-election survey showed that of the persons who abandoned the Liberals, 38.2 percent did so because of the pipeline debate, the major single factor cited.

It also marked the end of the political careers of Beaudoin, St. Laurent, Harris, Howe and several other Liberal cabinet ministers. Drew, exhausted by the strain, resigned the leadership of the Conservative Party three months after the pipeline debate.

In the aftermath of the debate, the position of the Speaker of the House was removed from partisan politics so that there can no longer be any suspicion that the Speaker is an arbiter whose decisions and interpretations of the rules may be designed to favour the team in power. The House of Commons also began to move slowly toward Parliamentary reform designed to preclude undue delays in the passage of legislation, while at the same time ensuring adequate time and opportunity for thorough debate.

A Royal Commission, appointed by the Conservative government following the election in 1957, strongly criticized the profits which Trans-Canada chairman N.E. Tanner and president C.E. Coates had made from company stock options.

In a preliminary report the commission, headed by Toronto industrialist Robert Borden, appeared satisfied that the stock options exercisable at $8 per share, which Trans-Canada had granted to Tanner and Coates (60,000 shares for Tanner), were reasonable and fair. Shares of the company were later offered to the public at $10 per share. The commission suggested, however, that they should not have been given the opportunity to make large profits on these options once the government had stepped in to help Trans-Canada with an $80-million loan:

The commission feels that when temporary financing by the government was assured and thereby he (Tanner), personally, stood to reap very large financial benefits . . . either the government of Canada should have insisted, as a condition of financial assistance, that steps be taken or Mr. Tanner should have voluntarily taken such steps as would have

precluded him from reaping very large capital profits from the option for the purchase of shares in a company by which he was employed and which was being financed, in an essential part and at a crucial time, with public funds.

The commission's report was even more critical of a further option on 10,000 Trans-Canada shares at a price of $1 per share which Tanner had been granted by Trans-Canada's two founding firms, Canadian Delhi Oil and Western Pipe Lines.

Trans-Canada shares traded in a range of $20 to $38 in 1958, which placed Tanner in a profit position well in excess of $1 million on his options on 70,000 shares. A few years later Tanner left Trans-Canada and retired to Salt Lake City, Utah, where he became a spiritual leader of the Mormon Church.

However questionable may have been the methods and tactics which the Liberals used to ram their pipeline bill through Parliament, subsequent events vindicated Howe's decision to back the Trans-Canada Pipe Lines project.

Trans-Canada successfully secured its public financing early in 1957, and repaid ahead of schedule the loan from the Crown corporation. Final weld on the line was made on October 10, 1958, and the first gas from Alberta arrived at Toronto on October 27. In 1963, Trans-Canada purchased the northern Ontario section of the line from the Crown corporation, which was then wound up. The line met the requirement of all the political parties for an all-Canadian system which would provide gas to the maximum number of Canadian consumers, including northern Ontario which would have otherwise remained without gas service. The desire to minimize the cost of moving Alberta gas to Ontario and Quebec markets has also been achieved by a second line which now moves additional gas by a shorter route via the northern United States from Emerson, Manitoba to re-enter Canada near Sarnia. The repeated charges that the pipeline bill was merely a scheme to benefit the "Texas tycoons" who were said to own control of Trans-Canada has proved completely unfounded: by 1970, Trans-Canada was more than 90-percent Canadian-owned and controlled.

A final footnote on Frank McMahon's last-minute offer to build the gas pipeline without government assistance, predicated on the sale of gas at Emerson to three U.S. firms, was disclosed on April 30, 1958 when U.S. Attorney General Rogers announced the return of a criminal indictment by a federal grand jury for violations of the Sherman Anti-Trust Act. Charged with having conspired to prevent the importation of Canadian gas by Tennessee Gas Transmission were Northern Natural Gas

Company, American Natural Gas Company, and People's Gas, Light and Coke Company. Also named as co-conspirator, although not a defendant in the case, was Frank McMahon. Fines of $100,000 were imposed under the charges against each of the three firms.

Chapter 16. The Oil Sands

People struggled vainly for 84 years to unlock the energy resources trapped in the world's largest petroleum deposits. Scientists, entrepreneurs, engineers invested hope, money, and often incredible toil in trial after trial, effort after effort, project after project, that resulted in heartbreaking failure after failure. But they were not failures so much as stepping stones in the progress that led to the world's first large-scale commercial oil sands production. Now, 121 years and billions of dollars after the first attempt using water to wash bitumen from sand, Alberta's oil sands provide half the oil produced in Canada, and 10 percent of North America's oil supplies. Some predict that the oil sands will provide as much as 90 percent of Canada's oil production early in the 21st century. But the struggle continues, because all the efforts have so far found out how to unlock only a fraction of the energy resource stored in Alberta's storied Athabasca and other, smaller oil sands deposits, and there are technological, resource, environmental, and economic challenges still to be met.

For more than half a century, the people of Fort McMurray had watched the oil men come and go.

The oil men had come to dig from the banks of the Athabasca and Clearwater Rivers a plastic mixture of sand and bitumen they called the Athabasca tar sands, now known as the Alberta oil sands. They dug holes, drilled wells, experimented with underground fires, studied plans for an underground nuclear explosion, and built plants to mine and process the tar sands. They came with visions of developing the world's largest oil deposit, and they left, despairing, defeated, and frustrated.

Fort McMurray has seen a lot of history since that day in 1788 when fur trader Peter Pond arrived to establish his "Fort of the Forks" near the junction of the Athabasca and Clearwater Rivers. This was the heart of the storied Athabasca country, hub of a fur-trading empire that stretched from the Great Lakes to the Pacific Ocean, from Alaska to California.

From Montreal and Hudson Bay, the fur traders paddled their canoes to Athabasca — men such as Peter Pond, David Thompson, Alexander Mackenzie, George Simpson and Simon Fraser — men who first explored, mapped and tamed the northern half of the North American continent. More than a century and a half later, half the population of Fort McMurray was Metis and names such as Mackenzie, Fraser and MacDonald were common in the area.

Fort McMurray became the staging area for transportation into the Arctic northwest, the start of a 1,700-mile transportation system down the Athabasca and Mackenzie Rivers as far as the Arctic coast. First canoes, then the steam-powered, wood-burning tugs of the Hudson's Bay Company plied the broad, placid waterways downstream from Fort McMurray. In 1916 it became the terminus of the 250-mile Northern Alberta Railway from Edmonton, and heavy freight and supplies were loaded here on the barges towed by the throbbing diesel tugs of the federal government's Northern Transportation Company.

During the Second World War, some 2,500 members of the U.S. Army and 50,000 tons of equipment were transferred from rail to barge at Fort McMurray for shipment 1,100 miles downstream for the Canol project. Later, Fort McMurray handled the freight moving in and out of Uranium City on Lake Athabasca where the government's Eldorado Mining and Refining was developing production from what was then the world's richest known uranium ore body. These were hectic, exciting years for Fort McMurray.

Then came the slump. A new highway and then a railway to Hay River on Great Slave Lake bypassed the transportation route to the far North through Fort McMurray. With a world glut of uranium, activity at Uranium City ground to a halt. Tugs of the Northern Transportation Company were beached. Athabasca's historic fur trade industry shrank to a shadow.

"This seemed like God's forgotten country," Clair Peden, road construction contractor and former mayor of Fort McMurray recalled in the late 1960s.1 It looked like it, too. In 1960, it was a one-street town (a street of either mud, dust, or snow, depending on the season) with a single clapboard hotel, a lonely service station, a few frontier stores, and a collection of mostly unpainted shacks and log cabins, housing a population of 1,100. And still the oil men kept coming and going to drill their wells, study the oil sands, conduct their experiments, and operate their pilot plants. The people of Fort McMurray no longer cared. They had long since lost all faith and hope in the plans of the oil men. They knew that literally beneath their **END PAGE 332 START PAGE 333** feet lay

the largest known deposit of oil in the world, and for all that they could tell, it would be there forever.

"When the real thing finally came, hardly anyone would believe it," Clair Peden recalled.

The real thing finally came in 1964 when first hundreds, and then finally as many as 2,000 men, together with hundreds of thousands of tons of equipment, supplies and material moved through McMurray to the site of a vast construction project 20 miles northwest of the town. Slowly it dawned on the people of Fort McMurray that this time it was for real. By the time the $280-million complex of Great Canadian Oil Sands Limited was completed in 1967, McMurray was a far different town. No longer a poverty-ridden backwater, it was a thriving town of 5,000 people, as modern as tomorrow, "the oil capital of the world," as it billed itself. And the town's growth had just started.

More than three-quarters of the Athabasca oil sands consist of a beautiful white sand, with the rest consisting mostly of bitumen plus a little clay, silt and minerals. They embrace an area of 30,000 square miles, an area twice as large as Lake Ontario. The sands range in thickness from a few feet to 300 feet and are covered with overburden measured in inches to 2,000 feet. All this is set in a gently rolling land covered by scrub trees, cut by deep-banked rivers, pockmarked by a myriad of lakes and embracing endless miles of muskeg. Together with smaller deposits to the south at Cold Lake and to the west in the Peace River country, there are 1.6 trillion barrels of bitumen buried in Alberta's oil sands. Some 178 billion barrels of this are estimated to be recoverable under economic and operating conditions prevailing in 2003, according to Alberta's Energy and Utilities Board.2 To put that in perspective: Alberta's economically recoverable bitumen reserves were more than three times the remaining discovered conventional oil supplies of North America, and 18 percent of the world's. Only Saudi Arabia had greater oil reserves.3 Billions of dollars are meanwhile being spent in efforts to ultimately bring to market much of the as yet economically unrecoverable 90 percent of Alberta's oil sands energy.

Looking for the motherlode

First recorded mention of the Athabasca oil sands was by Peter Pond who, in 1788, noted the black gunk oozing from the banks of the Athabasca River and reported that the Indians used it to caulk their canoes. "Some bituminous fountains in which a pole 20 feet long may be inserted without the least resistance," were noted the following year by Alexander Mackenzie during his historic voyage to the Arctic coast.

GSC geologist Robert Bell examined the oil sands in 1881 and 1884 and was the first to suggest that there might be great commercial value

here, with a pipeline to Hudson Bay and shipments to world markets. Bell wrote:

> Independent of railway construction, an outlet for the oil to foreign markets might be found by conveying it by steamers, for which there is uninterrupted navigation, from the Athabasca River to the eastern extremity of the lake of the same name, and thence, by a pipe to Churchill Harbour on Hudson Bay.4

When the early geologists and oil explorers first looked at the Athabasca oil sands there were two visions of great oil wealth. The most obvious lay in the bitumen that is near the surface. Another concept held that the oil sands are merely somewhat baked and dried-out crude oil that had seeped to the surface from deeper Devonian rocks, and that even vaster and far more profitable quantities of liquid crude oil awaited only the drill bit in these deeper formations.

In his reports on the Athabasca tar sands, Bell wrote:

> The enormous quantity of asphalt, or thickened petroleum, in such a depth and extent of sand indicates an abundant origin. It is hardly likely that the source from whence it came is exhausted. The whole of the liquid petroleum may have escaped in some parts of the area below the sandstone, while in others it is probably still imprisoned in great quantities and may be found by boring.5

George Dawson, later director of the GSC, told a Senate committee in 1888 that there was “reason to believe that extensive deposits” of crude oil existed at Athabasca and that “the quantity appeared to be practically inexhaustible.”6

With this type of promise in mind, it was inevitable that wildcatters would start punching holes through the oil sands looking for the liquid motherlode that the best geological brains believed lurked there. First in the field was the Geological Survey itself, which drilled at the town of Athabasca in 1893 and 1894 to a depth of 1,770 feet without reaching even the oil sands, let alone a deeper oil pool. Three years later, the GSC drilled its famous Pelican wild gas well, which burned out of control for 21 years. George Dawson is reported to have “expressed concern and disappointment at finding maltha or tarry oil instead of liquid oil at Pelican Portage.”7

Thirty-six wells were drilled in the Athabasca region from 1893 to 19248 in search of the elusive basement oil. Most were drilled by small wildcatters and stock promoters but two of them, drilled in 1917 to 1919,

were the first wells drilled in Western Canada by Imperial Oil. Some of the promoters reportedly salted their wells by dumping volumes of crude oil downhole to be pumped up later for the edification of credulous investors.

There was a period of feverish speculation and a short-lived boom in Fort McMurray that sent land prices from a few dollars to as much as $200 per lot in 1912. The most active of the early Athabasca drillers was a German immigrant, Count von Hammerstein. He is seen in a photo on horseback looking every inch the German aristocrat, garbed with polished knee-length boots, a military tunic, cape, and plumed hat. He appears to have arrived at Fort McMurray from Winnipeg where he and two associates in early 1906 incorporated the Bonnet Falls Power Company to build a suburban electric railway that came to exist only on paper. Later that year he drilled the first of nine wells at Athabasca, finding a small amount of heavy oil which some reports suggest were salted, but which nevertheless fuelled the mini-speculative boom. Von Hammerstein died impoverished, but obsessed with the hoped-for value of his tar sands properties.

Some of the early Athabasca wells found significant amounts of natural gas. A well drilled a short distance south of Fort McMurray by Northern Alberta Exploration Company found a thick section of salt, which led to the formation of the Alberta Salt Company and a business pumping brine and making salt. None of the Athabasca wildcat tests ever found the basement oil, of course, but they were not entirely failures. They found gas and salt and they contributed to the growing knowledge about Alberta's oil sands.

Washing out the sand

While searching for the non-existent basement oil was underway, other efforts were focused on mining Athabasca's oil sands and seeking a way to extract the bitumen, most commonly with the use of hot water. Eighty-seven years of testing and experiments preceded Great Canadian Oil Sands' use of hot water to wash away the sand from the bitumen. When Geological Survey of Canada geologist Robert Bell looked at the bitumen oozing from the banks of the Athabasca River, he shipped samples of the sands to Ottawa where G. Christian Hoffmann, the GSC's chemist and metallurgist, conducted experiments to examine the possibilities. Hoffmann thought the sands were "admirably adapted . . . for asphalting purposes" with "very slight treatment" and without the need to separate the sand and bitumen. They were, he wrote, suitable for "construction of roads, footpaths, courtyards, and for asphalting the floors of granaries, basements of warehouses . . . and as a roofing material."9

Should anyone want to bother separating the bitumen, however, Hoffmann concluded that this would be a simple matter. It could, he wrote, “be effected by simply boiling or macerating the material with hot water, when the bituminous matter entering into fusion will rise as scum to the surface and may be removed by skimmers, whilst the sand falls to the bottom of the vessel.” That’s not far off from the basic approach used in today’s multi-billion dollar oil sands plants, albeit with enormous refinements to the process.

Unfortunately, Hoffmann’s macerating didn’t remove quite all of the most minute particles of sand. The bitumen he extracted by this method still contained 50.1 percent very fine sand. It would take a little more than “simply boiling” to completely remove it.

Hoffmann added that, given greater quantities than his few samples, the bitumen might be distilled and “advantageously employed as a crude material for the manufacture of illuminating and lubricating oils and paraffin.” This was still the age of coal oil lamps.

Other government-funded researchers seeking ways to extract the bitumen would follow in Hoffmann’s footsteps, while there were more than 30 private sector attempts, using hot water, steam, fire, solvents, and even microbes, that were supposed to separate the bitumen by eating it.

Sidney Clarke Ells, an engineer with the federal Department of Mines, in 1913 set out for Athabasca to survey the prospects of commercial production, a task to which he devoted the next 32 years. It was pioneering under conditions as difficult as any fur trader ever faced — travelling by foot with a 70-pound backpack the 250 miles over trackless muskeg and forest between Edmonton and Fort McMurray; camping out under northern stars at temperatures as low as -40∞C; hauling on a tracking line 20 hours a day to help pull barges up the Athabasca River.

Ells set out from Athabasca Landing (north of Edmonton) with a 30-foot scow, a 22-foot freight canoe and a “crew of three white men and an alleged native pilot.” Floating downstream it took the party only nine days to cover the 240 miles to Fort McMurray. In the following three months Ells’ party located 247 tar sands outcrops extending over a distance of 185 miles along the banks of the Athabasca and tributary rivers, and collected more than 200 samples from hand-augured holes to depths of five to 17 feet. It took 23 days, with Ells and a 12-man crew of natives pulling 20 hours a day on a track line, on the return trip which brought out the first meaningful tar sand samples.

Ells’ report of his field work in 1913 concluded that “certain areas should lend themselves to large scale commercial development,” with the most promising use as a paving material. He also reported that

"discovery of petroleum fields in Western Canada will have a direct bearing on the development of Alberta bituminous sands."10

The oil sands samples that Ells had shipped out in 1913 were used in Ottawa and in Pittsburgh to test methods of extracting the bitumen by means that would be further tested by others over the next half century. Ells and his associates tried centrifuges, solvents, distillation, and hot water. The most encouraging results were obtained at the Mellon Institute of Industrial Research in Pittsburgh where hot water and varying amounts of acidic and alkaline reagents were used in three types of flotation cells.

In the early winter months of 1915, Ells shipped out 60 tons of tar sands from McMurray to Edmonton by horse team "in temperatures ranging from 20 to 50 below zero and without tents for men or horses."11 The following year the Northern Alberta Railway was completed to within 17 miles of Fort McMurray (it was another 10 years before the final stretch was built). That summer Ells used the tar sands for experimental paving of Edmonton streets, pavement that was still in use half a century later. The tar sands material was also subsequently used for paving in the Jasper National Park. In 1930 Ells built a large mixing plant, housed on a railway flat-car, for preparing paving material at a rate of 700 tons per day. The plant was used for a period of two months, but with Alberta gripped by the Depression, there was very little road construction, and the plant was eventually sold for scrap. In the end, the cost of transporting raw tar sands from Athabasca made its use economically unfeasible.

Another bitumen paver was Thomas Draper, an oil equipment manufacturer from Petrolia, Ontario. In 1920 Draper experimented with heat to distill the bitumen from the sand, then spent 16 years mining oil sands, separating sand and bitumen by hot water flotation, and paving roads and streets. From 1922 to 1926, Draper mined more than 1,500 tons of oil sands for use in tests and experiments by the Alberta Research Council.12 Draper's McMurray Asphaltum and Oil Company spent $35,000 to build a water flotation separation plant near Fort McMurray, but in 1924 it was the first of three pioneer oil sands plants to be destroyed by fire. During the next dozen years, Draper won contracts to successfully pave a portion of Parliament Hill and a short stretch of Wellington Street in Ottawa, and other roads and streets in Alberta towns, including Medicine Hat, Vegreville, and Camrose.

But it was clearly Ells who was first in the field aggressively pursing opportunities for commercial development of the oil sands. Max Ball, possibly the most widely known petroleum authority in mid-20th century and a major figure in development of the oil sands, in 1950 described

Ells as “the father of the Alberta bituminous sands research and development.” Ball credited Ells with having made the first “systematic study of the deposits,” the first “comprehensive maps of the area in which they lie,” the “first systematic study of methods for separating the bitumen from the sands,” and the first to have “developed and demonstrated the principle of hot water separation.”13

That description of Ells could not have sat well with Dr. Karl Adolf Clark, who has also been called the father of oil sands development, having spent nearly 40 years improving hot water flotation technology. Clark began his studies in 1920, seven years after Ells had first entered the field, working for the newly formed Alberta Research Council. At first, “in the spring of 1917, Ells had happily shared information about the oil sands with the University of Alberta,” oil sands historian Barry Glen Ferguson claims.14 But three years later, “Ells was co-operative neither with the University nor with its offshoot, the Research Council of Alberta.” As for the Alberta scientists, as well as other business and government officials, they thought “Ells was a man to be avoided,” and they did not want to work with him. Perhaps there was an element of professional rivalry. Perhaps it was personality conflicts. There might have been an element of federal-provincial tension: Ells represented the federal government working on Alberta’s resources; it would hardly seem surprising if Alberta placed greater emphasis on the efforts of its own scientists. Whatever the cause, it did not help that in his first report, a year after he started his studies, Clark claimed that he had found a “new method” — hot water flotation — to extract the bitumen, without any reference to the work of Hoffmann, Ells or others. Ferguson archly suggests that Clark did not want to share any credit, that he “was ignoring the cumulative nature of his technique for reasons that seem unlikely to yield documented explanation.”15 Ells, too, was probably guilty of the same thing.

Regardless of these relations, no one spent more time nor greater effort in developing the hot water flotation process than Clark. Working with $300 worth of test equipment, Clark seemed confident that he had solved the problems almost immediately. Barely a year after his appointment, Clark confided to the university’s president, Henry Marshall Tory, that “something definite has been accomplished and a very considerable glimmer of daylight let through the problem.”16 Later the same year, he announced that, “Most of the purely inventive work has now been done. There remains to be accomplished the practical application of the new methods to the production of bitumen from the tar sands. This means . . . commercial production.”17

But it wasn't quite that easy nor quick. None of Clark's projects nor others he was associated with resulted in sustained commercial oil sands production until the GCOS plant began producing 46 years later.

Clark and his assistant S.M. Blair built their first hot water separation plant in the basement of the university's powerhouse and the following year built a larger plant at Edmonton's Dunvegan railway yards. This plant was moved to a site on the Clearwater River south of Fort McMurray in 1929 where it operated well enough to produce some bitumen used to pave Edmonton roads. Clark and the rest of the Research Council transferred to teaching duties at the university during the Great Depression, where Clark remained until his retirement in 1954 as head of the Department of Mining and Metallurgy. After retiring from the university, Clark continued his oil sands efforts, working from an office and laboratory space at the Research Council. In the 1960s, Clark was retained by Great Canadian Oil Sands as a special consultant to help in yet one more effort to apply his process in a commercial application. But he never did see it brought to fruition. He died in December 1966, just seven months before the GCOS plant began production.

About the time that Clark started his research work, a group of New York City policemen acquired leases in the Athabasca oil sands and formed Alcan Oil Company, selling out in 1923 to R.C. Fitzsimmons, who re-organized it as the International Bitumen Company.

Fitzsimmons developed his own hot water flotation process — in principle similar to Clark's but different substantially in application — and, using less than $50 worth of materials, managed to construct a make-shift unit. Fitzsimmons' operation was enlarged several times (by 1941 the firm had invested more than $300,000) and, in a limited sense, was really the first successful commercial oil sands operation. The bitumen that Fitzsimmons produced was not completely free of sand or clay particles and certainly was not suitable for refinery feedstock. But it was a fine product for waterproofing roofs and was sold for this purpose through a Western Canadian chain of hardware stores. Following a series of changes in name and ownership, Fitzsimmons' company eventually became Great Canadian Oil Sands, and finally, Suncor Energy.

Another attempt at oil sands production resulted from a visit to Denver in 1929 when Ells outlined the possibilities of the oil sands deposit to U.S. oil man Max W. Ball and his associates. The following year Ball formed Canadian Northern Oil Sands Products Limited, which later became Abasand Oils Limited, and during the next 15 years funnelled more than $2 million into oil sands development, some of it

financed by the federal government during the Second World War in an effort to secure more oil supplies.

After conducting laboratory research and pilot plant work, Ball had a plant in operation in 1940, capable of processing 400 tons per day of oil sands. By September the following year the plant had produced 17,000 barrels of bitumen which was refined into gasoline, diesel oil, fuel oil, and coke. Then fire destroyed the plant.

The Abasand plant was rebuilt and one of those involved in this wartime effort was Harold Rea, GCOS's first chairman. Rea had been manager of sales with Canadian Oil Companies, Limited — best known for its White Rose gasoline — when he was loaned to the federal government's Wartime Oil Administration. "During the dark days of World War Two, Canada was hard-pressed to meet even essential petroleum needs," Rea later recalled. "Submarine warfare had already closed down a large East Coast refinery. The Canadian Wartime Oil Administration was forced to initiate development of every known Canadian source of petroleum, including the Athabasca tar sands." After the war, Rea returned to Canadian Oil Companies where he became president until 1963 when the company was acquired by Shell.

The government took over the Abasand property on a temporary basis, redesigned the facilities to incorporate some improved separation methods, and by 1944 once more had the plant in operation. But in the following year, the ill-fated Abasand plant was for a second time destroyed by fire. Abasand, however, managed to retain a 25-percent interest in certain Athabasca leases, including the 4,000-acre lease from which GCOS developed its first oil sands production.

Despite initial success in selling bitumen as a waterproofing compound, Fitzsimmons' International Bitumen Company also had its share of troubles. In 1942 Fitzsimmons sold out to a group of Canadian and British investors headed by Montreal financier Lloyd R. Champion and the firm's name was again changed, to Oil Sands Limited. In 1944, Oil Sands and the Alberta government started work on a $500,000 pilot plant to further test the hot water separation methods developed by Clark and the Research Council. The plant was completed in 1949 and based on the results an economic study sponsored by the Alberta government in 1950 concluded that commercial production of the Athabasca tar sands was economically feasible. But there was no great rush by oil companies to exploit the oil sands on the basis of the findings of a government study. The large fields of conventional oil then being discovered in Alberta offered far more profitable sources of petroleum than those star-crossed oil sands.

Pew's big gamble

With a string of such profitable oil discoveries as Leduc, Redwater, Bonnie Glen, and Wizard Lake, who needed the tar sands?

John Howard Pew, that's who. Pew was chairman of Sun Oil Company and a son of the company's founder. Controlled since its inception by the Pew family, Sun Oil in 1967 ranked as the 12th largest U.S. oil company. Its operations embraced shipbuilding, oil production in the United States, Canada, and Venezuela, petroleum marketing in the Eastern United States, Quebec, and Ontario, and refineries in Pennsylvania, Ohio, Texas, and Ontario. But Sun had historically been a crude-deficit company, its refineries using more oil than its oil wells could produce. It was one of the first American oil firms to join the Alberta oil search in the post-war period, three years before the Leduc discovery, but its success had been modest.

From Sun Oil's headquarters in Philadelphia, the Pew family had maintained a keen interest in the Athabasca oil sands since 1944 when John Edgar Pew — Jack Pew, to his associates — Sun's exploration and production vice-president, held discussions with Champion, whose Oil Sands Limited was searching for money for another tar sands mine and plant. Sun decided that the time for oil sands was not quite ripe, but in 1954 acquired a 75-percent interest from Abasand Oils in 4,000-acre lease number 86 at Athabasca. Oil Sands Limited, meanwhile, had again changed its corporate coat and in 1953 emerged as Great Canadian Oil Sands. In 1958, GCOS contracted with Sun Oil for the rights to mine and process the sands from lease number 86 (subject to royalty payments to Sun and Abasand) while Sun also contracted to purchase 75 percent of production from a plant proposed by GCOS which would produce 31,500 barrels per day of synthetic crude.

GCOS formally applied in 1960 for Alberta government authorization for its complex. It finally won approval in October 1962, and the permit stipulated that construction was to start by 1964 with completion by September 30, 1996. But this was far from the end of troubles for GCOS.

During hearings before the Alberta Oil and Gas Conservation Board, competing applications for oil sands projects were made by Imperial Oil and three affiliated oil companies — Cities Service, Richfield Oil Corporation, and Royalite — and by Shell Canada. Both the Imperial group and Shell sought authorization for projects that would each produce 100,000 barrels per day of synthetic oil, maintaining that this was the minimum economic production and implying that the GCOS project was too small to be economically viable.

The government was anxious to see some commercial production from the oil sands, for this would ensure continued production when Alberta's conventional oil wells began their inevitable slow decline. In its request

for a permit, GCOS pointed to evidence “that additional sources of Canadian oil must be brought into production if Canada is to supply its domestic and U.S. export needs and still keep a prudent life of reserves,” especially in the face of dwindling supply and increasing demand in the United States.

The government appeared to agree, yet it was also concerned about the preferential treatment that oil sands production required and the possible effects on the conventional oil producing industry. To be economical, an oil sands plant would have to operate at essentially 100 percent of design capacity, at a time when about half the production capacity of the province’s oil wells was shut in for lack of market demand. Moreover, since this would be marginal-cost production, it did not look as though oil from the oil sands could enrich the provincial coffers to the same extent as conventional oil. The government did not want any impairment of an oil producing industry from which it reaped a quarter of a billion dollars a year. The result was that the government authorized the small GCOS plant, and deferred until 1969 decisions on the Imperial Oil group and Shell applications.

Now GCOS had its permit, and all it needed was the money to build the plant, an amount estimated at $110 million in 1960 but revised to $122 million by 1962. Up to this point, financing for GCOS had come primarily from Canadian and English investors, and Champion, who had bought out International Bitumen in 1942, was still a major shareholder. To help raise the money it needed, GCOS granted an option to Canadian Pacific Railway to purchase a 51-percent interest in the company; the CPR in turn had assigned one-third of this option to Sun Oil and one-third to Canadian Oil Companies, which by that time, however, had been acquired by Shell Canada.

Before putting up the money, the CPR and Shell took another hard look at the project and dropped their options, which left Sun holding the ball. Sun wasn’t certain that it wanted it either — certainly not at a production rate of 31,500 barrels a day.

The decision that faced Sun’s directors at a board meeting in Philadelphia in 1963 was whether or not to put up $67.5 million to acquire 87 percent interest in Great Canadian Oil Sands (later increased to 96 percent) and assist in borrowing the remaining money for an expanded development now estimated to cost $190 million. The contemplated investment was conditional on Alberta’s approval to increase planned production capacity from 31,500 to 45,000 barrels per day of synthetic crude oil.

The directors were well briefed on the pros and cons and alternative opportunities to increase oil production, particularly in Venezuela.

Investing in GCOS would mean committing a substantial portion of the company's financial resources to a venture where operating costs and results were unproved, where the technology was mostly untried, where the profit would depend on everything working out as calculated and within budget. It was a big gamble — larger, perhaps, than the company realized, because by the time the operation achieved design capacity, the cost was not $190 million but $280 million.

An oil sands plant, however, held the promise of a number of advantages. To meet its product sales, Sun in 1963 was a net buyer of some 75,000 barrels a day of crude oil and refined products, the amount that exceeded the production from its oil wells. GCOS would help bring production closer into balance with product sales. Sun refineries would be assured of a continuing oil supply at a constant price, regardless of future supply-demand trends or government restriction on foreign oil imports (Canadian crude was exempt from then existing U.S. oil import controls). With conventional U.S. crude supplies declining, development of a synthetic crude oil industry, based on Alberta oil sands, oil shales, or coal, might well be the answer in meeting future U.S. petroleum needs.

The first firm to establish such production would have a big competitive edge, and might thereby reap benefits eventually, even if initial rewards were slim. Integrated oil companies with production in balance or in excess of the needs of their own refineries could hardly afford to cut back their conventional oil production to accommodate more expensive synthetic crude at their refineries. Thus if the GCOS plant did turn out to be the precursor of a large synthetic industry, Sun's crude deficit position could really turn out to be an advantage after all.

As Sun's directors debated risk and reward, the most eager advocate for going ahead in Athabasca was the company chairman, 81-year-old J. Howard Pew. When Sun assigned George Dunlap to Calgary to head its Alberta operations in 1949, he was called into Pew's office. From a file cabinet, the patriarch picked out a thick file marked "Athabasca Tar Sands" and reviewed its maps, reports and memos with the head of the company's new Canadian division. "I believe the Athabasca tar sands will, some day, be of great significance to the needs for petroleum in North America," Pew is reported to have said. "I want you to be sure that Sun Oil always has a significant position in the Athabasca tar sands area."18

Now it was time to do it or drop it. As the directors debated, Pew reputedly warned them: "I have been closely following progress at the Athabasca tar sands for 20 years. If Sun does not go ahead with this project, I will." Sun did.

The Alberta government approved the revised plans of Great Canadian Oil Sands in April 1964. One of the conditions of the approval was that the plant was to be in production by September 30, 1967.

On September 25, 1967, some 500 government, industry and press representatives from throughout North America flew to Fort McMurray to attend the dedication of the complex, which was already producing synthetic crude. Within a few weeks the product would be starting its pipeline journey of nearly 3,000 miles to refineries in Ontario and Ohio. The dedication ceremonies were held in the "bubble," a huge fabric structure supported by compressed air and formerly used to cover winter construction at the plant site. The sound of heavy equipment and the shrill siren blast from the excavating machines reverberated throughout the bubble, signifying here was a project so urgent that production couldn't be stopped even momentarily for the official dedication.

There was a long head-table of company officials and visiting dignitaries and an endless procession of speakers. Sidney Ells was there, a living witness to the 54 years of hopes and frustrations that had passed since that day he had first arrived at Athabasca by river scow to assess possibilities of developing the tar sands.

At the head table, an old man sat silent, impassive, through the lengthy speeches, huddled deeply into a blue overcoat with the collar turned up at the back, and with rimless spectacles riding down an ample nose. When everyone had their say, the old man got up to speak, and it was evident that John Howard Pew, approaching 90, was still the undisputed captain of Sun Oil.

"No nation can long be secure in this atomic age unless it be amply supplied with petroleum," Pew said. "It is the considered opinion of our group that if the North American continent is to produce the oil to meet its requirements in the years ahead, oil from the Athabasca area must of necessity play an important role."

Digging in

The world's first large-scale production of bitumen did not mark the end of difficulties and obstacles in the development of Alberta's oil sands, it merely marked the start of a new phase in a struggle that continues nearly four decades later. There were operational problems at Great Canadian Oil Sands' mine and plant that took a quarter of a century to iron out before it became a smoothly running, reasonably profitable operation for what is now Suncor Energy. There were political and economic issues that delayed a second mining operation until public funds were invested. And when essentially all the operational problems were overcome, there remained the fact that digging can recover only about seven percent of the 1.6 barrels of bitumen buried in the oil sands.

In most of the areas of deposit where the overburden is too thick to be stripped away, the bitumen must be separated from sand where it lies buried — it must be separated "in situ," in place — and then pumped to the surface. Finally, there are resource constraints and environmental challenges that still face both mining and in situ production of the bitumen and its conversion into synthetic crude oil. But great as the number of problems might be, they are no greater than the number of different approaches, ideas and methods with which they are being tackled in scores of different research and development efforts involving hundreds of millions of dollars. Most of them might fail, but only a few successes are needed.

Great Canadian Oil Sands might have produced black oil but on the company's books it was all red ink, with losses amounting to $37 million in the first three years, $90 million after seven years. "For GCOS common shares to have any value whatsoever it is obvious that the company must have much higher prices for its products," Touche, Vincent Investment Consultants Ltd., a respected Calgary firm, declared in a study in early 1971.19 Even if oil prices zoomed, they were expected to yield much greater benefits to other oil companies with larger reserves of conventional crude oil. Nor could expansion of GCOS' operations be expected. "It is extremely unlikely that the company could attract capital for an expanded operation, and none is envisioned," the report concluded. The GCOS mining and processing facilities seemed headed for the junkyard.

It was, indeed, higher prices that rescued the operation. "Rising petroleum prices during the 1970s helped to keep the expensive operation afloat," Suncor president Richard George later observed.20 World oil prices were $2.55 per barrel when the mine and plant started producing in 1967, and had quadrupled to $10 in 1973, and reached a peak of nearly $45 by 1980,21 thanks to an oil embargo by the Organization of Petroleum Exporting Countries (OPEC).

Despite the price increases, things weren't much brighter in 1991 when George, a 41-year-old Sun Oil petroleum engineer who also holds a law degree, took over the reins as president and CEO of Suncor, into which GCOS had been rolled. A fire that year caused $16 million in damages to Suncor's upgrader plant while an electrical failure in -44∞C cold turned a labyrinth of outdoor pipe into solid icicles with foot-thick hoarfrost, and shut down operations for 10 days, costing a further $10 million. Nor was that the first freeze-up to shut down operations: it had happened twice before, for longer periods, in earlier years. A roller coaster had sent oil prices plunging by more than $22 from the 1980 peak. And Suncor's oil sands lease had enough bitumen left to keep the

operation going for only another 10 years. The future still looked far from certain.

The job of turning the operation around landed on the lap of Dee Parkinson-Marcoux, Suncor's executive vice-president. Parkinson-Marcoux arrived at Suncor the same year as George, and she, too, was an engineer, who had been in charge of Petro-Canada's refineries in Western Canada.

The company's biggest operational problems centred on its costly, inefficient, and unreliable excavators — nine-storey monster vehicles with studded bucketwheels that scooped up overburden or oil sands — and the conveyor belts that carried the oil sands to the plant for separation. Parkinson-Marcoux and her staff surveyed the world's biggest strip-mining operations where they found that giant buckwheel excavators had been largely replaced by mammoth crane-like shovels and giant trucks. Two years after George and Parkinson-Marcoux arrived, Suncor junked its four giant bucketwheels in favour of the scoop shovels and trucks with 240-ton payloads — and later, even larger trucks, the world's largest, house-size vehicles driven by 2,700-horsepower diesel electric engines that carry 360-ton loads. The switch from bucketwheels to scoops and shovels shaved costs by $5 a barrel while other improvements have cut Suncor's costs in half, making it one of the lowest-cost oil producers in North America — although still much higher than Middle East oil costs.

By 2004, Suncor had acquired new oil sands leases, opened a new mine, boosted production capacity from the original 45,000 to 225,000 barrels per day and was on target with planned further expansions to 500,000 barrels per day by 2012, including mining and in situ production.

While its oil sands operations have been transformed, so has Suncor's corporate structure, from a 96-percent owned subsidiary of a U.S. parent to a widely held Canadian company. Suncor was formed in 1979 when parent Sun Oil (later named Sunoco Inc.) merged its two Canadian subsidiaries, Great Canadian Oil Sands and Sun Oil Co. Ltd. The latter had been marketing petroleum products since 1917, building a chain of service stations in Ontario and Quebec and a refinery at Sarnia in 1953. Then from 1981 to 1995, Sun sold its interests in Suncor for more than $1.9 billion, in three stages. First came the sale of a quarter interest to the Ontario government's ill-fated Ontario Energy Corporation for $650-million; followed by a public offer of 20 percent to Canadian investors in 1992 for $120 million; and the sale of its final 55-percent interest to a Canadian investor group headed by Nesbitt Burns Inc. of Toronto for

$1.16 billion. Ontario Energy also sold the stake it had bought in Suncor.

The sales were not timely for Sunoco, and worse for Ontario Energy. The Ontario government lost more than $300 million on its $650-million investment in Suncor. And Sunoco sold out just as Suncor was ramping up production, revenue, and profits. In 2003, Sunoco earned a profit of $406 million while Suncor earned two-and-a-half times as much, turning in a profit of more than $1 billion for the first time.

The offspring had grown bigger and more profitable than its parent. J. Howard Pew's bold and visionary gamble on the Athabasca oil sands finally paid big dividends, but the family-controlled firm failed to hang on long enough to cash in.

Oil sands and political tar

The next two strip-mining operations brought into production were Syncrude in 1978 and Shell Oil and its partners in 2003. Both experienced long periods of gestation, and for Syncrude, at least, a difficult birth midwifed with money from the Alberta, Ontario, and federal governments, which put up half the cost.

Cities Service Athabasca Inc., a subsidiary of Henry Doherty's research and conservation pioneering Cities Service Oil Co., in 1957 began the research that would lead to the start-up of Syncrude's production 21 years later. By 1959, Cities Service's pilot plant at Mildred Lake north of Fort McMurray was strip-mining oil sands with a bucketwheel excavator, extracting the bitumen, and shipping it for processing at a pilot refinery. Cities Service was later joined by Imperial Oil, Atlantic Richfield (Arco), and Royalite (which was then an independent oil producer-refiner-marketer, having been sold by Imperial but not yet acquired by Gulf Canada). When the applications of the Cities Service group and Shell were rejected in favour of final approval of GCOS, the Cities Service group was reorganized in 1964 as Syncrude, and applied again.

Syncrude won approval for its oil sands plant — more than twice the size of GCOS' initial capacity — in 1969, but that was not the end of its difficulties. Two years later, Syncrude had achieved little progress when Peter Lougheed's Conservatives swept into power, ending Social Credit's 36-year reign in Alberta. The Conservatives brought with them a new approach to energy, and especially oil sands policy that effectively put Syncrude on hold. Ernest Manning's Social Credit administration acted in the manner of a landlord, seeking to wrest as much profit as possible from its tenants, the oil companies, to whom it had leased oil and gas

rights. The Lougheed government wanted to be more than just a landlord, it also wanted to be a player in the oil game.

One of the new government's first actions was to ask a group of senior bureaucrats to draft an oil sands development policy for consideration by cabinet. The 1972 confidential report advocated a strong interventionist policy and criticized Social Credit's laissez faire approach which it claimed imposed "long term costs arising from exported energy, technology, job opportunities and environmental damages, in addition to the depletion of non-renewable resources."22 The bureaucrats advocated a policy "developed, shaped and influenced by Canadians for the benefit of Canadians," one which might "change the historical trend of ever-increasing foreign control of non-renewable resource development in Canada." The government was urged to undertake at least some of the oil sands development itself, financed in part by a proposed special levy on those to whom it had issued oil sands leases.

The government didn't walk the full length of this bureaucratic plank, but it certainly stepped in that direction with new terms under which it was prepared to allow Syncrude to proceed. Those terms were made clear during negotiations in Edmonton with Syncrude that David Wood, a Lougheed lieutenant and head of the government's Public Affairs Bureau, later characterized as "those suspense-filled days of August 1973."23 The negotiators were Peter Lougheed and Energy Minister Don Getty for Alberta; and the chief honchos for the oil companies: Syncrude president Frank Spraggins, Jack Armstrong of Imperial, Jerry McAfee of Gulf Canada, Gordon Sellars of Cities Service, Bob Anderson of Arco, and platoons of cabinet ministers, vice-presidents, and experts.

The first meeting, involving only the vice-presidents and cabinet ministers led by Getty, was almost the last. When the Syncrude people said that the terms under which the consortium was prepared to continue were not negotiable, Getty and his group walked out of the meeting. The next day, when Lougheed outlined Alberta's terms, the oil companies were close to walking out. Lougheed wanted 50 percent of Syncrude's net profits for Alberta; a back-in option to acquire a 20 percent interest in Syncrude, after final costs and probable profits were determined following the start-up of production; and for Alberta Energy Company (half owned by the government), half ownership of the oil sands-to-Edmonton crude oil pipeline plus 80 percent of the project's large power generating plant. The pipeline and the power plant were the only aspects of the project that were almost certain money makers.

It required several more "suspense-filled days" before the oil companies caved in to Alberta's demands and Syncrude was back on track. But not for long. Sixteen months after the terms had been agreed

to in Edmonton, Arco, with its 30 percent stake, pulled out of Syncrude on December 7, 1974, leaving a gaping hole that was bigger than the remaining three participants were willing to fill. In a period of roaring inflation, final cost estimates by now had doubled to $2.3 billion, Atlantic Richfield Canada's U.S. parent needed money to develop its share of Prudhoe Bay, North America's largest oil field on the North Slope of Alaska; and the U.S. Export-Import Bank had declined to finance the purchase of U.S. equipment that would be used in building the Syncrude plant. Once more, Syncrude was on the brink of collapse.

Some hurried telephone calls and discussions set up a rescue meeting in Winnipeg on February 3, involving the governments of Alberta, Ontario and Canada and the CEOs of Imperial, Gulf Canada, and Cities Service Canada. Lougheed and Don Getty were there for Alberta; Ontario sent Premier Bill Davis, and Canada sent Energy Minister Donald MacDonald. Each party had an agenda. Macdonald and Davis were gripped by the OPEC embargo that tripled oil prices in three years and threatened severe shortages. Rescuing Syncrude was viewed with a sense of national urgency. Alberta wanted to hang on to the terms it had wrung from the oil companies and, according to insider David Wood, "In order to do that, Lougheed knew, Alberta would have to put up equity."24 The three oil companies wanted someone to fill the hole Arco had left, and it was clear that the governments would have to do that. Which they did, going on the hook for at least half the total cost. The federal government agreed to take a 15-percent stake; Alberta took 10 percent, and Ontario, five percent. In addition, Alberta loaned $200 million to Gulf and Cities Services, later converted to a 20-percent interest in Syncrude, and committed its Alberta Energy Company to put up all the costs of the pipeline and the power plant.

Three months after the Winnipeg rescue, Ottawa established its national oil company, to howls of bitter protest in Alberta. In Calgary, Petro-Canada was at first about as welcomed as a hooker at a matronly tea party. Bumper stickers would later proclaim, "I'd rather push this car a mile than fill up at Petrocan." No one seemed to notice that it was Alberta that had the second biggest corporate interests in the oil business, in Alberta Energy, in its 20-percent stake in Syncrude, and in Nova, with its province-wide gas-gathering grid which, while not government-owned, was a tool of government policy.

Would Syncrude have flown without more than a billion dollars in government help if Alberta's terms had been less demanding? It's a moot point. But it's interesting to note that Alberta's stake in Syncrude and Alberta Energy were later sold, while Lougheed's terms were scaled back. In December 1995, Alberta announced a new royalty deal for oil sands

projects, with a basic one percent gross royalty and a reduction from 50 percent to 25 percent on profitable production, after recovery of capital costs plus a rate of return equal to the rates paid on long-term Canadian bonds. The effect was immediate, and dramatic. In seven years following announcement of the new terms, capital expenditures on oil sands development totalled $24.5 billion, nearly five times the $5.5 billion spent during the preceding seven years.25

Fifty-seven years after it first started exploring the oil sands, and following drilling, research, pilot projects and several regulatory applications, Shell Canada completed the third oil sands mine in 2003. The Shell group's $3.7 billion Athabasca Oil Sands Project includes a mine and extraction plant some 40 miles north of Fort McMurray with a design capacity of 155,000 barrels a day of bitumen. The bitumen is diluted with lighter petroleum liquids so it can be pipelined to an upgrader at Edmonton where it is converted into high-grade synthetic crude oil. Shell's partners in the operation, with 20-percent interest each, are Chevron Canada and Western Oil Sands.

In situ: fired and steamed up

There are only two ways to produce the bitumen trapped in Alberta's oil sands. One is to mine the sands and extract the bitumen in large processing plants, as Suncor, Syncrude and Shell are doing. The other is to thin and extract the bitumen in situ — in place, where it lies buried mixed in the sand beneath a hundred or a thousand feet of overburden so that oil wells can pump it to the surface, as Imperial Oil and others are doing. Only seven percent of all Alberta's oil sands can be economically mined, the province's Energy and Utilities Board estimates; the remaining 93 percent are covered with too much overburden and must be produced in situ if they are ever to be recovered.26

Heat, steam, and solvents are the only known ways to produce bitumen in situ, and all three were tried during a period of 65 years in tests that might be categorized as ranging from crude to refined, before commercial success was finally achieved in 1985.

The first attempt at in situ production was made in 1918 by the Northland Oil Syndicate at a well drilled three miles north of Bitumount. Twelve pounds of dynamite were exploded at the bottom of the hole, followed by injection of hot steam, which resulted in pumping a mixture of liquid bitumen, sand, and water, with some of the sand settling out to the bottom of a storage tank.27 Although no sustained production was achieved, this effort at least pointed to the right direction. Exactly 50 years later, the first successful commercial in situ production was achieved by means of steam injection.

Two years after the Northland test came the first “fire flood” effort to produce bitumen in situ. A man identified only as D. Driver built a substantial wooden derrick and drilled through the oil sands at a site near Fort McMurray. Casing was set near the base of the oil sand, to where natural gas was fed through a small-diameter pipe, and ignited. The resultant fire produced some “vapours” but no bitumen production.28

A second fire flood was later attempted by Montana oil man Jacob Absher for the Bituminous Sands Extraction Company, a venture of Turner Valley oil producer William Fisher. Absher first tried injecting steam down a number of shallow wells without success, then poured burning kerosene down the well. The bitumen ignited but the fire was so hot that the pipes melted.29

Standard Oil of Indiana in 1968, following 10 years of lab and field testing, thought its production subsidiary, Pan American Petroleum, finally had a fire flood system that could produce liquid oil from the Athabasca oil sands. At a pilot project 25 miles southeast of Fort McMurray, Pan American (later called Amoco Canada Petroleum) pumped 20,000 barrels of liquefied bitumen from oil sands ranging in thickness from 220 to 340 feet and covered with about 1,000 feet of overburden during a 16-month trial, using a method it called COFCAW, “combination of forward combustion and waterflooding.”30 Pan American first fractured the oil sand formation by hydrafracing, a company-patented system of applying hydraulic pressure, followed by air injection, ignition of the bitumen with a catalyst, and water injection to create steam underground. The resulting mixture of water, sand, and bitumen was then pumped to the surface by a nearby well. Pan American confidently announced it would produce 8,000 barrels a day of bitumen from 75 producing and 20 injection wells, with initial commercial production to start in 1973. Later expansion to a production rate of 60,000 barrels a day was contemplated.

“After more than 10 years of research in the lab and field, we are confident that we have found the answer to producing reluctant subsurface Athabasca tars,” Lloyd Elkins, Pan Am’s director of production research in Tulsa, announced.31 Not quite. For whatever reason, COFCAW didn’t work as successfully as anticipated, and Pan American shelved the project. The facility was later taken over for further tests by the Alberta Oil Sands Technology and Research Authority as part of a $1-billion research program by the government and industry consortium.

The most spectacular fire flood idea occurred to M.L. Natland of Richfield Oil Corporation in 1957 in Saudi Arabia, as he watched the

setting sun which, he later wrote, “looked like a huge orange fire-ball sinking gradually into the earth.”32 The sunset reminded Natland of a nuclear explosion, causing him to wonder why the intense heat generated by such a blast could not be harnessed to cook the bitumen out of the oil sands. Richfield and its partners carefully worked out plans to set off an experimental nine-kiloton nuclear explosion at a depth of 1,250 feet at a site 64 miles south of McMurray. The plans were studied and approved during 1958 and 1959 by the U.S. Atomic Energy Commission and by special technical committees established by the Alberta and federal governments. But in the end, final approval was withheld by the federal government because of an international moratorium on nuclear testing.

One of the great virtues of the petroleum industry is that there are so many players pursuing different ideas, only a few of which need to succeed to make notable, and sometimes stunning, progress. Thus in the oil sands, while some pursued fire floods, others continued with the steam injection approach first tried by Northland Oil in 1918, and with solvent extraction.

Shell Canada, in 1957, claimed to have achieved “the first . . . in situ recovery to give significant oil production from the Athabasca oil sands,”33 at a pilot test 40 miles north of Fort McMurray. In an area where the bitumen is covered with less than 200 feet of overburden, Shell had injected 800 barrels of a synthetic detergent and produced an emulsion of oil and water from a well 26 feet away from the injector well. In expanded tests during a six-year period, Shell injected steam and detergent in five closely spaced injection and production wells, achieving peak production rates of 90 barrels of oil per day. Shell expected its steam injection system to recover 50 to 70 percent of the oil in place, “far greater than that obtainable in conventional oil fields.” A group of Shell’s researchers concluded that “a process has been developed that can successfully produce oil by an in situ process” while “drilling and geological studies have shown the existence of oil-in-place of sufficient continuity and volume to support a commercial-sized operation.”34

The first commercial in situ production of bitumen was, indeed, achieved by steam injection, but at the Cold Lake, not the Athabasca oil sands deposit. On leases with an estimated 44 billion barrels of oil in place, Imperial Oil began tests in 1964 on what has been called the “puff and huff” method, alternately puffing down steam and chemicals and huffing up an emulsion of oil and water. Imperial started with a four-well pilot program, later expanded to a 23-well pilot test, then a 56-well program, and in 1979 applied for Alberta’s permission to build a $7-billion, 135,000-barrels-per-day in situ plant and upgrader to convert the

bitumen into light, synthetic oil. But Imperial shelved this with the advent of poor economic conditions and a wrangle between the Alberta and Canadian governments over energy policies and taxes that followed the 1980 National Energy Program.35 Imperial later revived operations at Cold Lake, and early in the 21st century was producing more than 100,000 barrels of oil per day from its rich Cold Lake leases.

The biggest breakthrough in in situ production was made possible by horizontal well drilling, which became commercially viable only in the late 1980s,36 and has since been enormously improved. In the latest directional or horizontal drilling technology, the 30-foot sections of steel drill pipe used in conventional drilling to rotate a drill bit are gone. They are replaced by flexible coiled tubing that does not rotate but connects with downhole, hydraulically powered motors that rotate steerable drill bits. A horizontal well is typically first drilled vertically to just above a desired depth then sharply angled to quickly attain a horizontal direction. The downhole motor and drilling bit can be steered up, down or sideways with precision using information from downhole sensors that is telemetered to the surface. Horizontal drilling can extend for surprising distances: in 2003, BP Amoco "drilled a virtually horizontal well from onshore in Britain out into the English Channel for 6.3 miles to recover about 15,000 barrels of oil per day."37

With horizontal drilling, the first big in situ breakthrough came in 1991 with an announcement of pilot test results of a new process by the Alberta Oil Sands Technology and Research Authority (AOSTRA), a joint government-industry undertaking that had spent 18 years and $1 billion researching and testing various ways to recover and refine bitumen. At a "proof of concept pilot underground test facility" 37 miles north of Fort McMurray, AOSTRA had demonstrated a method called "steam-assisted gravity drainage" (SAGD) that enables in situ production of the oil sands at a cost comparable to the cost of new supplies of conventional crude oil.

The technology is complex, but the concept is simple. In the pilot test, a series of twin wells were drilled vertically and then, with a sharp 45-degree bend, drilled horizontally for a distance of 1,968 feet through oil sands, one above the other, spaced 16 feet apart. Piping-hot steam was injected at high pressure through the top well, heating the bitumen enough to flow down into the lower well bore, from which it was pumped, together with water, to the surface. A dozen twin wells were drilled and equipped at the test facility, each pair spaced 230 feet apart. The SAGD method was designed to produce from oil sands that are at least 50 feet thick and covered with more than 230 feet of overburden. That encompasses most of Alberta's oil sands deposits.

Based on the results of the pilot test, in which more than 100,000 barrels of bitumen were produced, AOSTRA estimated that the SAGD process could recover 60 percent of the oil in place at suitable oil sands sites, at a cost of about US$11 per barrel.

Progress and problems

Production of Alberta's oil sands was expected to approach one million barrels of oil a day in 2004 and more than double that early in the century's second decade, with new and expanded facilities that were actively underway. By then, oil sands production was expected to total about 800,000 barrels a day of steam-driven in situ production and about 1.8 million barrels a day from mining operations, not including planned projects that had not actually got underway by 2004.

But big challenges still confronted the growth of oil sands production, including emission of greenhouse gases, massive requirements for water and fuel, and environmentally safe disposal of billions of tons of mined sand, plus tailings from the hot water separation plants. Fortunately, tens of millions of dollars were also being spent in research and development of new in situ methods which, if successful, could go a long way to resolving these challenges.

The size of the challenges can be quickly sketched.

ï Fuel. Oil sands are fuel hogs. Generating steam to recover one barrel of raw bitumen in the SAGD production process requires about 1,000 cubic feet of natural gas. Upgrading bitumen to synthetic crude oil requires about another 750 feet of gas.38 That doesn't include the fuel used by the giant scoop shovels and the sand-and-bitumen separation process in mining operations. These figures suggest that projected oil sands production of 2.6 million barrels a day by 2015 would burn up gas at a rate of almost three billion cubic feet a day, about one-fifth of Canada's total gas production. Gas consumption could be reduced by using the bitumen itself or upgraded bitumen products for fuel. Either way, it's a lot of fuel.

ï Greenhouse gases. Upgrading raw bitumen into synthetic crude oil — a blend of naphtha, kerosene, and gas oil (similar to diesel fuel) — involves the removal of carbon, the addition of hydrogen (derived from natural gas), and removal of impurities. The process results in the emission of substantial greenhouses gases, primarily carbon dioxide and small amounts of methane. Burning natural gas to produce steam for in situ production also results in the emission of carbon dioxide. In 1990, each barrel of oil sands production resulted in emissions amounting to the equivalent of more than 100 kilograms of carbon dioxide.39 Processing improvements have cut this in half, but total emissions have

still increased with the rapidly growing volume of oil sands production. Emissions of nitrogen oxides and sulphur dioxides from oil sands production also impose environmental challenges.

By far the greatest emission of greenhouses gases, however, comes not from producing oil, but from using it. For every ounce of carbon dioxide emitted in producing a barrel of oil from the oil sands and refining it into finished products, four or five times as much is emitted when cars and trucks burn it as gasoline or diesel fuel or in other uses.

Land disturbance. About two tons of sand are left to be disposed of for every barrel of oil produced in mining the Athabasca deposit. Close to four million tons of sand will have to be returned to mined-out areas each day by early in the century's second decade. By returning previously removed muskeg and topsoil together with replanting trees and shrubs and by other measures, oil sands miners have successfully restored mined-out areas to at least their original state of biological productivity, but it is not a small task. Water and clay from the water separation plants dumped into tailing ponds also have a potential impact on water quality that "does not lend itself to . . . easy solutions," according to the Canadian Association of Petroleum Producers.40

Water consumption. About 80 percent of the water used for steam in in situ production is recycled, and most of the remaining 20 percent is absorbed by the ungrounded sand. The net result is that about one barrel of water is consumed or lost underground for every barrel of in situ oil production and upgrading. Thus by early in the next decade, water consumption for SAGD in situ production is likely to exceed 200,000 barrels a day, with the possibility of increasing volumes thereafter.

Cost, rather than technology, is likely to be the only constraint on the ability to meet these and other challenges confronting oil sands development. Innovators are gambling hundreds of millions of dollars that research and development will yield commercially economic solutions. Every obstacle that had earlier faced oil sands developers was slowly overcome during the past century, step by step. There is no reason to believe that current challenges will not similarly be met. The major difference now is that with advanced technology such as computer-simulated models, the answers to technical problems come much, much faster.

Two pilot in situ projects launched in late 2003 and in 2004, each costing a projected $30 million could by themselves, if successful, overcome many of these challenges. One involves the use of solvents to extract the bitumen, the other uses fire flooding. Both are based on the

hope that horizontal drilling will do for these methods what it did so spectacularly for the use of steam to extract the bitumen underground.

John Wright, CEO of Calgary-based Petrobank Energy and Resources Ltd., told Oilweek that he is "highly optimistic" that the two-year fire flood project south of Fort McMurray "has the potential to revolutionize the heavy oil industry on a global basis."41 Dubbed THAI, for "toe-to-heel air injection," initial work on this concept of fire flooding began in 1993 while the pilot project follows $4 million spent in 2003 by Petrobank on computer-simulated models. Potential benefits include the fact that no fuel other than the bitumen itself will be needed to produce steam. THAI is expected to burn 10 percent of the bitumen in the sand, and recover up to 80 percent. It will involve far less surface disturbance than mining, with no sand nor tailings from a separation plant to be disposed of. The underground combustion is expected to burn the carbon, sulphur, and other impurities, eliminating the need for surface processing facilities to handle this aspect. Carbon dioxide emissions are expected to be reduced by 20 percent compared with either in situ or mining operations, and further reductions might be achieved by returning the carbon dioxide into bitumen-depleted sands, rather than venting it into the air. The pilot project, which received Alberta approval early in 2004, is being conducted by Petrobank subsidiary Whitesands Insitu Ltd.

Another $30-million in situ pilot program, in which propane and other vaporized solvents are being used to thin the bitumen and wash it from the sand so that it can be pumped to the surface, began operating late in 2003. Called VAPEX, it is claimed that the system could reduce carbon dioxide emission by 85 percent as well as reduce water consumption and possibly fuel requirements.42 The pilot program, which is to operate for a period of five to 10 years, will use the Underground Test Facility at which AOSTRA developed the SAGD in situ method more than a decade earlier. Financed 50 percent by the Alberta and Canadian governments, 50 percent by half a dozen oil companies, the program is being conducted by Devon Canada Energy.

Research and development programs, such as VAPEX and Whitesands, aimed at overcoming economic, environmental, and resources challenges to unlock more of the world's largest oil deposits in the Alberta oil sands, could have far-reaching global impact, as the world's largest store of oil becomes increasingly accessible.

Chapter 17. Frontier Energy: Cam Sproule and the Arctic Vision

Oil in the Arctic awaits the advance of civilization upon this, the last of our geographical frontiers. — Wallace Pratt, 1944.1

The vice-president and chief geologist of Humble Oil and Refining Company, Standard Oil of New Jersey's principal U.S. subsidiary, viewed the Arctic as a former tropical region where "for the greater part of geologic time plant and animal life alike have abounded" and "tropical plants and ferns grew in profusion," providing the raw material for nature's manufacture of oil and gas. "The lands that edge the Polar Sea — the northern shores of Siberia, Alaska, and Canada — are masked by a series of conspicuous seepages of oil," Pratt wrote. "They are landlocked like . . . the Caspian, Black, and Mediterranean seas in the Old World, and the Gulf of Mexico and the Caribbean Seas in the New World . . . the sources of by far the larger part of all the petroleum so far found on earth," and largely because of "their character as long-enduring mediterranean seas." Canada's islands that dot the Arctic's mediterranean sea, Pratt noted, are "composed of gently folded sedimentary rocks, rich in organic remains" and "geologically favorable for petroleum," with abundant indications, including bituminous shale on Melville Island that Arctic explorer Vilhjalmur Stefansson burned for fuel.2

The gold digger

Cam Sproule, who would lead the effort to make Pratt's vision a reality in the islands of the Canadian archipelago, began his geological career with a gold strike now buried under water in northwestern Alberta and ended it four decades later with oil and gas buried under ice and permafrost.

John Campbell Sproule was 20 that August Saturday in 1925 when he hiked from the village of Hudson Hope seven miles up the Peace River to go fishing. After completing high school, Sproule had been earning and saving money for university by working on farms in Alberta's Peace River country and as an assistant to his father who was both a farmer and a dentist serving a few small communities. Sproule knew there was gold in the Peace River country. He had seen a fabulous necklace of gold nuggets worn by a farmwife. The nuggets had been gobbled up by the family's chickens, and the wife had later retrieved them as she prepared the chickens for Sunday dinners.

The river was said to have been at its lowest in 25 years the day young Sproule went fishing. As he walked out on the exposed, rock-solid portion of the river bed, he noticed it was pockmarked by sink holes where softer concetionary rock had been washed out. Sproule reasoned

that if gold nuggets had ever bounced along the river bottom, they might have become trapped in the sink holes. In the application of his first geological theory, he reached into one of the sink holes and pulled out a handful of gravel and several gold nuggets. Intending to return the next day for gold digging and perhaps stake a claim, Sproule returned the nuggets to the sinkhole, as safe a place as any to hide them. But the river, fed by mountain flash-floods, suddenly rose overnight and covered the sinkholes with 14 feet of water. “The river has never been that low since,” Sproule recalled much later, “and I guess the gold must still be there.”3

Within weeks of his ill-fated gold discovery, Sproule had enrolled in geology at the University of Alberta in Edmonton. During the next 26 years he worked in the summers on government geological field parties in the North; earned his doctorate at the University of Toronto; looked for oil in Saskatchewan as chief geologist for an Imperial Oil subsidiary that pulled out of the wheat province after drilling 13 dry holes; spent six years looking for oil in Peru and Colombia for International Petroleum, another Imperial Oil subsidiary; returned in 1951 with his wife and two daughters to Calgary where he had previously been briefly stationed by Imperial; and hung out his shingle as J.C. Sproule and Associates, which promptly became Canada’s largest petroleum consulting firm.

Sproule was now 46. He did not look the image of an oil man. Physically unimposing, with his plain dark suits, rimless glasses and cookie mustache, he looked more like a high school English teacher. He was at an age when prominent geologists tended to study geology from their office desks, leaving the black flies and rubble scrambling of field work to younger colleagues. Not Sproule: for the rest of his working life he spent as much time in the field as managing a 60-person firm would permit, and micromanaging every aspect of the work he couldn’t do himself. An arduous outdoor life had kept him physically trim. As a summer student working for Sydney Ells in the Athabasca oil sands, he had carried loads of up to 200 pounds on his back, once injuring the lower part of his spine, producing a swelling the size of a potato which he “bandaged up with moss and an old rag.” A medical examination decades later revealed that his spine had been permanently bent. His back was injured more seriously nearly 40 years later when his petroleum consulting firm was the largest in Canada. The fact that he had a staff of 65 didn’t stop him from joining in the heavy lifting work. It was 1961 and he fell off the roof of a steel building he was erecting as the Resolute Bay, Arctic Islands, field office of J.C. Sproule and Associates. A perpetual energy machine, he drove himself and his staff hard, and often to distraction. His doctor warned him that if he didn’t slow down and take a

vacation, he would be dead in a year. Dutifully vacationing in the Caribbean, he was up at 5 a.m., helping clean up debris on the beach.

Sproule and his field parties kept moving farther and farther north, from Alberta's Athabasca country, along the Mackenzie River Basin, in the Mackenzie Delta on the edge of the Arctic Ocean, in the lower mountains in the Yukon north of the Arctic Circle. The only companies drilling for oil and gas north of the 60th parallel throughout most of the 1950s were Sproule clients. And they were successful. Two of the first three sites in the North recommended by Sproule for wildcat drilling were discoveries. The first, at Rabbit Lake, just north of the Alberta border, was a substantial Devonian-reef gas discovery in 1955. In 1957 and 1958, Eric Harvie's Western Minerals drilled the first two wells in the Canadian Arctic, a formidable undertaking in the remote Peel Plateau and Eagle Plains area of the northern Yukon, both on sites recommended by Sproule. During a three-year period, 5,500 tons of freight, including a drilling rig, equipment, and supplies were trucked along the Alaska Highway to Dawson City then 200 miles farther north by tractor train in the dark January-to-March period when the muskeg and permafrost were safely solid. The first test was a dry hole, but the second, 50 miles southwest, discovered both gas and oil — but not enough to be commercially developed at such a remote location. The gas and oil at Eagle Plains have awaited half a century for a reasonably close pipeline outlet.4

While Sproule and his geologists were busy exploring the oil prospects of the northern mainland, the Geological Survey of Canada sent important field parties into the Islands in 1955 and again in 1957, using small aircraft with oversized low-pressure tires to land on unprepared sites on flat areas that cover much of the Islands. Sproule later credited the GSC's preliminary surveys with having "brought the Archipelago into the spotlight as a major potential oil and gas producing area."5

Enthusiasm seduces prudence

Sproule and his clients were quick to follow the GSC lead. His firm had a more extensive library of aerial photos of the sedimentary basins of Western Canada and the Arctic Islands than any other petroleum consultants, and he was a pioneer in photogeology. Photogeology was a first-step exploration tool that Sproule had used effectively in South America. It offered his clients an edge in initial assessments of both petroleum and metal prospects in the Islands.

Sproule's hand was evident in January 1959 when scores of firms, mostly small oil and mining companies, filed applications for exploration permits covering 80 million acres of the Arctic Islands, although this

number was reduced when the actual permits were issued 15 months later. A few big oil companies were in the play — Chevron, Texaco, Union Oil of California, Sun Oil, and Amoco among them. But by late 1966, Sproule's clients held about 70 percent of the 63 million acres of permits in the Islands.6

Oilweek speculated on the reasons for "one of the biggest and fastest land plays to hit Western Canada since the discovery of Leduc."7 A number of factors were said to have accounted for this sudden surge of interest in what is possibly the world's most challenging operational environment. There were the GSC reports of its 1955 and 1957 field parties. There were suggestions that the government was planning new regulations intended to provide greater exploration incentive in the Arctic. There was the submarine. The nuclear-powered U.S. Nautilus had just completed the first submarine voyage to the North Pole, travelling serenely beneath the polar ice where the seas are always calm. Visionaries, such as Cam Sproule, saw in this "the prospect for submarine tanker transportation of crude oil, which would place these reserves within 3,000 tanker-miles of Europe — less than half the distance to England from the large Persian Gulf reserves."8

Sproule's super salesmanship and enthusiasm sometimes ran away with prudence. He predicted that in the Islands "the finding cost of oil on a per-barrel basis is bound to be low" and that commercial production could be achieved within five years.9 Oil and mining companies could work together in mutual prosperity: "There are few other areas on earth where such a happy geographic relationship exists between mineral resources and readily available and inexpensive sources of hydrocarbon energy."10 Small oil companies could become giants: "The Arctic Islands is the only place in Canada and probably the only place on earth where an independent oil company has a chance to become a major oil company."11 Moving the oil out should be a cinch: "It should not take science long to devise icebreakers that could move more or less at will through the Arctic Islands for at least the greater part of the year . . . meanwhile, the idea of effective and economical large-scale submarine freight traffic is so far advanced as to be practically assured within the next five to eight years."12 U.S. military contractor General Dynamics Corporation thought so, too. John L. Helm of the Electrical Boat Division told a Northern Development Conference in Edmonton that 170,000-ton nuclear submarine tankers are "entirely practical and economic" and could provide "lower costs for moving Arctic oil into large U.S. and Canadian eastern oil markets than can be achieved with alternative systems."13

Sproule was not the only one to see visions of ice-breaking tankers crashing their way through the fabled Northwest Passage. A decade after the Arctic Islands land rush, the world's biggest oil company spent millions to send a converted tanker on two voyages through the Passage, and concluded that it was a commercially feasible way to ship Arctic oil.

Natural gas presents a more difficult problem because it is more costly than oil to transport, by either ship or pipeline, especially a pipeline from the ice-bound Islands. A consulting engineer in Fayetteville, Arkansas, Miles Sonstegaard, figured he had the answer to that problem, too: gigantic dirigibles, "aerial tankers," nearly a mile in length, cruising above the ice at a speed of 38 miles an hour. The way Sonstegaard calculated it, the cost of moving natural gas from King Christian Island, the site of Canada's biggest gas discovery, 2,800 miles to New York would amount, in 1970 values, to a modest 17 cents per thousand cubic feet.14

Even the Government of Canada seemed infected by the Arctic contagion. In a study commissioned by Ottawa, former petroleum economist and academic David Quirin endorsed a conservative estimate of 33 billion barrels of oil waiting to be found in the Arctic Islands, and estimated demand for this oil in Europe and Eastern Canada to be as much as 1.5 million barrels a day by 1980. "Risks are greater in the Arctic Islands," Quirin wrote. "So, perhaps is the possibility of large gains."15

If Sproule's exuberance sometimes got the best of him, it was never the hype of hucksters. He had the courage of his convictions, and put his money where his mouth was. Starting in 1960, Sproule sent two to four geological field parties into the Islands every year for five years, and spent on these studies $1 million more than he received in fees. A million dollars in exploration expenditures was less than loose change for a big oil company, but, in the 1960s, it was a lot of money for a consulting firm, and it strained the resources of J.C. Sproule and Associates. Employees were sometimes asked to hold on to their paycheques until there was enough money in the bank. To help underwrite the Arctic work, petroleum engineers were added to the staff of geologists: they generated more immediate and more certain revenue from less glamorous work associated with the industry's development and producing activities in southern Canada.16

As on the mainland, Sproule and Associates achieved immediate success in the Arctic Islands, at least in metallic terms, if not in terms of petroleum. During their first year on the Islands, one of the Sproule survey parties found a rich lead and zinc deposit on Little Cornwallis Island. Teck Cominco Ltd. developed it into the most northerly producing mine in the world, with the world's largest Canadian flag painted on the

roof of the concentrate warehouse. Nearly six million tons of lead and zinc were shipped from the company's Polaris mine to European mills by Canarctic Shipping's icebreaker cargo ship MV Arctic during a 22-year period before the mine closed in 2002.

Drilling for oil was not quite as successful. The first wildcat was on Melville Island. Contractor Peter Bawden Drilling hauled a rig by railway from Calgary to Montreal, and from there aboard the Danish freighter MV Thora Dan to the drill site. Dome Petroleum, operator for 13 oil and mining companies, began drilling Dome Winter Harbour, the world's most northerly exploratory well, on September 10, 1961. The hope was to find a coral reef, the Allan Bay reef that tiny bugs had built when the Arctic was tropical. There were outcrops of Allan Bay reefs some 300 miles west on Banks Island and about the same distance east on Cornwallis Island. Geologists thought there was a chance of an Allan Bay reef as thick as 5,500 feet somewhere under Winter Harbour. If the reef was there, if it was porous, like a sponge, if the porosity was filled with oil, there could be a multi-billion barrel oil field at Winter Harbour. A lot of "ifs." And, as with any wildcat, the odds were that it would be another dry hole. It was. Seven months after drilling started, Dome Winter Harbour was abandoned at a depth of 12,543 feet, having found only a small showing of natural gas. A similar fate awaited the next two Island tests, drilled on Bathurst and Cornwallis islands.

A big chill in the Arctic

The Arctic fever was cooling off in late 1964, chilled by the three dry holes and by the attraction of exploration dollars to the North Sea, the U.S. Gulf Coast, and offshore from California where big finds were being made, when Sproule broached to one of his clients an idea for a new approach. The small oil and mining companies that comprised most of his clients were running out of money for Arctic wildcatting. Permits were being dropped in the face of increasing expenditure requirements, falling from a peak of 63 million acres to 41 million by mid-1966.

A pooling of resources, risks and rewards, seemed to Sproule the best, perhaps the only way to keep high Arctic exploration in gear. Almost the entire region would have to be explored in the manner of a single concession, with one company, the operator, doing the work on behalf of all. Sproule had already convinced his clients to share geological knowledge gained by the five years his field parties had been working on the Islands, providing a picture of the entire area rather than a series of separate pictures of different permit areas. This approach had been facilitated by the fact that exploration work to meet government permit expenditure requirements need not necessarily be done within a permit

area. Extending this co-operative approach to the far more costly wildcat drilling stage required a mechanism to share not only risks and expenses but the rewards from any resulting discoveries.

"Farmouts" are the industry's long-established way of sharing wildcat risks and rewards. An oil company drills on permits, reservations or leases held by another and earns an interest in those lands. The two then, in effect, become partners in development and production if oil or gas is discovered. What Sproule had in mind was the biggest series of farmout arrangements ever made. He wanted nearly all of the permit holders in the Arctic Islands to farm out their holdings to a single company that would conduct a widespread exploration program.

Sproule mused about these thoughts in December in a casual conversation with one of his clients, an Arctic Islands permit holder, Eric Connelly, president of Pembina Pipe Lines (which was an oil producer, as well as a pipeline company). All that was needed, Sproule told Connelly, was $30 million.17 Connelly was infected with Sproule's contagious enthusiasm. Together they conceived Panarctic Oils. It would acquire farmouts covering all the best oil prospects in the Arctic Islands. The money would come from the oil and mining companies, and from another new firm, Great Circle Petroleum, which would secure additional financing from private investors. Deane Nesbitt agreed to raise this part of the money. He had played a vital role in financing TransCanada PipeLines and his Nesbitt, Thomson and Company Montreal investment firm had been a leader in financing Canadian energy firms for four decades, including McColl-Frontenac, Canadian Oil Companies, and Power Corporation. Over a five-year period, they would drill 50 exploratory wells in the Islands. Twenty of them, Sproule predicted, would be oil discoveries, a remarkable four-in-10 discovery ratio.18

As the plan evolved, it called for not just the approval of the landlord, but also for the active participation of the federal government, the real owner of whatever resources were up there. Ottawa was interested, not only to see the development of its northern resources, but also to strengthen Canada's claim to sovereignty in the High Arctic. The Northern Minerals Exploration Program, announced by Ottawa September 6, 1966, offered to cover 40 percent of the cost of approved exploration for petroleum and metallic mineral resources north of the 60th parallel. If exploration was successful, the government was to be paid back out of commercial production during a 10-year period. The government would also collect its landlord revenue from lease rentals and sales royalties.

Sproule and Connelly had already incorporated Panarctic Oils Limited, on May 27. Here's how they planned to get the $30 million: $6

million would come from the government's forgivable loan, which would be made to Great Circle Petroleum; $9 million more would be raised for Great Circle by Deane Nesbitt; $9 million would come from the oil and mining companies; and $6 million, in the form of geological work and cash, would come from J.C. Sproule and Associates.

It didn't work out quite that way. Negotiating complex agreements with 75 companies was a long and difficult task. Getting them to put up the needed money was even more difficult. Eighteen months after he and Connelly had first hatched their plan, Sproule was still a few million short of the needed $30 million. Deadlines for work expenditures required under the terms of the government permits were fast approaching. If the money wasn't soon in hand, the whole program would collapse.

It was on the long weekend that marked Canada's 100th birthday, July 1, 1967 that five oil men and a number of their lawyers held crisis meetings in search of a way to rescue Panarctic. The rescue seekers included Sproule and his lieutenant Gordon Jones; John Taylor, general manager of Canadian Pacific Oil and Gas; Bob Armstrong, Cominco's exploration vice-president; and Jack Gallagher of Dome.19 The end result was a new plan announced by Indian Affairs and Northern Development Minister Arthur Laing in the House of Commons on December 12, 1967. Panarctic had been saved. It had taken three years since Sproule and Connelly had first hatched their plan to put it all together, and it wasn't quite what they had first envisioned.

It was to be a scaled-back exploration effort: from five years to three years; from $30 million to $20 million; from 50 wildcat wells to 17. If success attended their initial efforts, the program could be restored to its initial dimensions. The forgivable government loan was scrapped: Ottawa would instead put up $9 million for 45-percent ownership of Panarctic. Twenty oil and mining companies would put up $11 million for 55-percent ownership. The three-year program would earn Panarctic from 50- to 90-percent interest in 44 million acres of permits farmed out from 75 companies; and greater interest if exploration was extended to five years. Aside from the government, Panarctic's biggest shareholders were the oil and mining subsidiaries of Canadian Pacific Investments, Canadian Pacific Oil and Gas (later, Pan Canadian Petroleum, and then EnCana Corporation) and Cominco, which together had committed $3.6 million for an 18-percent stake. Dome Petroleum and Dome Mines held 5.4 percent.

Sproule was chagrined that Panarctic was, at least initially, to be managed by Dome Petroleum. In a letter to a colleague, he complained that Panarctic was "being operated by a gang of 'Nincompoops.'"20 The

Nincompoops, for their part, were starting to look askance at Sproule's evangelic Arctic fever. There was also the fact that Sproule had no experience managing an oil company. Jack Gallagher and his "gang of Nincompoops" to this point had been highly successful in building and managing Dome Petroleum.

There was more bitter disappointment for Sproule. He was almost totally excluded from Panarctic's management team. John Taylor was the first president; Bob Armstrong was executive vice-president, and John Godfrey, manager of Dome's land department, was the second vice-president. Sproule was but one of 14 directors and his position as a member of Panarctic's exploration committee was terminated after a little more than two years. Sproule wound up with a net eight-percent carried interest in Panarctic's holdings, and Eric Connelly with two percent (which he later sold to Petrofina for $6 million, before it became worth virtually nothing). Being shut out of the management of Panarctic was probably the most bitter disappointment in Cam Sproule's life.

At the very time that Northern Development Minister Arthur Laing was announcing Panarctic's bold adventure, a lone wildcat well a thousand miles to the west of the Islands, on the Arctic coastal plain of Alaska, was working on a big chapter in the history of polar petroleum exploration that, for a time, would dramatically change the outlook for Panarctic. Thirty-five wildcats had been drilled by the U.S. navy on its Alaskan North Slope Naval Reserve from 1945 to 1953, finding about 100 million barrels of oil and one trillion cubic feet of gas. There had been no further exploration until British Petroleum and Sinclair Oil drilled eight dry holes between 1963 and 1967. Drilling had started at one more wildcat in the spring of 1967.

"It is anticipated that little or no geophysical or geological work will be conducted on the Arctic slope during 1968 unless the currently drilling well is successful," the American Association of Petroleum Geologists concluded.21 The "currently drilling well" was Arco Humble Prudhoe Bay No. 1, completed in June the following year, with the discovery of North America's largest oil field. It was dramatic confirmation of the Arctic potential that Lewis Weeks had foreseen 24 years earlier and which Sproule had been promoting so vigorously. The sedimentary rocks that rim the northern fringe of the continent in a giant arc were suddenly a global hot spot for oil seekers. Property that Sproule had found so difficult to peddle for exploration dollars was now in hot demand, at least for a time.

Surviving in the Arctic

Robert Service's Law of the Yukon "that surely the weak shall perish, and only the fit survive" holds even greater sway in the Islands. Industry has conquered those globs on the globe that mark the world's most northerly lands, has mapped its geology, learned how to drill here year-round to depths of three miles or more, looked at the petroleum beneath the permafrost, mined its minerals, plowed ships through its ice-infested waters. But the terrible unforgiving harshness of its elements, the drifting ice that sinks ships, the whiteouts that blur land and sky for aircraft pilots, the summer storms that blow away tents of geologists and rim ropes and guy lines with up to six inches of ice in July, the fierce winds that can toss helicopters around — have exacted their tolls in money and blood.

The first fatalities for the Islands oil explorers came with Sproule's first field parties in 1960 when a Piper Super Cub aircraft on a reconnaissance flight along the East Coast of Cornwallis Island crashed, killing the pilot and geologist. Suspected cause was either a whiteout or iced-up instruments that failed to indicate altitude.22 Ten years later, a helicopter pilot and his passenger working for Panarctic were killed while moving supplies for a third wildcat on Melville Island. Timber slung below the chopper tipped in a gust of wind, became tangled with the rear rotor, causing the main rotary blades, thrown out of kilter, to slice through the bubblenose Plexiglas cockpit, decapitating the pilot and passenger.23 Then three years after that, 32 people were killed when Panarctic's Viscount aircraft, carrying a drilling crew to the base camp at Rea Point, crashed into the ice and water of the Arctic Ocean, a mile short of Melville Island. Only the two pilots survived because the aircraft nose came off and they were able to scramble onto the ice.

In dollar terms, the most costly accident was the $6-million loss of two barges, 200,000 gallons of diesel fuel, drill pipe and all the other dry goods that Panarctic had intended using for its 1969 drilling season. The tug Irving Birch was pushing one barge and pulling a second as it approached Resolute on Cornwallis Island when the train became trapped by shifting ice, sinking the lead barge in a matter of minutes. The aft barge, drifting with the moving pack ice, threatened the tug and crew with a similar disaster. The tow line was quickly severed, and the second barge sank. At Calgary and Edmonton, replacement supplies were hurriedly assembled and flown in on an armada of Hercules aircraft.

The pace picks up

The Prudhoe Bay discovery was a powerful stimulant to the search for oil in the Islands. The Arctic had yielded North America's largest oil field; surely other giant oil finds would follow. Panarctic controlled most of the prospects, and it would soon have partners to help in its search. It didn't hurt that, following the dry holes of others, Panarctic's first wildcats yielded dramatic discoveries. Arctic Islands exploration was on a roll, for at least a few years.

Two of Panarctic's first four wildcats found very large gas fields, and each blew out of control. The drilling crew was pulling pipe to replace a worn-out drilling bit at Panarctic's Drake Point hole on Melville Island in July 1969, when the derrick began to tremble as though in the grasp of an earthquake. As the drillers scrambled for safety, a plume of mud, water and gas surged above the top of the derrick at rates of as much as 40 million cubic feet per day of gas and 40,000 barrels of lukewarm salt water. The water kept the gas from igniting into a ball of flame, but inundated an area the size of a city block, threatening to wash away the ground and permafrost from under the drilling rig. It was hitched up to tractors and pulled to safety before it could tumble into a pit of mud and water. As the water spewed into the sky it froze, building up an ice cone that eventually reached a height of 250 feet.

It took $2.7 million, 16 months and the drilling of two relief wells to shut down the flow from the rogue well. The first relief well had drilled diagonally only half way to its target when it encountered its own problem with high-pressure gas, and had to be shut down before it too blew out of control. The second relief well, just 100 yards away, successfully intercepted the hole from which the gas and water spewed, and the wild well was shut down and capped with cement.24

Drake Point was the only Panarctic discovery that Sproule was to witness. The rogue well was still running wild when he died suddenly of a massive cardiac arrest, on May 20, 1970, while delivering a paper on his favourite topic, Arctic Islands geology, to some 40 delegates at an annual meeting of the Association of Professional Engineers, Geologists and Geophysicists at Alberta's Jasper Park. His name was later perpetuated when the government, at the instigation of Jean Chretien, then minister of Indian Affairs and Northern Development, named the northwest tip of Melville Island, Sproule Peninsula. "As long as there are maps of Canada, Cam Sproule's name will be inscribed as a tribute to his development of Canada's North," Chretien declared.

Panarctic's second discovery, on King Christian Island, blew in even more spectacularly on October 25, 1970. The gas flow this time was estimated at 400 million cubic feet per day, 10 times the flow at Drake Point, and it came without water to keep it from bursting into flame.

When it caught fire, it was the equivalent of burning gasoline at a rate of more than 2.5 million gallons a day and the flare that shot into the Arctic darkness was visible from aircraft more than 300 miles away.

Unlike Drake Point, it took only three months and one day before water, mud and cement were pumped down a relief hole to snuff out the King Christian well. But it was probably then the world's biggest fire, a wonderful promotional tool for the man who, in August, had become Panarctic's first, and last, full-time president.

Charles Hetherington, the Oklahoma engineer who had arrived in Calgary in 1949 to build Frank McMahon's Westcoast Transmission gas pipeline and had stayed to help run Westcoast as well as McMahon's Pacific Petroleums, until Phillips Petroleum took control, knew how to turn a wild well to advantage. He had seen how effective McMahon's famed Atlantic No. 3 wild well had been in putting the Leduc field on the global oil map and putting millions of investment dollars into McMahon's eager hands. Hetherington set out to duplicate that in the Arctic.

One thing was very clear about Hetherington's prospects as head of Panarctic: the job certainly wouldn't last any longer than Panarctic itself. The 20 Panarctic shareholders had agreed to extend the exploration program from the minimum $20 million to the originally contemplated $30 million. But by the end of 1970, more than half of that money was already gone. Seven wildcats had been drilled on the Islands (four by Panarctic), and no oil had been found. It's true that two of those holes had discovered two of Canada's largest gas fields, a remarkable exploration success, but they were of dubious value. Aside from Sonstegaard's equally dubious idea of mile-long balloons, moving gas out of the Islands presented an even more difficult and costly challenge than shipping oil.

Panarctic's small oil and gas companies were getting discouraged, the risks and costs of High Arctic exploration were getting a little rich for their blood. If Panarctic, and Hetherington's job, were to last more than three years, additional sources of money, from deeper pockets, would have to be found. That was where the King Christian blowout came in. It was the world's biggest flame to attract the world's richest moths.

The basic solution was simple. By drilling enough wildcats, Panarctic could earn 50 to 80 percent interest in more than 40 million acres farmed out from the 75 permit holders. Panarctic could afford to give up some of that interest to deep-pocket companies in return for continuing the drilling. Even before the King Christian well blew wild, British Petroleum subsidiary Triad Oil and King Resources Company had agreed to drill a number of wells to earn 40 to 50 percent interest in nearly six million acres. Now, Hetherington would use the wild well to attract more

money. A photographer was hired to film the spectacle. A planeload of oil and gas pipeline executives was flown in to witness the inferno. The stage was well set. “Around the fire were . . . diesel generators, compressors, mixing tanks, racks full of steel pipe, and mountains of cement bags, all under the glare of powerful arc lights.”25 As Hetherington later recalled it: “I took presidents of oil companies to see it, to show that the Arctic definitely had energy reserves. As a result, four of the companies wanted to invest money in the area!”26

Exploratory drilling in the Arctic Islands, fuelled by visions of more multi-billion oil fields like Prudhoe Bay, lasted 21 years, and then the High Arctic was returned to its vast solitude, housing a large storehouse of idle energy resources, technological triumphs, and unanswered questions.

When the last well reached its total depth in 1987, nearly a billion dollars had been spent to drill 160 holes over an area of half a million square miles, an area larger than Ontario, twice the size of Texas. About 120 holes were wildcats looking for new oil and gas pools, not much more than one hole for every 5,000 square miles; the others were follow-ups to define the size of discovered fields. The wildcats found three oil fields (one on Cameron Islands and two offshore), and 16 gas fields, holding the equivalent of about 2.5 billion barrels of oil. About one in every eight exploratory holes was a discovery, with an average of about 170 million barrels oil equivalent for each discovery. Anywhere else in North America, the 14 discovered Arctic Islands fields would produce more than $100 billion worth of oil and gas. But this discovered volume of fuel is only 20 percent oil and 80 percent natural gas; the gas is too costly to move, and the oil too little to overcome the ice-bound challenge.27

Taxpayers paid for more than half the billion dollars spent exploring the Islands, mostly as shareholders in Panarctic with the same prospects of risk and reward as the shareholders of the participating private companies. But the type of super-incentives that financed early exploration in the Beaufort Sea by loading nearly all the risks on the taxpayers with rewards to be reaped by private shareholders, were not as big a factor in the Islands. Those excessive incentives came in 1977 with a super depletion tax allowance and in 1981 with Petroleum Incentive Payments. Most of the Arctic Islands drilling was already completed, having peaked in 1973 and tailed off sharply after that.

The Northwest Passage resurrected

In addition to the locked up oil and gas, the legacy of the Arctic Islands explorers included impressive technological achievements, in year-round drilling and support operations through the long dark of

Arctic winters; in drilling and completing oil and gas wells (at least for testing purposes) from strengthened ice in 1,000 feet of Arctic Ocean water; installing wellhead facilities to produce oil and gas from beneath the ice; building pipelines from offshore wells to facilities on land; and shipping through the Northwest Passage.

If anyone had a grander vision than Cam Sproule of crashing tankers through the ice to finally crown with success the 400-year-old quest for commercial shipping through the Northwest Passage, it was the world's biggest oil company. Standard Oil's Humble Oil subsidiary looked at three alternatives to move the very large Prudhoe Bay oil reserves: by pipeline across Alaska and tanker to West Coast ports; by pipeline across Canada to refineries in the U.S. Midwest, and by tanker through the Northwest Passage. It envisioned a fleet of 30 supertankers each moving 250,000 tons of oil across the top of the world to U.S. East Coast ports by 1980. "An open Northwest Passage means not merely an oil route, but an international trade route that will have profound influence on the rate of Arctic development and the pattern of world trade," Humble's president Dr. Charles Jones predicted. "A year-round sea route in this area could do what the railroads did for the Western United States — and might do it quicker."28

To test its tanker concept, Humble took a two-year charter on the Manhattan, the most powerful tanker in the U.S. fleet, cut it into four sections, and towed the sections to four shipyards for modifications. A new 125-foot icebreaker bow and an ice fender made of high-strength steel 11D 4 inches thick were added, and the 1,000-foot leviathan made two voyages from Pennsylvania to Prudhoe Bay and back, in 1969 and 1970. It was not all clear sailing. On the first voyage when the Manhattan was routed north around Banks Island through McClure Strait, rather than south around the big island, Humble was hoping to keep the ship in what it hoped were international waters rather than a more southerly passage through what are even more indisputably Canadian waters. But in McClure Strait, the Manhattan was gripped fast for 34 hours in a 10-foot pan of polar ice before it was finally freed by the tiny 9,000-ton Canadian Coastguard icebreaker John A. Macdonald.29 After spending US$50 million on the Manhattan tests, Humble concluded that icebreaker tankers can conquer the Northwest Passage, but for Prudhoe Bay oil, the trans-Alaska pipeline appeared to offer lower-cost transportation. In a statement issued after the big ship's second trip, Humble declared that "the use of icebreaker tankers to transport crude oil from Alaska's North Slope to U.S. markets is commercially feasible . . . but pipeline transportation appears to have an economic edge."30

While Prudhoe Bay oil moved by pipeline, some three million barrels of Arctic Islands oil were shipped between 1985 and 1996 from the smallest of Panarctic's three oil fields but the only one on land, the Bent Horn field on Cameron Island. Hauled by Canarctic Shipping's MV Arctic, most of the Bent Horn went in two shipments each summer to Petro-Canada's Montreal refinery. The Bent Horn oil was so clear and light that it was used just as it came from its subterranean reservoir to fuel Panarctic's drilling rigs, Northern Canada Power's diesel power plant at Resolute, and the Polaris mine on Little Cornwallis Island. Originally built as an icebreaking bulk carrier to haul ore from the Polaris mine, MV Arctic was converted after the Bent Horn oil discovery into the world's only dual purpose ore freighter and oil tanker. Gulf Canada Resources, in 1986, delivered the only other tanker shipment of Arctic oil, 320,000 barrels of crude shipped to Japan from its Amauligak discovery in the Beaufort Sea off the Mackenzie River Delta.

The Manhattan, the MV Arctic, and Panarctic's drilling, testing, and producing operations all suggest that multi-billion barrel oil fields in the Arctic Islands could be commercially produced, if only such fields could be found.

Gas is another matter. Because a given volume of natural gas contains roughly only one-third as much energy as the same quantity of crude oil, it's a more costly form of fuel to transport, especially from the ice-locked areas of the High Arctic. Gas can be greatly compressed into liquid form under pressure and very low temperatures, and while that means a very much smaller volume for a given amount of energy, it's also a costly process. That's why liquefied natural gas (LNG) has never been moved by tankers in volumes remotely comparable to crude oil from super-abundant sources in the Middle East and elsewhere. Pipelining gas from the Arctic Islands is also a formidable challenge, not only because of the cost of trenching a pipeline under the ice, but once it reaches the mainline, a pipeline would have to be trenched through endless miles of the granite-hard rock of the Precambrian shield.

Thus it was dismal economics that killed two proposed projects to move Arctic Islands gas. In 1980, Petro-Canada, Dome Petroleum and Husky Oil applied to the National Energy Board for approval of the $2-billion Arctic Pilot project to ship LNG from the Islands, but withdrew the application two years later because it would have been a money loser. The same fate befell the multi-billion dollar pipeline plans of Polar Gas.

Will it ever be economic to ship out the gas? Are there multi-billion barrel oil fields up there that still await the drilling bit? Are the Arctic Islands analogous to the Athabasca oil sands where half a century was required to achieve commercial production? In the technologically fast

time frames of the 21st century, could it be achieved much more rapidly? Or will the energy resources of the Arctic Islands remain forever frozen in time and place?

Chapter 18 Frontier Energy: From the End of the Mackenzie River

By the 21st century, 183 wildcat wells — one for every 250 square miles — and 66 development wells in the Mackenzie Delta-Beaufort basin had found and delineated oil and gas fields with recoverable reserves estimated at one billion barrels of oil and nine trillion cubic feet of gas. Yet the search had barely more than started.

For millions of years, North America's second longest and largest river, the great, broad Mackenzie, has carried its burden of sediments more than 2,500 miles to spew forth from its end in a fan-shaped arc covering 45,000 square miles of the delta with its maze of flat, low islands, along a narrow coastal plain, and out along the shelf of the Beaufort Sea for a distance 50 to 100 miles where the water becomes as deep as 600 feet. It is a mistake to think of this as the river's mouth, for the mouth is where things start to go down, but here at the end of the river is where things come out, at "the opening at the lower end of the alimentary canal," as the dictionary so delicately puts it. What has come out has been sediments rich in the flora and fauna remains of a lush tropical region. During the millions of years this debris has been deposited it has piled up here as sedimentary rocks, as much as seven or more miles thick. Yet to geologists, much of the sedimentary rocks in this Mackenzie Delta-Beaufort Sea region of the Arctic are juvenile rocks of the Mesozoic era, deposited a mere 100 million to 200 million years ago. Below them are the sedimentary rocks of the Paleozoic era, deposited as long as half a billion years ago. It is in the younger Mesozoic rocks that drillers have encountered 90 percent of the oil found to date throughout the world.1

For half a century, private investors and taxpayers have paid geologists and drillers, supported by accountants and aircraft pilots, camp cooks and truckers, lawyers and sailors, a few billions of dollars to find the Delta-Beaufort's oil and gas. The search has been a battle against nature, to keep drilling rigs on land from sinking into a quagmire of thawed permafrost, and offshore rigs from being torn apart by the forces of gale winds, raging seas, and pounding ice. On land, helicopters flew in 25-foot Sitka spruce poles for pilings set in drilled holes, butt end up, to create drilling rig platforms above the permafrost for the first

drilling rigs in the Delta. Offshore, the Arctic's largest-ever non-military armada of vessels and support equipment, as well as man-made islands, challenged the destructive polar forces.

The search has proceeded in spurts and stalls, like a high-powered engine with a fuel line problem, accelerated by the prospect of more Prudhoe Bay-size oil fields and the generous but short-lived support of taxpayers, while stalled by lack of pipeline transportation, the Arctic's costly challenges, the failure so far to find more multi-billion barrel oil fields, the rollercoaster ups and downs of oil and gas prices, and the shifting balance of natural gas supply and demand.

As it later did in the Arctic Islands, the field work of the GSC and Sproule's geologists in the late 1950s focused interest in the oil potential of the Delta-Beaufort basin, and oil companies rushed to acquire exploration licences. The largest blocks were taken out by Imperial, Shell, and British American (later Gulf Canada). These three in 1965 drilled the first wildcat in the Delta, on Richards Islands, to a depth of nearly 13,000 feet, finding a little gas and indications of oil. Imperial made the first discovery four years later, a small oil pool at Atkinson Point northeast of Inuvik. In the next couple of years, Gulf, Imperial, and Shell scored three large gas discoveries on the low-lying land and islands of the Delta. The Parsons Lake, Taglu and Niglintgak fields, with some six trillion cubic feet of gas, are the anchor fields of the proposed Mackenzie Valley gas pipeline hopefully planned for completion by 2009, nearly four decades after the discoveries.

The Arctic armada

While drilling on land found substantial gas reserves and a modest amount of oil, it was apparent that the largest structures and best prospects lay beneath the Beaufort Sea. Imperial, in 1972, was the first to step out, drilling from a pair of artificial islands dredged from the sea bottom in 19 feet of water. A decade later, there were 19 man-made islands in the shallow waters of the Beaufort, most of them later washed away. Artificial islands were practical in no more than 60 feet of water. To drill tantalizing structures revealed by seismic under deeper water would require some very special vessels.

The largest armada ever assembled in Arctic waters, aside perhaps from naval vessels, began gathering in the Beaufort 1976 to probe the prospects that can't be tested from dredged islands. First on the scene was Dome Petroleum's Canadian Marine Drilling (Canmar) followed by Gulf Canada's BeauDril. At the peak in 1985, there were six ice-reinforced drill ships of various designs, 14 icebreaker supply ships, three of the world's largest ocean-going dredges, a floating drydock

capable of servicing 30,000-ton vessels, a supertanker with a store of 650,000 barrels of oil to fuel this Arctic armada, a score or more of barges and smaller vessels, onshore warehouses, living quarters and other facilities, and numerous helicopters. Three thousand people were working in the Delta and on the Beaufort in the search for oil and gas, on the drilling rigs, on the man-made islands, the drill ships, the dredges, the supply vessels, and all the support services. Canmar had twice-daily flights from Edmonton with its Boeing 737, one flight carrying crew changes and the other flying in cargo. BeauDril was not far behind. Between them, Canmar and BeauDril had an investment of some $1.3 billion in highly specialized vessels and facilities for drilling along the fringe of the permanent polar ice cap, which revolves clockwise around the top of the world at a speed of three miles a day. Drifting packs of ice, pushed by gale force winds, move a little faster to crash with incredible force against anything in their path.

Dome had started its Beaufort drilling from an artificial island, its Tarsuit, the deepest, in nearly 60 feet of water. It was almost smashed away by 12-foot waves driving 20-foot ice ridges, and the crew had to be evacuated to safety three times.2 Dome had another problem, too. Most of the permit area it acquired in 1967 was under more than 60 feet of water. Dome had 12 years, until 1978, to drill a number of wells on these permits, or lose them, together with substantial deposits. No one knew if it was even possible to drill in these deeper waters of the Beaufort, where, unlike areas among the Islands, there was no landlocked ice from which to construct stable drilling platforms.

Dome farmed out its permits to the Hunt brothers — Bunker, Herbert, and Lamar — sons of Haroldson Lafayette Hunt who had founded a fabulous family fortune in the East Texas oil field, the continent's largest until Prudhoe Bay came along. After taking a closer look, the Hunt brothers and their oil company officials decided that the drilling called for in the farmout agreement with Dome was too great a challenge. Dome made a new deal: it would drill the wells, but the Hunts would pay the costs and also provide Dome with an option to earn an interest in the Hunts' own permits. Dome hoped to form an Arctic offshore drilling firm in partnership with Gulf Canada and Global Marine of Los Angeles. When this fell through, Dome borrowed $120 million from its bankers to set up Canmar, and in 1974 hired a president to head Canmar, Gordon Harrison, a Manitoba farm boy and electrical engineer who had risen through the ranks at Mobil. Harrison was manager for Mobil's Sable Island drilling in 1968 before being transferred to London as manager of Northwest Europe, including North Sea drilling and producing operations. Within two years, Canmar had its initial fleet in the Beaufort:

four icebreaker supply ships and three drill ships: Explorers I, II, and III, strengthened for ice conditions.

As Canmar's navy grew to 40 vessels costing $690 million, including associated land facilities, the most innovative was a 10-year-old, 150,000-ton Japanese supertanker, purchased for $5 million. With the hull strengthened by three feet of steel and concrete and the addition of a drilling rig and a 180-foot derrick to drill through a moon hole amidship, the tanker became a submersible drilling caisson (SDC), towed to the Beaufort in 1983, a floatable island capable of drilling year-round. With later modifications, the SDC was able to drill in water depths of 24 to 80 feet. When ballasted, it sat placidly on the ocean bed; when the ballast was vented, it floated and could be towed to a new location.

Gulf's BeauDril also had its unique drilling vessels, Molikpaq and Kulluk. Molikpaq was, like Canmar's SDC, a floatable island, 300 feet square, designed to be towed to a drill site and ballasted to sit on the ocean bed. It was built with a hollow core to be filled with sand for greater stability while it squats on the ocean bed. Kulluk was a doughnut-shaped drill ship, its circular design providing greater protection from drifting ice while anchored and drilling in water deeper than that for artificial sand islands or moveable drilling caissons.

Drilling from the artificial islands uncovered a score of oil and gas fields. The biggest was Gulf Canada's Amauligak discovery, with more than 300 million barrels of recoverable oil and 2.3 trillion cubic feet of gas.

Then things grew quiet. The ships, the drilling rigs, the dredges, the airliners, the helicopters, and all the other activity that shattered the frozen stillness and solitude that so often prevail in the Arctic, ground quickly to a halt after 1986. In the following years, the Beaufort armada spent most of the time literally in cold storage. The last well drilled in the Canadian Beaufort for at least 15 years was completed by Imperial Oil and Chevron, their Isserk wildcat, in 1990. After acquiring Dome Petroleum, Amoco Canada in 1997 sold Canadian Marine Drilling to five shipping companies in Cyprus for an undisclosed sum. Canmar's three Explorer drill ships, its big submersible drilling caisson and BeauDril's doughnut-shaped Kulluk, when they weren't in storage, drilled a few holes in Alaska's portion of the Beaufort Sea. After drilling a pair of wells, Canmar's big SDC was stacked for 10 years at Alaska's Port Clarence, north of Nome, sold to Seatankers Management of Oslo, Norway, and brought out of storage in 2002 to drill a dry hole north of Prudhoe Bay for Calgary's EnCana. In August 2003, the SDC returned to the Canadian Beaufort to harbour at Herschel Island in the hope that it would be used by Devon Canada for a planned four-well drilling program

starting in 2005, the first planned drilling in the Canadian Beaufort in 15 years. BeauDril's big Molikpaq, meanwhile, in 1998 was towed through the Western end of the Northwest Passage and across the Pacific, filled with 278,000 cubic metres of sand, and now sits permanently on the ocean bottom, 10 miles northeast of Russia's Sakhalin Island to which it is linked by a pipeline. It is an oil production platform in an area of severe ice conditions for a group of companies headed by Shell.3

The stop and start signals

More than anything else, it has been the failure of plans to pipeline oil and gas from both the North Slope of Alaska and the Mackenzie Delta-Beaufort basin across the northern half of the continent that has blocked production and retarded exploration of Canada's Western Arctic energy resources. In the absence of production revenue with a pipeline outlet, exploration was kept alive largely by billions of dollars of taxpayers' money. When the taxpayer money ran out, exploration ground to a halt, not to be revived until early in the 21st century when political and market conditions renewed hopes for pipeline outlets.

The first and worst setback was the failure to achieve a crude oil pipeline from Prudhoe Bay 400 miles east to the Mackenzie Delta, up the Mackenzie Valley, across the Northwest Territories and half way across Alberta to Edmonton where it could tie in with existing oil pipelines stretching from Vancouver and the U.S. Pacific Northwest to Chicago and Toronto.

When tanker shipments were ruled out as too costly following the 1969 and 1970 voyages of the Manhattan, the 1,600-mile trans-Canada pipeline route, and a 700-mile trans-Alaska pipeline and West Coast tanker route were the two alternatives for moving Prudhoe Bay oil. The trans-Canada route offered clear advantages. It offered the shortest delivery route and the lowest cost for moving Western Arctic oil to the major portion of the continent's oil markets. It would make available oil from a much greater potential supply region, since the entire 1,600-mile route lay along prospective sedimentary basins. It would virtually ensure exploration and development of petroleum resources along the route of the pipeline, especially in the Mackenzie Delta-Beaufort Sea. It was environmentally safer than the trans-Alaska pipeline and tanker route.

Ottawa lobbied Washington for the Mackenzie Valley route. Oil companies active in the Canadian North pushed for it. Imperial, Gulf, Shell, Atlantic Richfield, the Interprovincial and Trans Mountain pipeline companies and others in 1969, the year after the Prudhoe Bay discovery, organized Mackenzie Valley Pipe Line Research Limited and undertook a $2-million study, including construction and operation of two 2,000-foot,

48-inch-diameter test pipelines in continuous permafrost near Inuvik. To no avail. The all-American route prevailed for much the same political reasons that various groups in the 1950s had unsuccessfully pushed for an all-Canadian route to move Alberta oil into Ontario, and later successfully pushed for an all-Canadian gas pipeline route to Ontario and Quebec.

Twenty years after its completion, the environmental costs of the trans-Alaska pipeline grabbed dramatic global attention when Exxon's tanker Valdez ran aground and spilled 11 million U.S. gallons of Prudhoe Bay oil along 1,500 miles of Prince William Sound coastline. The spill killed an estimated 250,000 seabirds, 2,800 sea otters, 300 harbour seals, 250 bald eagles, 22 killer whales, and cost Exxon US$3.5 billion in cleanup work, settlement of claims, and court-awarded damages.

The fate of plans to pipeline natural gas from Prudhoe Bay and the Delta-Beaufort has been more protracted, still unresolved 35 years after they were first announced.

First in the field were TransCanada Pipelines and its partners, People's Gas, Light and Coke of Chicago and American Natural Gas of Detroit, who in June 1969 announced that they were studying plans for a 3,100-mile pipeline from Prudhoe Bay to Chicago. Others immediately entered the contest. Westcoast Transmission planned a line to move the Alaskan gas to tie in with its existing system in northeast British Columbia for movement as far south as San Francisco. Alberta Gas Trunk Line, an instrument of Alberta government policy headed by Bob Blair, wanted to move the Western Arctic gas through a pipeline system with segmented ownership, of which it would own 100 percent of the portion across Alberta. El Paso Natural Gas advanced the most costly proposal, a trans-Alaska gas pipeline and tanker shipment of liquefied natural gas, an expensive procedure under the best of conditions.

It required eight years and nearly 700 days of public hearings, a quarter of a billion dollars in engineering, economic, and environmental studies and regulatory costs, and Canada's most intensive energy debate, before the Canadian and U.S. governments agreed on a pipeline system and route. It was a made-in-Canada decision, to which the U.S. government agreed.

It might have been a made-in-Canada decision, but it was not the one that the Government of Canada had said it wanted. Ottawa wanted a pipeline to move the gas up the Mackenzie Valley. It especially wanted that pipeline during the 1973 energy crisis precipitated by a crippling embargo of Arab oil supplies to Western nations. Prime Minister Pierre Trudeau made that explicit in the House of Commons:

A major development is the proposed gas pipeline up the Mackenzie Valley to move Alaska gas to the U.S. markets and at the same time make it possible to move Canadian northern gas to Canadian markets. While this project must, of course, be subjected to the usual regulatory proceedings, and cannot go ahead until it has been approved by the responsible authorities, the government believes it will be in the public interest to facilitate early construction by any means which do not require the lowering of environmental standards or a neglect of Indian rights and interests.4

After eight years of the most exhaustive regulatory examination and public debate of any Canadian energy project, what the National Energy Board (NEB) approved and the Canadian and U.S. governments endorsed was what a later Energy Board chairman termed a "fundamentally unsound" project incapable of being financed because its sponsors "boldly ignored almost every aspect of the operation of markets."5

Hearings on the competing applications were held in Washington by the U.S. Federal Power Commission (211 days of public hearings), in Ottawa by the NEB (253 days of public hearings) and more than 200 days of hearings in cities across Canada but mostly in the North before Mr. Justice Thomas Berger, late of the B.C. Supreme Court, appointed by the federal government as a one-member Royal Commission "to inquire into and report upon the terms and conditions that should be imposed in respect of any right-of-way that might be granted across Crown lands for the purpose of the proposed Mackenzie Valley pipeline."6

The hearings followed the applications filed on March 21, 1974 by Canadian Arctic Gas Pipeline Ltd. in Ottawa with the NEB and by its sister Alaskan Arctic Gas Pipeline Company in Washington with the FPC, and later with the Berger commission. Arctic Gas, a consortium of more than 20 Canadian and American oil companies, major gas transmission companies, and gas utilities such as Consumers' Gas of Toronto, was an outgrowth of the studies started in 1969 by TransCanada and its two U.S. partners. Arctic Gas had spent nearly $100 million ($350 million in 2004 dollars) in research and studies, including $21 million on northern ecological and wildlife studies conducted by some of the most eminent northern biologists and botanists. "Never before in North America has industry spent so much on ecological research and then openly published the findings in a widely acclaimed 45-volume biological reports series which was made available to universities throughout Canada," University of Alberta botany professor Lawrence Bliss later wrote to Prime Minister Trudeau.7 The Arctic Gas filings were made on the same day that Ottawa appointed Justice Berger to conduct his Mackenzie

Valley Pipeline Inquiry. Later applications were soon filed by Alberta Gas Trunk Line (now joined by Frank McMahon's Westcoast Transmission and its U.S. customer Pacific Northwest Pipeline Corp., together forming Foothills Pipeline), and by El Paso's application to the FPC in Washington.

The final choice came down to the Arctic Gas proposal for a single pipeline to transport gas from both Prudhoe Bay and the Mackenzie Delta, and the Foothills proposal for two separate lines, a Prudhoe Bay pipeline half way across Alaska to Fairbanks then along the Alaska Highway, and a second pipeline for Delta-Beaufort gas. Two separate systems would require an additional 1,600 miles of pipeline. Arctic Gas chairman Bill Wilder likened this to building two St. Lawrence Seaways, one for American ships and another for Canadian ships.

It was Judge Berger, a man with an enviable record as a passionate legal advocate of Aboriginal rights, who really killed Arctic Gas and any gas pipeline from the Western Arctic for decades. In his report on April 15, 1977, Berger told the government that "there should be no pipeline" from Prudhoe Bay along the coastal plain to the Delta in order to protect wilderness area and its wildlife, while "a Mackenzie Valley pipeline should be postponed for 10 years" to allow time for settlement of Aboriginal land claims.8 The high-profile Berger inquiry and report generated enormous and widespread emotional appeal, politically difficult for any government to ignore. It was virtually impossible for a minority Liberal government dependent for its stay in office on the New Democratic Party. Berger was a former NDP member of Parliament, a former NDP member of the B.C. legislature, a former leader of the NDP party in British Columbia, and his report enjoyed the unquestioned support of the NDP in Parliament.

In Washington, the FPC staff weighed in with their assessment of the competing proposals, finding that Arctic Gas had "the most logical natural gas pipeline route," was "vastly superior" to either the Foothills or El Paso proposals, and environmentally preferable. Two separate pipelines required by the Foothills proposal, warned the FPC staff, would result in "dramatically higher transmission costs" because it would transport gas "in an enormously inefficient way." Presiding hearing examiner Judge Nathum Litt concurred, finding that 45,000 pages of the hearing record and more than 1,000 exhibits provided no basis for granting an application to Foothills.

No matter. Two months after Judge Berger issued his report, the NEB issued its echo. It found the Arctic Gas proposal offered the lowest-cost transportation and the greatest economic benefits for Canada, but that it

was “environmentally unacceptable” and that, as Berger had declared, more time was needed to settle Aboriginal land claims.

The board not only decided on two pipeline routes for Western Arctic gas but had a helpful suggestion about how to finance the uneconomic pipelines: “pre-build” the southern portions of the Foothills system to export more Alberta gas on an interim basis, to be replaced later by Western Arctic gas when the northern segments of the trans-continental systems were expected to have been built.9 Prime Minister Trudeau and U.S. President Jimmy Carter signalled approval in principle of the Canadian and U.S. governments when they jointly announced signing the Northern Pipeline Agreement on September 8, three months after the Energy Board decisions. The anticipated pipelines from the Arctic, however, kept being anticipated again and again in the following decades:

July 15, 1979. With the United States facing declining oil and gas reserves and a growing shortage of domestic energy, President Carter declares, “I will insist this pipeline be built.”10

October 5, 1982. The southern pre-build sections have been completed at a cost of $2.7 billion, boosting deliveries of Canadian gas to U.S. markets from San Francisco to Chicago. “Completion of the Alaska Highway Natural Gas Pipeline is of major importance to the energy securities of both countries,” Energy Board chairman Geoffrey Edge states at the dedication ceremonies for the southeast pre-build leg to Chicago.11

December, 1989. The Energy Board approves export sales by Imperial Oil, Gulf Canada (now ConocoPhillips Canada) and Shell Canada of 9.2 trillion cubic feet of Delta-Beaufort gas. Deliveries are expected to start by November 1996 through a lateral to the Alaska Highway Natural Gas Pipeline, which is expected to have been built before then.

The taxpayers pay

Perhaps it was just coincidental, but it seems appropriate that taxpayer subsidies to help finance the search for frontier oil and gas, especially in the Beaufort Sea, were announced just two weeks before the date of Berger’s report that froze pipeline plans. The timely help, which came with finance and former energy minister Donald Macdonald’s March 31, 1977 federal budget, was officially called the Frontier Exploration Allowance, but more popularly known as “super-depletion” or “the Gallagher amendment,” after Dome Petroleum chairman Jack Gallagher, whose super-salesmanship was reportedly instrumental in their adoption.12 With hope of any production and sales revenue delayed for a decade or decades, the search for more Delta-Beaufort gas would have been as frozen as the pipeline plans without taxpayer help.

Smiling Jack Gallagher never tired of displaying for anyone interested his seismic pictures of giant structures buried beneath the bed of the Beaufort Sea. If even one of these were filled with oil, it could mean billions of dollars in revenue for the federal government and taxpayers, as Prudhoe Bay had for the State of Alaska and Leduc and the post-Leduc oil discoveries had for Alberta. If taxpayers stood to be the chief financial beneficiaries of such speculated wealth, wouldn't it be reasonable that they carry a part of the cost of finding it?

The Frontier Exploration Allowance applied to costs in excess of $5 million spent on a wildcat drilled on the government's northern and offshore Canada Oil and Gas Lands. It piled tax deductions on top of existing deductions. Dome, with its Arctic armada and costly Beaufort drilling plans, became especially adroit at milking the FEA for all it was worth, reputedly more so than Ottawa's tax experts had anticipated. Depending on their particular tax circumstances, some Canadian companies and individual investors could use the FEA to cover most or all of the cost of a multi-million dollar wildcat; others could recover more than their cost; a few qualified to reap a profit of as much as 38 cents on every dollar spent on a dry hole.13

The FEA lasted three years and is thought to have contributed more than half a billion dollars to Beaufort drilling. It was replaced in late 1980 by the even more generous Petroleum Incentive Payments introduced with the National Energy Program in late 1980. With the PIP grants, as they were called, Ottawa spent $7.7 billion to subsidize frontier wildcats, most of it in the Beaufort.14 Depending on how costly they were and whether they were drilled by majority Canadian-owned or foreign-owned companies, PIP grants covered anywhere from 25 to 80 percent of the cost of approved frontier wildcats. All this, of course, was in addition to the frontier exploration financed by taxpayers through the government's Petro-Canada Crown corporation. Will taxpayers ever be adequately rewarded with federal government revenue for the tax dollars spent in subsidizing Beaufort exploration? Possibly. But if oil and gas pipelines from the western Arctic had been built, the subsidies would never have been required.

Caught in the cycle

When the price of pork is high, farmers raise hogs while consumers buy chicken, and the price of hogs goes down. Then the cycle starts over. Something like this has been happening in energy markets in general and natural gas markets in particular in the 40 years since the search began for oil and gas in the Mackenzie Delta-Beaufort basin. Tight gas supplies begat higher gas prices stimulating exploration, producing new supplies, followed by lower prices, then, as with hogs, the circle started

again. As the cycle has gone from phase to phase, so too have the prospects for a gas pipeline, or pipelines, from the Western Arctic, and exploration activity in the Delta-Beaufort, apart from taxpayer-subsidized drilling.

From 1955, when there were first deemed to be substantial natural gas supplies surplus to anticipated Canadian needs, to 1970, a total of 38 trillion cubic feet of natural gas — equivalent to more than six billion barrels of oil — was authorized for long-term contracted sales to U.S. buyers. But by the late 1960s there was already concern about North America's gas supplies without new sources. In was within this context that pipeline plans to tap the large gas reserves at Prudhoe Bay were advanced in 1969. And confirmation of that need seemed to come from the National Energy Board in late 1971. Barely more than a year after it had approved another large slug of export sales, the board concluded that there was "a deficit in supply" to meet anticipated Canadian needs as well as all that had been approved for export. In other words, an apprehension of impending supply shortages.15

In the United States, the "energy crisis" had already been proclaimed earlier that same year. "For the third successive summer, Americans by the millions are living under the dual threat of power brownouts, blackouts, and partial electricity rationing . . . part of the national crisis that won't go away — the energy crisis," the New York Times reported.16 The following year, 1972, Federal Power Commissioner John A. Carver predicted: "The energy shortage is not only endemic, it is incurable. We are going to have to live with it the rest of our lives."17 George A. Lincoln, director of the U.S. Office of Emergency Preparedness, warned that in the winter "there will be a shortage of natural gas" and "fuel oil for heating . . . is a matter of real concern." And the year after that, matters got much worse in October after the outbreak of the fourth Arab-Israeli war and the embargo on oil deliveries to the United States and other Western nations by the Arab members of OPEC.

Prices zoomed from $2.45 per barrel for imported oil laid down in Montreal in 1970 to more than $44 by 1980, while the export price for gas climbed from 33 cents to nearly $5 per thousand cubic feet. With higher oil and gas prices, just as with hogs, the demand growth slackened while oil companies accelerated the search for new supplies. By early 1979, the Energy Board found that once more there were gas supplies surplus to Canadian needs that could be sold to U.S. buyers. In the preceding four years, higher prices had increased the available gas supply by seven percent while anticipated Canadian requirements had been reduced by 11 percent.18 Naturally, prices fell, cut in half within four years of reaching their 1980 peak.

With not enough oil to fill a pipeline, with gas demand too weak and prices too low to build a gas pipeline, with the taxpayer subsidies gone, the Delta-Beaufort basin was in the doldrums. In 1997 and 1998 when Ottawa sought work commitment bids for new exploration permits in the basin, there were no takers.

Then, with sudden speed, the cycle changed again, and in 1999 and 2000 oil companies committed to spend $646 million (or lose hefty deposits) exploring new exploration permits in the basin. By 2004, the work commitments totalled $783 million, with wildcats on land and offshore to be drilled between 2004 and 2009.19 Leading the surge with a commitment to spend $275 million was Anderson Exploration, founded in 1968 by Nebraska geologist J.C. Anderson with $400,000 in seed capital from Texas investors. In 2001, Devon Energy of Tulsa acquired Anderson Exploration for $5.3 billion and planned to drill the first Beaufort Sea wells in 15 years, starting in 2005. Other explorers in the emerging exploration revival include Petro-Canada, Shell, Anadarko, BP Amoco, Burlington Resources, and ChevronTexaco

By the 21st century, 183 wildcat wells — one for every 250 square miles — and 66 development wells in the Mackenzie Delta-Beaufort basin had found and delineated oil and gas fields with recoverable reserves estimated at one billion barrels of oil and nine trillion cubic feet of gas.20 Yet the search had barely more than started. “Basin-wide appraisals indicate high potential for undiscovered petroleum resources, including the likelihood of several major fields (with recoverable volumes of greater than 100 million barrels of oil or one trillion cubic feet of gas) remaining to be discovered,” according to the Geological Survey of Canada.21

It’s needed, perhaps especially the gas. With a dramatic surge in gas demand for electric power generation and for raising steam to pump bitumen from the Athabasca oil sands, coupled with declining production of Canada’s conventional supplies of natural gas that peaked in 2001, gas prices tripled in a four-year period to 2004, and warnings were issued about a supply crunch that sounded like the early 1970s. “Natural gas markets . . . face challenges that result from declining production from conventional sources,” the Energy Board warned. “Significant market adjustments will be necessary . . . primarily in the industrial sector.” Some industries would have to switch to other fuels, including coal, while others faced the prospect of “relocating or discontinuing operations.”22 In the United States, Federal Reserve Board chairman Alan Greenspan warned of adverse economic effects and the “obvious loss of jobs that will go with the inevitable movement of gas-producing capacity to foreign shores, because it has made us largely

uncompetitive in a number of industries in which gas is a critical input."23

That's why oil companies were gearing up to spend a billion dollars searching for more oil and gas in the Delta-Beaufort basin, while pipeline and energy companies such as TransCanada and Enbridge jockeyed to build separate pipelines to move Prudhoe Bay and Delta-Beaufort gas by the end of the 21st century's first decade.

Two gas pipelines from the Western Arctic, rather than one, seem inevitable for two reasons. One is the implacable opposition to building a pipeline along the coastal plain and across the Alaska Wildlife Refuge from Prudhoe Bay to the Delta, which implicitly assumes that this 400-mile route would have greater adverse environmental impacts than 2,000 miles of pipeline across the far North. A more decisive reason may be that the owner of the gas, the State of Alaska, insists on an all-Alaskan route in order to supply gas to Fairbanks and the interior of the state — just as Canada insisted in the 1950s on an all-Canadian route to the East in order to supply gas to northern Ontario

Chapter 19.Frontier Energy: Don Axford and His Dumb Offshore Oil Idea

Axford held a contrarian view of the oil and gas possibilities of the continental shelf of Eastern North America. In his minds eye, he saw Sable Island as a ready-made drilling platform on which to test these prospects.

Donald W. Axford, a husky Viking from the Icelandic community beached far inland on the prairies of Manitoba, who went to sea with the Royal Canadian Navy on Atlantic convoy patrol during the Second World War, had this dumb idea that there was oil and gas to be found beneath the bed of the ocean off Canada's Atlantic coast. His boss said it was a dumb idea. His boss' boss said it was a dumb idea. Smart geologists said there was no oil or gas to be found beneath the Atlantic, north of the Gulf of Mexico. Yet there was something about the case Axford argued that caused the boss' boss to decide that the oil company they worked for should, after all, file claims for a million acres of oil and gas rights some 200 miles offshore from Nova Scotia. Several years later, Socony-Vacuum Exploration Company (now ExxonMobil) came back to that million acres and drilled a well on a sandbar called Sable Island, and uncovered the first deposit of oil and gas to be found offshore from some 1,500 miles of the North American east coast. Almost half a century later, nearly one-

fifth of Canada's oil production and a significant volume of natural gas flows from deep wells and high-tech production platforms offshore from Nova Scotia and Newfoundland. And Don Axford, for one, remains convinced that only a small portion of the oil and gas beneath the ocean beds off Canada's Atlantic coast has so far been found.

Axford's geological exploration career was kicked off in 1939 with a four-month prospectors' camp for University of Manitoba students, looking for hardrock minerals, followed later as a student geologist with GSC field parties in British Columbia, under the direction of Dr. Joe Spivak. During the Second World War he served aboard HMCS Athol, a corvette engaged on escort patrol out of St. John's, Newfoundland to Londonderry, Ireland. An experience aboard the Athol, steaming up the St. Lawrence, shook him to his first awareness of at least a tenuous possibility of oil and gas off the East Coast. He was "practically knocked out of [his] bunk by an earthquake," as he later recalled.1 Earthquakes mean there are faults. Faults produce traps in which oil and gas can sometimes be found.

If an earthquake that nearly tumbled him out of his sea bunk seemed a dramatic if tenuous signal, even more melodramatic and improbable — too improbable to be anything but real — was the sudden inspiration nearly 20 years later that launched the search for oil and gas off Canada's Atlantic coast. After the war, Axford had returned to university; had joined Joe Spivak, then head of Socony-Vacuum's Canadian exploration, on a geological field trip to the Arctic Islands and Alaska; had spent more than a year looking for oil and gas clues in the Rocky Mountains of northeastern British Columbia and the Yukon's Richardson Mountains near the Arctic coast; been hired permanently in 1948 by Spivak (permanently being a 27-year career with Mobil Oil; had participated in the discovery of some of the largest oil and gas fields in Western Canada; had worked on geological research out of Mobil's offices in Calgary, New York, and Dallas, and had returned to Calgary as Mobil Canada's chief research geologist.

Shortly after his return, Axford became locked in a day-long meeting of Mobil Canada managers devoted to personnel evaluations. Axford wasn't directly involved in much of the discussion, since his entire geological research department was only he and two other geologists. Restless and bored, his attention, as he later recalled, was grabbed by "the afternoon sun [that] came in through the windows and brightened up an aerosurface relief map," spotlighting Sable Island.2 Axford held a contrarian view of the oil and gas possibilities of the continental shelf of Eastern North America, a vast submerged coastal plain covering half a million square miles, stretching from Florida north to the coast off

Labrador and bulging some 300 miles out to sea under the Grand Banks. In his mind's eye, Axford saw Sable Island as a ready-made drilling platform on which to test these prospects at relatively little cost. Thirty miles long, Sable Island is the only part of the outer continental shelf of Eastern North America to rise above the sea.

For a research geologist, the next step was obvious: research all that was known about the geology of the East Coast, which Axford did for the next three months. It was a matter of looking at the onland geology in New Brunswick, Nova Scotia and Newfoundland and considering what this might imply about the geology extending a few hundred miles offshore. The prevailing thought was that there were only two types of oil and gas prospects off the East Coast of North America: slim and none.

The oil shows

Slicks, seepages and other tantalizing suggestions of oil on land accumulations in the Atlantic provinces have been known since at least 1812 when a certain Mr. Parsons skimmed oil from what became known as Parsons Pond in western Newfoundland and rubbed it on his joints to ease his rheumatic pains. Whether or not it helped him isn't known. There were repeated attempts to find the source this and other oil shows. Success was very limited but hopes die hard and the quest was still being pursued by persistent oil companies 192 years later.

At Parsons Pond, Nova Scotian John Silver used a steam-powered drill to sink a well on the north side of the pond in 1867, to no avail. Several others tried over the next 33 years, with similar results. But General Oil Fields Limited of Britain did manage to produce a small amount of oil from three shallow wells between 1919 and 1926, refining it to produce kerosene and gasoline for local residents and fishermen.3 Contact Exploration Inc. of Calgary and its partners returned to Parsons Pond in 2004 to drill West Newfoundland No.1, but suspended operations less than 600 feet short of the 3,700-foot target because of drilling problems.

Elsewhere in Western Newfoundland, on the Port-au-Port Peninsula that juts out in the Gulf of St. Lawrence, mining promoter Frederick Andrews sank four holes between 1898 and 1900 at the site of some oil-bearing shales and limestones, reportedly producing as much as 10 barrels of oil per day.4 In 1995, Hunt Oil and Pan Canadian Petroleum (now EnCana) drilled a 14,000-foot exploratory test on the Port-au-Port Peninsula, generating some excitement when the well found shows of oil and flared natural gas during testing. The accumulations were too small to develop commercial production, and the well was abandoned. Seven years later Canadian Venture Corporation and a number of small mining companies drilled a follow-up well that reportedly flowed oil at a rate of

195 barrels a day and gas at a rate of 1.2 million cubic feet per day. Plans for further development, however, were reportedly stalled for lack of funds after Canadian Venture ran into financial trouble.

In New Brunswick, early onshore results were somewhat better. New Brunswick, in fact, can make a strong claim to being the world's first commercial petroleum producing province, although the production was bitumen and not flowing oil. Nevertheless, New Brunswick's commercial production of bitumen preceded successful bitumen production from the Athabasca oil sands by more than a century. Unlike Alberta's oil sands, New Brunswick's production came from a vein of solid bitumen, so there was no costly problem of separating it from sand. Also, unlike Alberta's oil sands, it was a small deposit. Discovered 10 miles south of Moncton in 1849, the bitumen was mined for the next 20 years, supplying plants in Boston and Philadelphia that used it to distill lamp fuel after Abraham Gesner had developed the refining process to produce kerosene.

In 1859, the year of Drake's oil strike at Titusville and one year after James Miller Williams' well at Oil Springs in Ontario, Pittsburgh kerosene refiner H.C. Tweedle drilled near the New Brunswick bitumen deposit and discovered the small Dover oil field. Across the Peticodiac River from the Dover field, an English wildcatter, J.A.L. Henderson of London, in 1909 discovered the somewhat larger Stoney Creek field.5 New Brunswick's production has been tiny: between 5,000 and 30,000 barrels of oil per year from 1911 to 1988, with average gas production of 650 million cubic feet per year between 1912 and 1946, declining thereafter.6 At 2004 prices, peak production would have been worth about three-quarters of a million dollars a year. There was no lack of effort to find larger New Brunswick oil and gas fields. More than a dozen companies have tried, including Imperial, Shell, Chevron, Home Oil, Pan Canadian Petroleum and D'Arcy Exploration, British Petroleum's predecessor, which drilled 10 exploratory holes between 1919 and 1921, a decade after it had found in what is now Iran the first of the mammoth Middle East oil fields. It wasn't as lucky in New Brunswick: all 10 holes were dry. In 2000, Potash Corporation of Saskatchewan made New Brunswick's first commercial gas discovery in 91 years. The small field was developed with four wells that supply fuel for the company's Penobsquis potash mill.

Nova Scotia had oil shales, oil seeps at Lake Ainslie and Cape Breton Island, and small oil shows near Windsor. The Lake Ainslie Oil and Salt Company drilled the first Nova Scotia well in 1869, recording small amounts of oil and gas. From 1925 to 1930, Imperial Oil and Gulf Oil drilled some 20 exploratory holes, without success.

Until 1943, all the East Coast drilling had been on land. That year, Socony drilled its Hillsborough well in shallow water seven miles off Prince Edward Island on an island constructed with 7,200 tons of rock and concrete, cribbed by wooden timbers.7 Drilled as a wartime measure in search of oil supplies, the well probed to a depth of 13,890 feet at a wartime cost of $1.25 million ($15 million in 2004 dollars) without finding any indications of oil or gas.

Axford made an extensive study of all that was known of these oil shows and early drilling results, as well as more recent geological studies and maps. All the available clues and information were about the onshore geology. Even the Hillsborough well was too close to shore to say anything about what might exist hundreds of miles out to sea. “The prevailing academic theory of the offshore was that it was not prospective because a basement high called ‘Acadia’ existed in the Atlantic,” Axford later wrote.8 “Most sedimentary rocks in Nova Scotia were mapped as arriving from the east, from this presumed granite high.” A big basement high implied a thin layer of sedimentary rocks, with very little chance of finding any oil or gas. That’s not how Axford envisioned it. He saw Sable Island as the epicentre of sediments deposited not from granite rocks to the east under the Atlantic, but from the west by the St. Lawrence River, from the south by the currents of the warm Gulf Stream, and from the north by the cold Labrador current. The Atlantic’s flotsam and jetsam, including bottles thrown overboard, all seemed to land ashore at Sable Island, suggesting that the same currents could also have deposited ancient sediment-laden sands there.

A sliver of a 350-million-year-old fossil reef southwest of Halifax provided a clue that Axford was sailing on the right tack, with the possibility of more reefs out to sea. It also fired his imagination. Slightly older Devonian reefs, first probed by Imperial’s 1947 Leduc discovery, housed most of Alberta’s oil. Were there similar oil-bearing reefs offshore from Nova Scotia?

More supportive evidence of petroleum prospects came from small samples of younger Mesozoic rocks, the type that house most of the world’s crude oil, dredged from the sea bottoms by fishermen. That contrasted with onshore, where all the known sedimentary rocks were more than 225 million years old from the generally less petroliferous Paleozoic era. Final strong support came from a very recent seismic line shot by Boston’s Lamont Geophysical Laboratory, extending from near shore out to deep sea past the northern end of Sable Island. The seismic picture suggested sedimentary rocks becoming progressively thicker out to the edge of the continental shelf, but draped over a granite ridge in the area of Sable Island. “Just what I had expected,” Axford later wrote.9

The search begins

It was on a Thursday, at 9 a.m. on the ninth floor of the Baron Building — one of many new office buildings dotting Calgary's 8th Avenue to accommodate the influx of oil companies — that Axford made his 90-minute presentation, summarizing what he had learned and proposing that Mobil Oil Canada acquire a million acres of oil and gas permits on and surrounding Sable Island. "That is the dumbest recommendation I have ever heard," was the assessment of Axford's old mentor, Joe Spivak, by then Mobil Canada's exploration manager.10 Later that day, a dejected Axford was accosted by Mobil Canada's president Art Detmar, who demanded to know why his research geologist looked so glum. "This I've got to hear," Detmar responded when he was told about the ill-fated proposal. Axford repeated the 90-minute presentation first thing the following morning, with the same result. Detmar, too, said it was just about the dumbest thing he had ever heard.

For whatever reason, Detmar experienced an overnight epiphany, phoning Axford at 7 a.m. with orders to proceed to Halifax that day, Saturday, together with Mobil's landman Lynn Williamson, to file on a million acres of Nova Scotia mining claims. Claims were also later filed with the federal government, since it was then uncertain whether the mineral rights off the Atlantic coast were owned by Canada or by the provinces. Shell soon followed, filing on 20 million acres off Nova Scotia, completely surrounding Mobil's one million acres.

Events on the other side of the Atlantic would soon help stimulate interest in the oil and gas prospects on Canada's East Coast continental shelf. The same year that Mobil Canada applied for its first East Coast exploration rights, the Royal Dutch/Shell group, in partnership with Exxon, drilled the Groningen gas discovery in Holland. After nearly a century of searching for oil and gas in every corner of the globe, Shell had found what was then the largest gas field outside of Russia, right in its backyard. Since a good deal of Holland would be under water if it weren't for the famed dikes, it seemed logical that more gas might be found in the shallow waters off its coast. By 1965, large gas reserves had been found under the waters of the North Sea, and drilling was underway in the search for oil.

If gas had been found and there were good prospects for oil on the Atlantic's Eastern Shelf, why not on the Western Shelf? By 1966, the federal government had issued nearly 94 million acres of permits off Canada's East Coast, including 23 million acres held by Shell on the Scotian shelf; two million by Mobil on the Scotian shelf and 15 million more over the Grand Banks east of Newfoundland; and 41 million acres held by Imperial Oil and Amoco Canada Petroleum south of Mobil's

permits.11 Aside from Socony's 1943 near-shore test, Imperial and its partner drilled Canada's first offshore test on their 41 million acres. It was the first of 33 successive dry holes they were to drill during the next seven years, an early indication that neither the Grand Banks nor the nearby Scotian Shelf would yield their petroleum treasures easily, nor without discouragement.12 By coincidence, there were also 32 dry holes drilled off Norway and Britain before number 33 yielded the North Sea's first big oil field. Imperial and Amoco weren't that lucky: no oil fields followed their 33 dry holes on their big block of permits.

Mobil started drilling a year after Imperial and Amoco, loading a land rig and equipment shipped from Alberta by contractor Peter Bawden Drilling aboard a Second World War landing barge, and ramming it onto the shifting sands of Sable Island under the baleful gaze of the island's wild ponies. No one could be certain whether Mobil's Sable Island well would drill 2,000 feet or 20,000 feet before hitting the underlying Precambrian granite. It drilled to 15,106 feet, more than three times as deep as the first two Grand Banks wells by Imperial and Amoco. It finished drilling in Mesozoic, well above the older Paleozoic rocks, let alone the Precambrian basement. Geologically, the hole was still in the attic. It found traces of oil and a gas-laden sand under pressure too great to be safely tested with the type of blowout preventer then in use. The Sable Island well was seminal in the East Coast search. It proved not only the existence of thick Mesozoic rocks far out on the continental shelf, but also the existence of oil and gas in those sandstones.

Across the Atlantic in 1969, the year after Mobil finished drilling the Sable Island well, Phillips Petroleum found the giant Eskofisk oil field off Norway, and the North Sea was on its way to becoming one of the world's major oil producing provinces. Could the Grand Banks and the submerged coastal plain off Nova Scotia be far behind? Would Canada's East Coast rank with the Gulf of Mexico and the North Sea among the world's biggest subsea oil producers? The answers would come only after decades of drilling and development, billions of dollars, the world's most costly oil production platform, dry hole wildcats that cost up to more than $100 million, a $200-million blowout, the world's worst offshore oil tragedy, and political battles.

The first oil find, Mobil's Cohasset discovery near Sable Island in 1973, was disappointingly small, too small to be commercially produced, it was initially thought. But follow-up drilling by Mobil, Shell, Petro-Canada, Pan Canadian, Britain's London and Scottish Marine Organization (LASMO) and the province's Nova Scotia Resources resulted in a cluster of three small oil fields, Cohasset, Panuke, and Balmoral. Production began on June 6, 1992. It was Canada's first oil production

from beneath the oceans. Less than seven years and six months later, the three fields had been depleted and the wells were sealed with cement. They had produced 44.5 million barrels of oil, about as much oil as the world uses in 10 hours.

After 13 years of costly seismic and exploratory drilling, Chevron drilled Hibernia, the East Coast's first big oil discovery, 190 miles east-southeast of St. John's in 260 feet of water, earning an interest in acreage farmed out from Mobil and Gulf Canada. More large oil fields on the Grand Banks followed: Chevron's Hebron in 1981; Petro-Canada's Terra Nova, 21 miles southeast of Hibernia, in 1984; Husky Oil's White Rose in 1985.

Finding the oil was one thing, producing it was another. It took 22 years and billions of dollars before Hibernia would start producing oil, but money was far from the greatest cost. Three years after the discovery, Ocean Ranger, the largest semi-submersible drilling vessel off the East Coast, was drilling a follow-up well at Hibernia, when it capsized in a fierce Atlantic storm. All 84 people aboard were lost. It was the worst tragedy in the history of offshore drilling.

One thing that had to be decided before Hibernia's oil could be produced was who owned it. Canada, Newfoundland, and New Brunswick all claimed title to the subsea resources. Even France claimed a vast area fanning out from its tiny islands of Saint-Pierre and Miquelon, the last remnants of its empire that once embraced most of North America. Canada, Newfoundland, and France issued overlapping and sometimes conflicting permits to oil companies. International arbitration ultimately awarded France ownership of only a small area surrounding its two islands southwest of Newfoundland, a fraction of what it had sought, while in March 1984, the Supreme Court of Canada ruled that the offshore mineral rights belonged to Canada, not the provinces.

While Canada owned title to the mineral rights, it was apparent that arrangements would have to be made with Newfoundland and Nova Scotia to share potential revenues and administration of the resources. The first deal, in 1984, was signed by Pierre Trudeau's Liberal government in Ottawa and John Buchanan's Conservative government in Nova Scotia, only to be later scrapped by sweeter deals for the provinces when Brian Mulroney's Conservatives came to power. Patricia Carney, Vancouver business journalist, economist, regional planner, and politician, claims credit for devising the accords that were ultimately signed. Elected to Parliament in 1980, Carney was energy critic in Mulroney's Conservative opposition, and would later be energy minister in charge of demolishing the controversial National Energy Program.

Three months after the Supreme Court awarded the mineral rights to Canada, Carney, her executive assistant Brenda Brown, and Newfoundland Energy Minister William Marshall hammered out a conceptual agreement during lunch in St. John's Confederation Building. "Forget about ownership," Carney says she told Marshall. "It's the royalty revenues and jobs spin-offs that count." Carney adds that Brenda Brown "does not remember the conversation because she was wholly absorbed with the fact that the waiter's fly was open when he served us."13

Within another eight months, the basic terms agreed to by Carney and Marshall were incorporated in the Atlantic Accord, signed on February 11, 1985 by Brian Mulroney, then prime minister, and fellow Conservative, Newfoundland Premier Brian Peckford. It included a $225-million federal grant to help Newfoundland develop the infrastructure needed to secure oil jobs for Newfoundlanders, the joint Canada-Newfoundland Offshore Petroleum Board to administer the oil and gas resources, full authority for Newfoundland to set and collect the royalties from oil and gas production, and a complex formula limiting for 12 years reductions in Canada's equalization payments to Newfoundland that could otherwise result from the province's prospective oil revenues. A similar deal for Nova Scotia, replacing the earlier arrangement with Trudeau's Liberals, was later signed by Mulroney and Buchanan.

Carney later claimed that the Newfoundland and Nova Scotia accords were "probably Mashall's and my greatest independent contribution as politicians to Canada's economic development."14 A later Liberal politician would take a different view of these arrangements negotiated by Conservatives. Newfoundland Premier Brian Tobin, in 2000, described the royalty arrangement as "the worst thing to happen to Newfoundland since the disastrous Churchill Falls hydroelectric deal in 1969," under which Quebec reaped the lion's share of profits from electric power generated in Labrador. The problem with the royalty arrangement, according to Tobin, was that 85 percent of the province's oil royalties had been clawed back by Ottawa in the form of reduced equalization payments.15 Whatever. As far as the oil companies were concerned, the two accords at least provided a stable regime under which they could operate.

The holdup at Hibernia

A stable government administrative regime did nothing to speed the Herculean task of preparing Hibernia for production. Conflicting interests dividing the oil companies and the governments was a big part of the problem. Both the Newfoundland and Canadian governments wanted Hibernia developed and produced from a structure of steel and concrete

that would sit permanently on the ocean floor. Construction of such a gigantic platform would create the greatest number of jobs for Newfoundlanders, and the governments were desperate to get those jobs. Newfoundland already had Canada's lowest per capita income and highest rate of unemployment, when a moratorium on fishing for depleted cod stocks sent the unemployment rate to 20 percent.

The oil companies wanted to produce Hibernia at a profit, and that didn't look too promising after world oil prices were slashed in half from $38 in 1985 to $19 per barrel three years later.16 It especially didn't look promising with the big gravity ground-based structure (GBS) the governments wanted. The oil companies wanted to use a floating production platform which they said would cost only one-fifth as much and could be quickly and safely towed away if threatened by approaching ice bergs. Without that, Hibernia partners Mobil, Chevron, and Gulf were ready to walk away and let the project collapse.

Arne Nielsen, the stocky farm boy from southern Alberta who had found Pembina, Canada's biggest oil field, negotiated Hibernia's first rescue. With years of negotiations stalled, Nielsen met with federal Energy Minister Marcel Massé in Montreal to outline the conditions under which the oil companies were prepared to proceed. Their demands seemed so onerous that Nielsen did not expect them to be accepted. But they were. The government wanted those jobs. Ottawa agreed to kick in a billion dollars in cash subsidies and guarantee loans of $1.1 billion: if the project failed, Ottawa would have to pay off the loans. With this government support, contracts were let. Newfoundlanders had jobs building the giant production platform at the province's newly created shipyard and construction facilities at Bull Arm. That was the first rescue.

The next crisis came in 1992 when Gulf Canada Resources notified its partners that it wanted out. Gulf's interest dated back to 1970 at a time when it was eager to join the East Coast oil search, while Mobil was just as eager to join the Mackenzie-Delta play. Gulf acquired a quarter interest in eight million acres of Mobil's Grand Banks permits, while Mobil acquired a quarter interest in Gulf's three million acres in the Mackenzie Delta, including the large Parsons Lake gas discovery. Now, however, controlling ownership of Gulf Canada was no longer held by Gulf Oil Corporation of Pittsburgh: control of the renamed Gulf Canada Resources had passed to Toronto's Reichmann family. Once viewed as one of the world's wealthiest families, the Reichmann's were in deep financial trouble when Gulf announced its pullout, and three months later their vast real estate and resource empire was bankrupt. Gulf Canada Resources wasn't too financially prosperous, either.

Under the terms of their partnership agreement, Gulf was committed to Hibernia for 245 days after giving notice to Mobil, Chevron, and Petro-Canada, or until expenditures hit $1 billion. With Gulf's announcement, Hibernia's expenditures were cut in half to $1.5 million a day, planned production start was set back one year, and the search for a new partner to replace Gulf at a cost of $900 million was underway. The deadline was late January, less than a year away. No one was willing to take over Gulf's one-quarter share. Ottawa sought to induce Texaco with the offer of a $200-million loan. Texaco declined on December 15, perilously close to the deadline. "Hibernia's chances of survival were no better than 50-50,"17 according to John Crosbie, Newfoundland's voice in Mulroney's cabinet, former finance minister, now fisheries minister, and Hibernia's strongest supporter.

A tentative deal was hammered out. Murphy Oil, an Arkansas-headquartered U.S. independent active in deepwater exploration in the Gulf of Mexico, was induced to come in for a 6.5-percent stake. Mobil and Chevron agreed to each take an additional five percent. And the federal government was to take an 8.5-percent equity participation, in addition to its participation through Petro-Canada. All that added up to the 25-percent participation that Gulf was abandoning.

Hibernia's fate now hung on a meeting of a cabinet subcommittee chaired by Finance Minister Don Mazankowski to consider Ottawa's increased commitment. If the committee turned it down, "the project would surely be doomed," Crosbie wrote in his memoirs. Representatives from Mobil, Chevron, and Petro-Canada were asked to attend. Crosbie's account continued: "When the oil men finished answering our questions, they filed from the room. Mazankowski asked whether the committee wanted to recommend that the new arrangements and obligations be accepted. To my immense relief, my colleagues all murmured assent."

By the time the giant, $5.8-billion GBS squatted on the ocean floor, Hibernia was being called a White Elephant, laden with the weight of a million tons of steel and concrete and laden also with a string of superlatives: the world's biggest and most costly offshore production platform; the biggest structure ever moved by man, when it was towed to sea; North America's largest construction project underway when it was built in Bull Arm. From where it sat on the sea bottom, to the floor of the deck, to the tip of the drilling derrick, the structure measured 695 feet, the height of the Calgary Tower.

Now that oil is being produced from the platform, constant surveillance is on the lookout for any threatening icebergs that might approach. Supply ships, always standing by, can deflect the path of smaller bergs with water cannons. Larger ones can be lassoed and towed

out of harm's way. But with a five-foot-thick steel and ice apron and 16 serrated teeth to distribute the force of an iceberg over the entire structure, the platform is designed to withstand a direct hit from a one-million-ton berg with no damage and even a six-million-ton berg is expected to cause only local damage that could be quickly repaired.

It truly is a marvel of petroleum technology. Mobil and its partners drilled nine delineation holes to define the extent of Hibernia's two oil reservoirs. Wells were angled from the structure to hit the oil reservoirs as far as nearly four miles away (19,680 feet) and at depths of more than a mile below the top of the sea bed. In its belly, it can store a million barrels of oil.

Critics saw it as the industrial version of the definition of a pleasure craft: a hole in the ocean into which money is poured. They predicted it would never be anything but a money-losing make-work undertaking. And for a time after the oil started to flow in November 1997, it seemed that they might be right. Hibernia's economics were predicated on a flow of 135,000 barrels of oil a day over a couple of decades, but to ramp up to that volume required a couple of years. Meanwhile, the bouncing price of world oil, having recovered from a 1988 low, crashed once more, from $29 in 1996 to $20 in 1998. Profits, for either oil companies or governments, seemed far from certain.

Two things were to silence the critics. Oil prices did recover. As production history shed more light on the two reservoirs, estimates of the amount of oil that could be recovered were substantially increased, as was the rate at which it could be produced. In 2004, the joint offshore board increased its estimates of recoverable reserves from an initial 615 million barrels to 865 million barrels, plus 160 million barrels of natural gas liquids (propane, butane, condensate) plus natural gas equivalent to a further 220 million barrels of oil.18 The board also approved increased production from the initial 135,000 to 200,000 barrels per day. Everyone was making money.

Five years after Hibernia, Petro-Canada and its partners began production from the second oil field on the Grand Banks, Terra Nova, at a rate of 150,000 barrels per day, from the world's largest floating production storage and offloading vessel, which cost less than half as much as Hibernia's big bottom-based structure. Terra Nova's double-hulled vessel was built to withstand the impact of a 100,000-ton iceberg, or disconnect its 12 anchor chains and get out of the way of larger bergs within 20 minutes. Husky Energy and its partners were scheduled to start producing from a third field, White Rose, in 2005 from another floating and anchored vessel, at 90,000 barrels a day. The three fields

were then scheduled to be flowing more than 400,000 barrels of oil a day.

Gas pains

While oil companies and governments struggled to launch oil production from the Grand Banks, efforts to develop natural gas supplies off Nova Scotia met with both success and disappointment. After the Sable Island well was drilled in 1967 and 1968, Mobil and Shell found six nearby fields, initially thought to contain 3.5 trillion cubic feet of recoverable natural gas. The gas began to flow on New Year's Eve 1999 at a rate of half a billion cubic feet a day, delivered through 125 miles of pipeline to processing facilities on shore. A 657-mile pipeline carries the gas across Nova Scotia and New Brunswick to the outskirts of Boston where it ties in with the transcontinental gas pipeline grid.

The first commercial gas production off the Atlantic Coast appeared to offer the promise of a great new source of energy for the Eastern seaboard of Canada and the United States. Then in early 2004, following further follow-up drilling and evaluation of production performance, the amount of gas the six fields are expected to yield was cut in half. Production was expected to start falling in 2005 and the fields were expected to be depleted 10 years earlier than previously estimated. The $3-billion investment in production and processing facilities together with the $1.8-billion pipeline appeared to be in jeopardy unless new sources could replace the diminished supplies — soon. Relief might come from EnCana's Deep Panuke well, which in 1969 drilled through the Panuke oil reservoir to find gas in a lower formation. Two successful follow-up wells, 4.5 and seven miles northeast, confirmed the existence of a large gas field. EnCana prepared a development plan in early 2004.

Gloom or glory?

There were other disappointments. Mobil's 1984 West Venture high-pressure gas discovery blew out of control. It required a relief well, 20 months, and $200 million to shut it in. Shell in 2003 drilled a follow-up to its 1969 Onondaga gas discovery, a disappointing dry hole that cost more than $90 million. Bigger gas fields were thought to possibly lie under the deeper water of the continental slope, where the buried coast plain of the shelf starts to dip down into the abyss of the Atlantic Ocean. This seemed to be confirmed when Marathon Oil and its partners (EnCana, Norsk Hydro, and Murphy Oil) discovered 100 feet of gas sands at their Annapolis wildcat, drilled beneath more than a mile of water. Then EnCana and Shell in May 2004 completed their Weymouth wildcat in the deep water of the slope. At 20,000 feet below the seabed and at cost of more than $100 million, it was the most costly dry hole drilled off

the East Coast. “Hard times come to the Nova Scotia oil patch,” declared the Financial Post.19

On the Grand Banks and the Labrador shelf, 84 wildcats had been drilled during a 39-year period, yielding 16 oil fields with an estimated two billion barrels of recoverable oil and a finding cost of $4.5 billion (not counting nearly $13 billion for development and production expenses).20 On land, that would be phenomenally successful, but more problematic in costly ice-infested water. Ninety percent of that oil was in just four of the 16 fields — Hibernia, Terra Nova, Hebron, and White Rose. The 12 small fields might never be profitable to produce, unless follow-up drilling vastly expands their reserve estimates, or unless new fields can be found close enough to be produced from common production platforms. Production from even the 325-million-barrel Hebron oil field was in question when ChevronTexaco shelved a mooted $3-billion development project.

Never mind. “I predict the turbidites will become the biggest producers offshore Nova Scotia, unless we are very unfortunate,” Axford maintains.21 If the turbidites do for Nova Scotia what they did for the Gulf of Mexico, he’ll be right. Turbidite sands contain organic sediments and have been deposited by ocean currents. Over time, the sands become sandstones and hopefully the organic sediments are cooked into oil or gas and accumulate in traps. On the deepwater areas of the steeper-dipping continental slope, the turbidite sandstones are not only thicker than under the shallower waters of the shelf, but less compacted. That provides greater porosity to hold greater quantities of oil or gas (or water) and greater permeability which allows the gas or fluids to flow more freely, enabling more of it to be recovered and at faster rates.

It was turbidite sands in the deep water of the slope that revived exploration and oil production in the Gulf of Mexico during the final years of the 20th century. In the 1980s, oil companies had started to call the U.S. Gulf of Mexico the “dead sea.” Oil production had started to decline. It was thought that there was little still to be found in the shallow waters, and there was neither the equipment nor the proven technology to drill and produce from “ultra deep” waters of more than one mile. But when the deep water tools were developed and used, the results were spectacular. In less than a decade, oil production from the U.S. Gulf of Mexico doubled, from one million to two million barrels a day.22 Exploratory drilling, meanwhile, keeps extending farther and farther out into deeper and deeper water. Transocean’s drill ship Discovery Deep Sea approached the two-mile mark in late 2003 when it started drilling for ChevronTexaco in 10,011 feet of water.

Will the East Coast off Canada duplicate the deepwater success in the Gulf of Mexico? It could require quite a few $50-million and $100-million wildcats to find out. More than 40,000 wells have been drilled in the Gulf of Mexico; off the East Coast of Canada 226 wells had been drilled to 2004. It's early years yet.

Part Two: Government Help and Hindrance

Chapter 20. The National Oil Policy

Ask the government for a Band-Aid and you'll come out in a straitjacket. — W.O. Twaits, president, Imperial Oil Limited, 1960-1973.

In his always colourful way, Bill Twaits was sounding a warning about the risks of seeking government help to sell Alberta oil in the 1960s. Sometimes for better, sometimes for worse, energy policies have shifted left, right, and centre for more than half a century, sometimes helped and sometimes hampered development of Canada's oil and gas, raised fiscal and economic issues, and inflamed regional tensions, threatening to rip the fabric of Confederation.

First came the subsidies from Ontario consumers that rescued Alberta's oil industry under the National Oil Policy. Then came the National Energy Program with the straitjacket Twaits warned about. After that came the demolition of the NEP, deregulation, and greater market control than the industry has experienced since 1950. Unshackled, Canada's petroleum industry has become not only a major element of a continental industry, but also a significant global player. Yet even in the market economy era, there were a few billion dollars of government help to finance a government-mandated, costly make-work form of East Coast offshore oil development.

Whatever help governments have given the industry has been overshadowed by the help the industry has given governments. The oil and gas business is a giant source of public sector revenue, and government help has often been at least partially motivated by a desire to increase that public sector money.

Bobby Brown and the Montreal pipeline

A brief history of government help and hindrance could well start with Bobby Brown, Home Oil, and the quest for government help in seeking an outlet for depressed Alberta oil with a pipeline to Canada's largest petroleum refinery centre at Montreal.

Home Oil was Canada's leading independent oil producer in the 1950s, founded three decades earlier in Turner Valley by a man who had come to Alberta as a youth to seek his fortune in a bewildering array of hopscotch ventures. James Robert Lowery was 20 when he arrived in Edmonton in 1905, an Ontario Irish farm boy and schoolteacher seeking outlets for his natural talent as an amiable promoter (as a village school teacher, he prepared and sold water and soap suds as fly repellent)1 and his exuberant energy which he discharged in variegated ventures like pellets from a shotgun blast. Rumpled and red-headed, Lowery was so peripatetic, according to Home Oil historian Philip Smith, that his inchoate conversation was difficult to follow as he jumped from thought to thought in mid-sentence, his mind racing faster than his tongue. In his first 20 years in Alberta his activities included a partnership in an Edmonton newsstand, homesteading, a grocery store, a hardware store, produce speculation (he briefly cornered the Alberta market in potatoes, correctly anticipating a shortage), two election campaigns as a Conservative candidate for the new Alberta legislature (he won the second time by a margin of three votes), a brief return to Ontario and Queen's University in Kingston, earning a law degree with extramural courses at the University of Alberta (he never practiced law), a rural real estate business, two years in the Army during the First World War (he was shot twice during the appalling slaughter at the infamous battle of Vimy Ridge and discharged with the rank of major), and selling life insurance to support his family.

None of this brought fortune to Lowery before he stumbled into the oil business and the formation of Home Oil as a result of a tip from an Imperial Oil insider. It was 1924. Imperial Oil's Royalite subsidiary had just triggered the second Turner Valley boom with the discovery of the field's big gas cap which yielded condensate to make gasoline and residue gas to flare and light Alberta skies. Bill MacAdams was Imperial Oil's confidential land agent in Calgary, a former itinerant newspaperman, a brother-in-law of W.J. Hanna, Imperial's legal counsel and later president. MacAdams planted a bug in Lowery's ear. Imperial, so the story goes, had turned down an opportunity to acquire an 80-acre lease a short distance south of the big Royalite No. 4 discovery well, but MacAdams assured Lowery the acreage was bound to be productive.

Lowery had no money, no knowledge about the oil business, no big-money contacts, but he had great confidence, enthusiasm and knew how to sell. Armed with an introduction from MacAdams to a Vancouver mining promoter, Lowery soon raised enough money from some of Vancouver's most prominent business men to acquire the lease and, with himself as managing director, organize Home Oil. Home spent two years

and nearly $300,000 to drill a well that briefly became the most productive in Turner Valley. Lowery quickly learned the oil promoter's get-rich-quick trick: option a lease, form a company, float shares. While still employed as Home's managing director, Lowery floated Associated Oil and Gas, Baltac Oils, and Lowery Petroleums.

MacAdams possibly reaped greater rewards for his efforts as Lowery's unofficial confidential land agent than from his official job as Imperial's confidential agent. He held interests in all the initial leases acquired by the four oil companies Lowery organized, is reputed to have received $100,000 cash from Lowery, and was likely allotted 9,000 of the initial shares issued by Home Oil.2 There were other key allotments to the right people. In that era, neither oil men, politicians, lawyers nor judges looked askance or saw conflicts of interest when Home Oil issued shares to such friends as the province's minister of railways, a senator, Imperial Oil's Alberta manager Jack McLeod, Alberta Premier John Brownlee, and former prime minister Arthur Meighen.

The Brown family's first, but brief association with Home Oil came shortly after its founding. Robert Arthur Brown, the head of Calgary's electric light and streetcars department, who would soon uncork Turner Valley's biggest prize, the oil column, negotiated a sale of 160 acres to Home Oil adjacent to Home's producing 80 acres. The property was sold by United Oils, later a holding company controlled by Bob Brown, Jr., for what was then a staggering price of $1 million. The only well drilled on the property was a dry hole.

No matter. This was the Roaring '20s and Lowery was the Great Gatsby of the Alberta oil patch. He had posh homes in Vancouver and Calgary, a rural retreat at Qualicum Beach on Vancouver Island, a seven-passenger Cadillac in Vancouver, a big Packard in Calgary, a Stutz Bearcat in Ontario for use on business trips east. He threw lavish parties in the grand ballroom of Toronto's swankiest hotel, the King Edward, where he once brought in an orchestra from New York. He picked up the tab for a junket to New York and the Roosevelt Hotel for a group of Calgary and Vancouver business acquaintances and their wives, including costly gifts for all the wives.

The party years didn't last. Flush production from Home Oil's four producing wells by 1929 was falling as fast as the company's shares in that year's stock market crash. From a peak of $25 in 1925, Home Oil shares tumbled to a low of 15 cents in 1932 as the Roaring '20s turned into the bitter '30s of the Great Depression.

The 1936 Turner Valley Royalties well of the senior R.A. Brown, George Melrose Bell, and John Moyer that tapped the oil leg and launched Turner Valley's third life, enabled a slightly more cautious and

conservative Major Lowery to resuscitate Home Oil with leases acquired, with MacAdams' help, on what turned out to be the north end of the field. The leases made Home Oil Canada's largest independent oil producer in the pre-Leduc era. It would regain that title in the post-Leduc era, under the highly leveraged control of R.A. Brown, Junior. Within weeks of the Royalties strike, Brown senior and Brown junior launched the first of some 30 companies organized to develop Turner Valley production, seeking funds by taking their dog and pony show to prospective investors in Eastern Canada, the United States, and London.

Bobby Brown, baby-faced and curly headed with dark locks, spent the final two years of the Second World War in the navy, as a petroleum procurement officer stationed in Ottawa. Always immaculately and conservatively dressed, he was regally ensconced in a suite in the Chateau Laurier, adroit at securing not only oil but ample supplies of wartime limited liquor. That helped attract up-and-comers and people of influence to his generous parties. He was learning how government ticked, networking, building the contacts that every promoter needs.

After the war, Brown launched a business importing U.S.-made radios and washing machines with two brilliant navy comrades, John Scrymgeour, a Maritimer and son of an Imperial Oil refinery manager, and Bill Atkinson, an accountant and financial wiz from Regina. Scrymgeour and Atkinson later played indispensable roles in Brown's return to the oil business. That happened after 1947 when the import business collapsed with a government prohibition on the import of such luxury items as washing machines because of a currency crisis that was sinking the value of the Canadian dollar.

When the senior Brown died of a heart attack in May 1948, Bobby Brown took over control of the family's Turner Valley oil properties, now consolidated into Federated Petroleums. Father and son shared two pronounced characteristics: both were brilliant entrepreneurs and both were alcoholics. Father was a binge drinker, with periodic lonely bouts in hotel rooms that would last several days and undoubtedly helped contribute to his death at 62. The son, in his later years, became an even more tragic drinker.

When Leduc in 1947 triggered the biggest race then underway in the North American oil hunt, Jim Lowery and Home Oil were off at the starting shot, buying leases, drilling wells, building reserves and production revenue at the new field and later at Redwater. Federated Petroleums seemed stuck at the starting gate, with a small and diminishing flow of production and revenue from 17 Turner Valley oil wells. Brown set out to reverse that. To do it, he became the biggest borrower in the Alberta oil patch. His money came from Neil MacKinnon,

one of the country's boldest bankers who had started at 14 as a clerk with the Bank of Commerce and worked his way to the top. In Brown, MacKinnon must have seen a combination of astuteness and daring vision and opened the bank's vaults. In less than a decade, Brown borrowed from the Commerce $4.35 million to buy Imperial Oil's Turner Valley subsidiaries, other than Royalite Oil, as well as the Turner Valley wells of Frank McMahon's Pacific Petroleums; $8 million to buy secretly on the open market one-quarter of the outstanding shares of Home Oil; $3.25 million to effect Home's acquisition of Federated and consolidate his control of Home; most of the $30 million spent buying shares of TransCanada PipeLines to make Home Oil, and in effect Bobby Brown, its largest shareholder; and millions more, here and there, for numerous related enterprises and wildcatting, which Brown considered his chief calling.

When Home Oil shareholders assembled at Calgary's Palliser Hotel on Saturday morning, April 28, 1951 for their annual general meeting, among those in attendance was R.A. Brown, Jr. and an entourage of eight associates, including his key aides, John Scrymgeour and Bill Atkinson. Brown's holding company may have owned only one-quarter of Home, but for the next two decades Brown was firmly in control. Two of Brown's associates were elected to the Home Oil board, John Moyer, the third partner in the 1936 Turner Valley Royalties discovery well, and Montreal stockbroker Brigadier James Buchanan Weir. Within months, Brown elevated Lowery to chairman and replaced him as the president and chief officer with Bob Curran, formerly head of Imperial's western exploration and production operations. In due course, following a merger with Brown's Federated Petroleums, Curran was gone and Brown assumed the mantle of president and managing director.

Bobby Brown never owned as much as 10 percent of Home Oil but exercised control with almost unprecedented leverage, using his holding company and voting and non-voting shares. Even so, his control was threatened in 1967 when Scrymgeour and Atkinson, who had left Home after a disagreement with Brown to become Canada's largest wholesalers of plumbing and heating supplies, began buying voting shares of Brown's holding company, Cygnus Corporation, eventually acquiring 31 percent. Brown borrowed more money to hurriedly increase his one-third of the voting shares. After failing to acquire a controlling block, and after cancer tragically killed Atkinson at age 46, Scrymgeour agreed to sell to Brown his block of Cygnus shares for $5.75 million. When this was all over, Brown owned 27 percent of Cygnus but 69 percent of the voting shares; Cygnus owned 17 percent of Home Oil but nearly 42 percent of the voting shares. In effect, Brown and his family actually owned barely

4.6 percent of Home Oil but controlled it as if they owned 42 percent, and even more, counting a block of Home Oil voting shares owned by Home Oil subsidiary companies.3 It was the apex of leveraged control.

Montreal or bust

It was 1957. Alberta oil producers are staggering under a glut of oil. They are investing more money, drilling more wells, finding more oil, but there's no demand for all that additional oil. Half the production capacity of their wells under sound conservation practices, as determined by Alberta's Conservation Board, is shut in. Faced with competition from much lower-cost oil moved from Venezuela and the Middle East at little cost by the new mammoth supertankers, the market outlook is grim. If these conditions continued, the search for and development of the nation's petroleum resources, barely begun, would stall. Many independent producers, lacking the resources of the majors with their integrated upstream and downstream operations, faced financial trouble.

Home Oil is an example, a victim of its own success. It had built up its store of oil reserves by acquisitions, successful bidding at auctions of the government's "Crown leases," and by exploring for new fields. In January, it discovered the first of a number of large oil fields in the Swan Hills area of northern Alberta, an entirely new oil producing region. It was the most successful exploration Home ever experienced. In a six-year period to 1960, its oil reserves increased six-fold, while its rate of oil production dropped from 3.3 million barrels in 1956 to 2.5 million barrels in 1958, and did not fully recover until 1961.4 For all Alberta producers, oil and gas sales fell from $379 million in 1957 to less than $313 million in 1958 and, as with Home Oil, did not fully recover until 1961.5 Millions of dollars had been spent finding and developing oil fields with less revenue to show for it, while thousands of additional wells added to the operating costs.

There were two possible solutions, each with its own problems and difficulties. There was the continental energy approach. Sell more Alberta oil to the closest markets, in the U.S. Midwest and the U.S. Pacific Northwest, the highest-paying markets in the world thanks to U.S. protection of its own oil producers against those low-cost offshore imports. A continental energy market would require the United States to provide U.S. refiners with unrestricted access to Canadian oil, an uncertain proposition at best. The second solution was a new, $353-million express pipeline from Alberta to Montreal, to deliver 200,000 barrels per day of Western Canadian oil by 1960 and 320,000 barrels per day by 1965 to Canada's largest petroleum refining centre. This required a government embargo to block imported crude oil and refined petroleum

products and would impose higher prices on Quebec consumers. At stake in the two alternatives was whether Canada would pursue national or continental energy policies.

Leading the nationalist crusade for a pipeline to Montreal were Bobby Brown and Charles Lee, head of Western Decalta Petroleums, supported by a dozen independent oil producers and Alberta Premier Ernest Manning. It was Lee and Brown who first began talking about a pipeline to Montreal, but it was Brown who put up the money to promote it, commissioning three studies. New York petroleum consultant Walter J. Levy examined the prospects and problems of marketing Alberta oil. Dutton-Williams Brothers of Calgary prepared an engineering and cost-estimate study. Purvin and Gertz Inc. of Dallas examined the suitability of Alberta oil as a feedstock for Montreal refineries. For Brown, the studies were more than an effort to sell more Alberta oil. He wanted to build and control what would be at that time the world's biggest, longest crude oil pipeline. An undertaking of that size would seem to be well beyond the limited resources of Home Oil. The proposed pipeline, however, would require government backing, and given that, almost anyone could finance it.

It was the Levy study that received the most attention. Walter Levy was one of the world's leading petroleum consultants. A refugee from Nazi Germany, he fled to London in 1936 where he worked for Shell, studying European supplies and transportation. During the Second World War he served with the U.S. Office of Strategic Services providing expert information that helped Allied forces disrupt Germany's military petroleum supplies. In the immediate post-war period he headed the oil division of the U.S. Marshall Plan.

Levy painted a bleak picture, warning that Alberta's oil industry "could not continue [to operate] at around 50 percent of capacity without imposing seriously on the flow of investment funds necessary to sustain the vitality of exploration and development efforts." It would soon be operating at little more than one-third of capacity. He saw little chance of increasing Alberta's oil exports to the United States, and estimated the cost of Redwater oil laid down in Montreal at about 25 cents per barrel, or 10 percent more than the cost of imported oil. For more distant Alberta oil fields, such as Home Oil's Swan Hills fields, the cost disadvantage would be significantly greater.

It was not just the oil producers who were concerned: so was the Government of Alberta. Demand for Alberta's oil was briefly spiked in 1956 and early 1957 when Britain sent in troops to seize the Suez Canal after it had been expropriated by Egypt's strongman Gamel Abdel Nasser, cutting in half the flow of oil from the Middle East. When the crisis was

over, demand for Alberta oil promptly fell by one-third. With the resumed flow of ever-cheaper Middle East oil, the Eisenhower administration in mid-1957 imposed “voluntary” quotas on imported oil to protect its domestic producers.

In Calgary, Conservation Board chairman Ian McKinnon wrote to Ernest Manning in Edmonton urging the premier to seek Ottawa’s help in securing either a continental energy deal in which Alberta oil producers would have unrestricted access to U.S. markets, or alternatively federal government help to secure the Montreal market. Three weeks later, in November 1957, Manning and McKinnon met in Ottawa with Prime Minister John Diefenbaker and Finance Minister Donald Fleming to push McKinnon’s proposal in what Manning called a “grave situation of national concern.”6

Brown, meanwhile, armed with the Levy study, hyped the Montreal pipeline at every opportunity. Canada must end its reliance on “dictatorship oil” shipped on “hazardous oceans” from Latin American and the Middle East to supply Eastern Canada’s oil needs, Brown told Toronto’s financial analysts in January 1958. “The decision with regard to the Montreal market would be made very quickly if a few Russian Nautilus [nuclear-powered submarines] were found cruising in the Atlantic Ocean,” he predicted. “All that is required in order to put Alberta crude in Montreal refineries is the decision on the part of the Government of Canada that Canadian oil will be given a preference in that market,” either “on a voluntary basis as a result of government pressure, or by a quota system.”7

Four months later, Brown was able to repeat his pitch to a Royal Commission on Energy at hearings in Calgary. Henry Borden, head of Brazilian Light and Traction and a nephew of former Conservative Prime Minister Robert Laird Borden, had been selected by Diefenbaker to head a six-member commission with a mandate to consider, among other things, “the extent of authority that might best be conferred on a national energy board.” The commissioners spent much of the time hearing about the plight of Alberta’s oil producers. And it was the Alberta producers who suffered lack of market outlets. Because their wells were closer to the refineries in Ontario and the U.S. Midwest, producers in Saskatchewan and Manitoba, with their more limited reserves, were producing at full capacity, under optimum conservation practices.

There was standing room only at Calgary’s new 2,500-seat Jubilee Auditorium when the Borden Commission opened its public hearings in the city on February 2, 1958. Manning appeared to speak about the “millions of dollars of investment capital already spent in drilling wells which are now capped” and to plea for “a clearly defined national policy

with respect to both domestic and export markets."8 A few weeks later, Brown was the star witness at the Borden hearings when he briefed the commissioners on the Levy, Dutton-Williams Brothers, and Purvin and Gertz studies, and reiterated his call for the Montreal pipeline. The dozen independent producers who supported his call were the nucleus of what later became IPAC, the Independent Petroleum Producers Association of Canada. In his testimony, Brown pointed out that in 1956, Canada had been a net oil importer to the tune of 230,000 barrels a day at a time when Alberta had idle production capacity of 430,000 barrels a day.

The major oil companies with refineries and marketing in Quebec were unalterably opposed to the Montreal pipeline. Imperial Oil President John White claimed that it "would carry grave risks to the long-term well-being of the industry."

Manning appeared before Borden and his commissioners a second time on the final day of their hearings in Calgary, this time explicit in his support of the Montreal pipeline. He claimed that Alberta oil could be landed in Montreal "at prices roughly the same as those now being paid for imported crude oil" and that this "should not necessitate any increase in prices to consumers in Eastern Canada,"9 at best a controversial claim. Four days after the commission had completed its hearings in Calgary, Manning called a news conference to report that Alberta's oil wells were now producing at just 37 percent of capacity. The United States, he noted, had imposed import controls when its producers were restricted to 65 percent of capacity, and the time for similar action by Canada was "long overdue."10

While the case for the Montreal pipeline and a nationalist approach to the oil problem was being argued in front of the Borden commission, the opposing case, in favour of a continental approach, was argued elsewhere, first by Vancouver economist John Davis. Davis had been a consultant for the Royal Commission on Canada's Economic Prospects, headed by Walter Gordon, Liberal politician, super-nationalist and later controversial finance minister. In an appendix to Gordon's 1957 report and in a later study, Davis enumerated the claimed disadvantages of a Montreal pipeline. It would either reduce the wellhead prices received by Alberta oil producers, already US$0.53 per barrel lower than that paid to U.S. mid-continent producers, or impose higher costs on Eastern Canadian consumers, or impose subsidies of up to $50 million a year on taxpayers, or all three; complex and cumbersome controls would be needed to regulate imports of crude oil and refined products; there would be adverse effects on the Canadian economy, and a probable impairment of Canada's crucial trade relations with the United States. Davis predicted that within a few years there would be strong U.S. demand for

Canadian oil, especially in the Chicago refinery market, which was four times larger than the Montreal market and 600 miles closer to the Edmonton pipeline hub.11 In this, Davis would be proven correct.

A continental approach was also starting to take shape in initial oil discussions by Canadian and American officials. Tom Beall, U.S. deputy assistant secretary of state for economic affairs, briefed officials from the Canadian Embassy in late 1958 on U.S. thinking. The United States seemed prepared to open its doors to Canadian oil if Canada would keep its doors open to Venezuelan oil. "We are now thinking in terms of an arrangement under which imports from Canada may be admitted freely," Beall told the Canadians, adding that "Venezuela should continue to have access to Eastern Canadian markets."12

Three months after the briefing by Beall, Dwight Eisenhower issued a presidential proclamation making mandatory the former voluntary controls on imported oil. And the month after that, the United States introduced the "overland exemption," under which oil imports from Canada and Mexico were exempt from the import restrictions because they were deemed a more secure source of energy than tanker imports from Venezuela and the Middle East. No sooner was the overland exemption announced than the U.S. Department of the Interior, sensitive to the pressures of independent American oil producers, constantly sought unofficial quotas or other restraints within the exemption, but just as constantly, whatever voluntary restraints were agreed to were promptly exceeded by U.S. imports of Canadian oil.

The Borden commission's second report (the first report dealt with natural gas matters) rejected the Montreal pipeline and greeted with hope the recently announced overland exemptions. This exemption, wrote the commissioners, "could be the first step leading towards the development of a continental policy with respect to crude oil under which Canadian and United States crudes would be freely used in the refinery areas on the North American continent. . . . We feel that care should be taken to ensure that Canada, by its actions and commitments now, does not jeopardize the subsequent development of such a policy." Blocking oil imports into Montreal, the commissioners warned, would "seriously impair Canada's position vis-‡-vis existing United States import restrictions and might jeopardize the development of a continental energy policy."13

The Borden report outlined the framework for the later emergence of the National Oil Policy. Borden called for the displacement by domestic oil "as soon as possible" of 50,000 barrels a day of petroleum products moved from Montreal refineries into Ontario, and increased sales of Canadian oil in both Canadian and U.S. markets. The report noted that

the cost of finding and producing oil in Canada was considerably less than in the United States but much more than in the Middle East, where it said the cost was less than 20 cents a barrel, while transportation costs had been slashed by a plethora of supertankers. It suggested that if current conditions had prevailed a decade earlier, even the Interprovincial and Trans Mountain oil pipelines could not have been financed and built without government assistance, much less an express pipeline to Montreal.

Alberta Conservation Board chairman Ian McKinnon, who would soon be in charge of implementing Borden's recommended National Oil Policy, was a strong advocate of the Montreal pipeline that the second Borden report rejected. Almost three months before the report, McKinnon was in Washington, talking to U.S. oil officials, while Diefenbaker was considering him to head the new National Energy Board. Cabinet Secretary Robert Bryce, in a "personal and confidential" memo, briefed Diefenbaker on what McKinnon had been up to in Washington. According to Bryce,

> [McKinnon] went out of his way to state at length how vitally important it is to build the Montreal pipeline. He said that no one could count on the U.S. government making the U.S. market available to Canada and that the pipeline would pay for itself in fairly short order if imports into Eastern Canada were restricted. . . . He also expressed to [Norman] Chappell [Canada's energy counsellor in Washington] that there was 'no competence in Ottawa to deal with these matters.'14

Before the second Borden report was issued, McKinnon had been confirmed as the National Energy Board chairman, soon to be in charge of implementing Borden's recommendations.

McKinnon and his fellow board members, however, were far from confident that Borden's voluntary approach would be adequate. "The Board is not optimistic that the voluntary approach will quickly bring a satisfactory increase in production," its members stated in an unsigned memorandum to a cabinet committee. "Only a few companies need defy, ignore or evade a voluntary approach to make it unworkable . . . a transition of the program from a voluntary to a mandatory basis may prove inevitable."15

When the National Oil Policy was announced in the House of Commons on February 1, 1961 by Trade Minister George Hees, it did rely on voluntary compliance by the big oil companies, albeit with government arm-twisting. Hees announced a 1963 oil production target

of 800,000 barrels a day by 1963, “approximately as high as the figure which would be achieved if the Montreal pipeline were to be constructed.”16 In the event, production fell just 33,000 barrels a day short of that target, but by the time the NOP had run its 10-year tenure, Canada’s oil producers were pumping their oil wells flat out at full capacity, and essentially have been ever since.

The production target announced by Hees was to be met with increased sales to both U.S. and Canadian markets. All of the Canadian market west of the Ottawa Valley was to be supplied exclusively with Canadian oil. Ontario was the battleground where imported and domestic oil would clash. Hees warned that if “progress suggests that voluntary efforts are not producing the results anticipated, then the government will take whatever further steps the circumstances may require to ensure the success of its policy.” That would mean proclaiming section 87 of the National Energy Board Act which would empower the board to regulate oil imports and exports by licence: voluntary would become mandatory.

Canada’s new oil policy was not greeted warmly by American oil producers nor the U.S. Interior Department. “If the Canadian plan has a marked and abrupt adverse effect on our petroleum industry,” the United States would “undoubtedly” review Canada’s exemption from mandatory import controls, Interior Secretary Stewart Udall warned in a press statement issued the day after Hees’ announcement.17 The U.S. oil journal Petroleum Week asserted that Washington was “duty bound to re-examine the exemption enjoyed by Canadian oil” which it said “was not intended to provide a bonanza to be exploited.”18

Problems, problems

Implementing the NOP presented the new National Energy Board with a number of daunting challenges. The first problem was that discussing with Ontario oil refiners the “voluntary” amounts by which each was expected to increae its use of Canadian oil was dangerously close to illegal. The second problem involved plugging the leaks in the NOP wall that was intended to keep imported petroleum products out of Ontario west of the Ottawa Valley. The third problem involved oil exports to the United States. It was not so much a problem of increasing exports, but restraining their growth so as not to provoke a backlash that could terminate the overland exemption.

Five months after the NOP had been announced, D.H.W. Henry, director of investigation and research in the Justice Department’s Combines Branch, warned Hees that the individual oil company targets “gets very close to a tacit agreement” that would “contravene the

combination provisions of the Act. Any inopportune rise in the price of gasoline could easily provoke a complaint and lead to pressures for an inquiry."19

As it turned out, prices were restrained by leaks in the NOP wall. Independent markets in 1964 brought into Ontario west of Ottawa 263,150 barrels of gasoline purchased in Germany and Italy for as little as six cents a gallon (1.5 cents a litre). Canadian Petrofina, with a new refinery in Montreal that had been built specifically to serve both Quebec and Ontario, was a frequent violator of the prohibition on imported products in most of Ontario. It was the only major marketer without a refinery in Ontario. In 1969, Petrofina announced that it was preparing to ship "substantial amounts" of heating oil into Ontario. Gulf Oil Canada (formerly British American Oil) also threatened to break the oil policy. "There is a limit to how long we can continue to compete in this province with marketers of low-cost products from imported sources before we, too are forced by economics to break the oil policy," Jerry McAfee, Gulf Oil Canada president, warned.20

As gasoline price wars raged, Imperial recruited a marketing ally, the image of its friendly tiger at all its service stations and featured in all its advertisement. Oilweek was moved to pen a lengthy parody of a famous William Blake poem, the first and final stanzas being:

Tiger, tiger burning bright
on the highways of the night
What immortal hand or ass
could shove thee in a tank of gas?

Tiger, tiger, tell me true
which is really worse for you
battles in the jungle green
or price wars of the gasoline?21

Biggest importer of low-cost oil shipped west of Ottawa was Caloil Inc. of Montreal, which had brought in 1.3 million barrels of gasoline in 1969. The cabinet proclaimed section 87 of the Energy Board Act giving the board power to control imports by licence in order to stop Caloil from breaching the oil policy again in 1970. Caloil appealed to the courts that this was an unconstitutional restraint on interprovincial trade. Caloil lost. Imports now required a licence from the Energy Board. The oil policy was now mandatory. It didn't matter a great deal, since events would very soon outstrip the National Oil Policy and effectively terminate it.

While the Energy Board found it difficult to limit imports, it soon found it just as difficult to limit exports Canadian oil. This was such a sensitive matter that McKinnon urged Diefenbaker not to talk about it. As Diefenbaker prepared for a speech to a U.S. audience, McKinnon advised the prime minister in 1962: “A policy of saying as little about the National Oil Policy has much to recommend it.”22 The following year, an unsigned NEB memorandum observed that “Recent negotiations with the United States have not been too successful from Canada’s viewpoint. We have had to accept compromises by way of agreeing to accept informal quotas — under threat of jeopardizing what is left of the overland exemption.”23 And in 1965, a briefing paper prepared by the Board for an interdepartmental meeting warned: “We are confronted with a serious situation in respect of the future levels of oil exports to the United States.”24 The threat was removal of the exemption because of the rapid increase in Canada’s oil sales to the United States. They had already nearly tripled under the NOP, and they were to triple again during the next six years.

Opposition of U.S. independent producers was so great that, as we saw in chapter 13, a secret deal between the Canadian and U.S. government was needed to finally enable Interprovincial Pipe Line to extend its system to the Chicago area as it had originally contemplated as far back as 1948. Signed by Canada’s energy minister, Jean-Luc Pepin, the U.S. Interior Secretary, Stewart Udall, and Anthony Solomon of the U.S.
State Department on September 25, 1967, the agreement called on the Canadian government to restrain the oil exports “short of imposing formal export controls.”25 Sales of Canadian oil to U.S. markets east of the Rockies were to be limited to 280,000 barrels a day in 1968, increasing by annual increments of no more than 26,000 barrels per day for the following three years. Short of any law that would prohibit it, refiners in the northern states were less than willing to voluntarily limit their purchases of lower-priced Canadian oil, and the Canadian producers were just as unwilling to reject any purchase orders.

The overland exemption finally was terminated and Canadian oil brought under the mandatory import controls by a proclamation issued in March 1970 by U.S. President Richard Nixon. “This ends the arduous and latterly impossible task of voluntarily limiting exports to east of the Rockies to levels agreed to by the governments in 1967,” the National Energy Board noted.26 The end of the overland exemption had not the slightest effect on Canada’s oil exports. In 1970, export sales that were to have been limited to 336,000 barrels a day amounted to 657,302;27 for

1971, the limit had been set at 364,000 barrels a day while export sales exceeded 900,000 barrels a day.

The rewarding National Oil Policy

It was a new era starting in 1971. The Organization of Petroleum Exporting Countries, founded in Baghdad a decade earlier, had emerged as the most powerful cartel in the world. Starting in 1971, OPEC would push world oil prices from $2.45 to $44.66 per barrel.28 From 1971 on, Canada's oil sales to the United States have been limited only by the amounts that Canadian wells, the oil sands, and the pipelines can deliver. The National Oil Policy had effectively run its course.

It was a typical Canadian compromise, and an outstanding success. In its first years, at a time when two-thirds of Alberta's oil production capacity was shut in, it provided a degree of protection from low-cost Middle East crude oil and refined products. It was less protection than sought by producers who wanted imported oil blocked out of Montreal, less expensive for the Canadian economy in terms of energy costs, much less costly in terms of probable adverse effects on Canada's trade relations with the United States. But still it was a subsidy, a 10-year subsidy of half a billion dollars (more than $15 billion in 2004 dollars) for Alberta oil producers paid for by Ontario consumers.28

More important than anything else, the National Oil Policy marked the first step toward a continental energy policy. To that extent, it was a precursor of the 1987 Canada-U.S. Free Trade Agreement and the later North American Free Trade Agreement. It meant greater and more efficient use and higher prices for one of the country's largest natural resources, with enormous rewards for the national economy. During the 1961-1970 run of the National Oil Policy Canada's annual production of oil and gas liquids more than doubled and revenues from the sale of both oil and gas tripled from $492 million to $1.6 billion.

The success of the National Oil Policy would not be repeated in the 15 years that followed. The drive toward a continental energy policy would be temporarily derailed. Intensive government intervention and oil price controls would burden the economy, stall the search for new energy resources, and ruin Canadian companies it sought to assist. An oil pipeline would be extended to Montreal, at taxpayers' expense, but it would deliver no benefits for either oil producers or the national economy. Home Oil would disappear from the scene. And Bobby Brown would not live to endure it all.

Chapter 21.Engineering Energy and the Oil Crisis: Jack Austin and the Canadianization Passion

As the OPEC-controlled world oil price climbed almost steadily for 14 years, from 1971 to 1984, it added tens of billions of dollars to the market value of Alberta's supplies of oil and gas. Throughout those years, the governments of Canada and Alberta waged a bitter fight for oil money and political power.

The passing of the National Oil Policy was followed in the 1970s by the energy crisis that brought gasoline shortages and the threat of rationing; an explosion in world oil prices; a resulting global recession; an oil pipeline to Montreal; the controversial national oil company; a global storm over an international uranium cartel that strained Canada's and four other countries' relationship with the United States; the contentious National Energy Program that threatened the very foundations of Confederation; and Jacob Austin.

In the early 1970s, Jack Austin was at the centre of it all, playing a leading backroom role. It was Austin's initiatives that blocked the sale of Brown's Home Oil to a U.S. buyer, led to the creation of the uranium cartel, helped author national energy policies during the hectic energy crisis period, conceived Petro-Canada, and paved the way for the oil pipeline extension to Montreal. All this within five years, until controversy removed him from the centre of policy action. Possibly it is indicative of the behind-the-scenes nature of his activities that Austin is not even mentioned in Prime Minister Pierre Trudeau's memoirs, despite the fact he had been selected by Trudeau as the top bureaucrat in the energy department, served as Trudeau's principal secretary for two years, was appointed by Trudeau to the Senate, and later appointed by Trudeau to a powerful cabinet post.

A Calgary-born Vancouver lawyer, Austin had come to Ottawa and Trudeau's Liberal government bearing an impressive academic record (a fellowship at Harvard, a doctorate in international commodity arrangements from Berkeley, a law professorship at the University of British Columbia); business experience as a promoter of unsuccessful B.C. mining and forestry companies; political experience as campaign manager for resource and northern affairs minister Arthur Laing, and as an unsuccessful candidate for Parliament. After helping elect Laing to Parliament in 1963, Austin moved to Ottawa to serve as Laing's executive assistant for a brief period before returning to Vancouver, his law practices, and his business ventures, before returning again to Ottawa as

deputy minister — the top bureaucrat — in the relatively new and suddenly hot Department of Energy, Mines and Resources.

Austin also brought with him to Ottawa a concern about what he called the exploitation by foreign investors of Canada's natural resources — its patrimony, he called it. The year before his appointment as deputy minister of Energy, Mines and Resources, Austin told an annual meeting of the Canadian Bar Association, "Outsiders have exploited and continue to want to exploit this patrimony, but it must be protected, for this is the source of the wealth for the future — the nation's birthright. This concept will be more heard from across Canada."

During his recruitment interview for the deputy minister job at EMR early in 1970, Austin joined Trudeau aboard a government Jetstar on a flight from Ottawa and reportedly told the prime minister that he would like to establish a national oil company. The prime minister was non-committal about that, but the studious-looking 38-year-old Austin with the heavy horn-rimmed glasses and amiable grin, got the job. Within less than a year he had recruited the super bureaucrats, policy wonks with academic records as impressive as his own, who would later formulate the National Energy Board; attempt to buy Home Oil for his desired national oil company; and organize the international uranium cartel. Under Austin's prodding, EMR was transformed. Established only four years earlier, it was a relatively low-profile department concerned primarily with such technical matters as the work of the Geological Survey of Canada. The National Energy Board, in addition to its regulatory functions, had been specifically charged with the task of providing the government with energy policy advice. Now, with Austin's drive, EMR became the primary energy policy advisor, much to the chagrin of the Energy Board.

Just as Austin's career near the centre of public sector power was launching into its brief orbit in 1972, the high-flying financial world of Bobby Brown was crashing to earth, pulled down by a payload of debt, by ill health, and the failure of the biggest wildcat plunge of his career. It had been the ride of an enigma. In appearance and demeanor (except occasionally when fuelled with too much liquor) he was the image of a conservative financier: impeccably dressed, soft spoken, polite, courteous, almost deferential. In appurtenances, he was ostentatious. His $3-million Grumman Gulfstream II jet was outfitted with gold-plated wash taps in the shape of dolphins. The top floor of Calgary's Home Oil Building, with its executive offices, was panelled with rosewood from Italy, ebony from Indonesia, Paldao from the Philippines, and walnut from Rhodesia; floored with lava rock from Italy; draped with curtains flecked with gold and silver "by a secret screen printing process." In the

dining room executives and financiers sat in chairs from an Irish castle. It was Brown's philosophy that it helped in borrowing money if you had the appearance of not needing it. In his actions, he was visionary, bold, and daring, sometimes to the point of recklessness. In the end, he was Rudyard Kipling's If man:

> If you can make one heap of all your winnings
> And risk it on one turn of pitch-and-toss,
> And lose, and start again at your beginnings,
> And never breathe a word about your loss.

Brown's loss came from his pitch-and-toss on the North Slope of Alaska following the 1968 Prudhoe Bay discovery by Atlantic Richfield. Arco, as it was commonly known, not big enough to rank with the fabled Seven Sisters that then ruled the world of oil, was still among the 20 largest U.S. corporations, and suddenly had giant prospects. Home Oil was Canada's largest and most profitable independent oil company, with net earnings of nearly $11 million from revenue of some $26 million and promising exploration programs in Western Canada, the North Sea and on land in Britain. Now Brown was about to bet the farm on the flat tundra of Alaska's Arctic coastal plain, gambling not only with Home Oil money but all his own personal fortune, collateral for all he could borrow.

Brown made three gigantic bets. Home Oil gambled perhaps close to $40 million in lease acquisitions and exploration on the North Slope, including $23 million to drill two costly wildcats on 450,000 acres farmed out from Arco, in which Home earned an average 42-percent interest, and $11 million for a quarter interest in a block of leases auctioned by the State of Alaska. He committed Home to invest $18 million for a two percent interest in the planned pipeline to move Prudhoe Bay oil across Alaska. And a staggering $69 million to buy 622,280 shares of Atlantic Richfield — including 476,380 shares acquired by Home and 145,900 shares acquired by Brown and his holding company. Brown's audacious hope had been to acquire control of Arco, a mouse trying to swallow an elephant. In assets, Arco was more than 20 times the size of Home Oil.

It was Brown's biggest play, and biggest flop. The Arco shares that had cost $69 million to acquire in 1969 at the peak of speculative frenzy over Alaskan oil, were worth no more than half that in 1970. Home Oil fell from a 1969 high of $80 to a low of barely more than $20 a share two years later. The only luck Home had was managing to escape its commitment to put up two percent of the cost of the Prudhoe Bay oil

pipeline; by the time it was completed, five years behind schedule, it cost 20 times more than the original estimate.

Newspaper suggestions that Home was in financial trouble were not quite correct. Despite spending nearly $4 million more than its total 1969 gross revenues just on exploration, Home still earned a slim profit that year, was financially sound, had a growing source of revenue from its production properties, attractive exploration prospects, and an outstanding managerial and technical staff. It was Bobby Brown who was in trouble. It was at best questionable whether if pressed he could realize from his holdings the $23 million that he personally owed to the Bank of Commerce and Bank of Nova Scotia, and the banks were starting to press.

Brown's last hope was the long-odds chance of a blockbuster discovery on the big Alaskan North Slope farmout from Arco; something even a fraction the size of Prudhoe Bay would skyrocket the value of both his Home and Arco shares. Failing that, he faced the prospect of either bankruptcy, or a favourable sale of Home Oil to a major company. Either way, he would lose his highly leveraged control. The first of the two costly wells on the Arco farmout was a dry hole. The second was still drilling when Brown was hospitalized in Calgary in June 1970 with a heart attack, his second in seven years but this one far more serious. He was still in hospital when Jack Austin phoned, seeking an appointment. Austin saw in Brown's financial bind a possible opening for his national oil company. On August 5, he flew to Calgary to meet Brown who was still recovering from his heart attack, bedridden at home, under the supervision of his doctor and the constant care of a team of nurses. Brown confirmed that a sale might be in the offing, but no commitments had been made. Austin said the government would not like to see Home fall under American ownership. He suggested Polymer, the Sarnia-based, government-owned petrochemical company, might be a potential buyer. Brown promised to keep him informed of any negotiations. Two days later, a group of Home Oil's top executives were gathered at Brown's bedside in the evening when results of testing at the second North Slope wildcat, drilled to 17,000 feet, were phoned from the well. Brown took the call. The test had produced copious quantities of water — a dry hole, in the anomalous phrase of the oil business. According to Home Oil historian Philip Smith, "Bob Brown uttered no word of disappointment, much less of complaint. As courageous as ever, he climbed out of bed and in his dressing gown escorted his guests to the front door. 'Thanks for coming, fellows,' he told them."

It was too late for Rudyard Kipling's If man to start again at his beginnings. He faced two deadlines. The Bank of Nova Scotia had taken

over his loans, now $24 million. A third heart attack, two weeks after his meeting with Austin, left him also with “a lot of kidney damage.” The doctors gave him one or two years. The bankers were even tougher: 90 days to find a buyer before they foreclosed on his assets.

It took, in fact, more than eight months to find a buyer for controlling interest in Home under terms that would meet Brown’s requirements and the government’s determination to keep the leading independent oil company Canadian. Brown had already started talking with Olin Atkins, head of Ashland Oil in Covington, Kentucky, even before the second dry hole on the Alaskan North Slope ended any hope of abandoning the need to sell. They reached a deal that met Brown’s needs. Ashland’s Canadian subsidiary would merge into Home, the merged company would still be Home Oil, Brown would keep his CEO job and get the money to pay off his $24-million bank loan, but effective control would be held by Ashland as the largest shareholder. Energy Minister Joe Greene and his deputy Jack Austin said no, it had to be a Canadian buyer. Brown, ashen-faced and in such ill health that he was frequently accompanied by a nurse with an emergency tank of oxygen in case he collapsed, spent months in intense talks looking for a Canadian buyer that would match the terms offered by Atkins. When no Canadian buyer was found, he felt free to proceed with the Ashland deal. Greene and Austin said no again. Home Oil’s fate by now had become an issue in the House of Commons, where the New Democratic Party demanded the government act immediately and decisively to stop any sale of Home to a U.S. buyer, as it had the year before in blocking Steve Roman from selling controlling interest in Denison Mines, with the world’s largest uranium mine at Elliot Lake, to Hudson’s Bay Oil and Gas for $104 million.

By early 1971 it looked very much as though Austin would get Home Oil as the seed for his proposed national oil company. The block of Home shares owned by Brown and his family were to be purchased for more than $22 million by the government’s Crown corporation, Eldorado Nuclear Ltd., and Brown would continue as CEO. Brown and his officials had spent 10 days negotiating the terms with Eldorado. Lawyers for Brown, for Home Oil and for the government, working until 4 a.m. on the morning of Friday, March 19, had drawn up the papers. But late that afternoon, barely hours before Greene was to make his announcement in the House, Brown decided he wouldn’t sign the papers after all. “Brown had always opposed any government involvement in private business, particularly the oil business,” Philip Smith wrote in his Home Oil history. Except, of course, when it came to asking the government for help to build an oil line to Montreal. Brown never got that help, but he still almost wound up in the straitjacket that Bill Twaits had warned about.

Brown ultimately found a Canadian buyer, Consumers' Gas Company of Toronto, the country's largest gas utility. It was much like the ill-fated deals with Ashland and Eldorado: it effectively gave Consumers' control; it gave Brown the money he needed and he kept his job as CEO of Home. Not for long, however. Eight months after the Consumers' deal, Brown suffered his fourth heart attack. He did not survive. He was dead at 59.

Home Oil, too, would pass. With the National Energy Program, intended, among other things, to "Canadianize" the oil business, it would be acquired by a new Canadian owner, then by an American, then oblivion.

The great uranium cartel

On April 28, 1971, precisely one week after the purchase of Brown's Home Oil shares was approved by Consumers' board, Joe Greene and Jack Austin were flying to Canberra seeking to sell a Candu nuclear reactor to the Australian government, to talk about uranium marketing problems, and to plant the first seeds of a cartel which five years later would set off dozens of lawsuits involving billions of dollars, a U.S. grand jury investigation, Congressional hearings, strained relations with the United States and the governments of Canada, Australia, France, Britain, and South Africa, and a law that forbade Canadians with knowledge of the cartel to even talk about it, on penalty of five years in jail.

Five months after the trip to Canberra, Greene and Austin were flying again, this time to Tokyo, the first stop in a planned around-the-world trip to talk more extensively with governments about those uranium marketing problems. Greene never got farther than Tokyo where the scrappy, loquacious lawyer suffered an incapacitating stroke that ended his political career. Austin completed the tour, with meetings in Singapore, London, Paris, Bonn, and Tehran (for talks with the Shah about oil). With the groundwork established, it was at Canada's instigation that officials from five governments met in Paris on February 2, 1972, followed by three days of meetings of the uranium producing companies, to establish the cartel. Since many of the uranium companies, such as Eldorado, were government owned, it was sometimes a case of those who attended the government talks putting on different hats to attend the producers' talks.

There was never any secret that the cartel was being organized. Indeed, three days before the Paris meetings, Ottawa had telegraphed its embassy in Washington:

> Please advise appropriate [U.S.] authorities of Canada's initiative in calling a meeting in Paris on February 2 of government officials

> from Australia, France, South Africa and Canada to explore all facets of the present uranium market problems. Stress that the meeting was called because of our concern with the continuing chaotic price situation, which could reduce exploration to a point endangering the adequacy of supplies in latter part of this decade.

Ottawa continued to keep Washington advised, in general terms. All that was missing were the details of the cartel's activities, its market-sharing arrangements, and its pricing agreements. At least they were until four years later when someone broke into the Melbourne offices of Mary Kathleen Uranium Ltd. and stole some 200 confidential cartel documents. The stolen documents wound up in the hands of Friends of the Earth, igniting the fireworks well after the cartel had ceased to function.

There was no secret, either, about the cause of the marketing problems faced by Canada and the other uranium-producing countries. They were caused by American policies and actions. The deep and costly mines at Elliot Lake in northern Ontario had been developed in the 1950s with the encouragement and support of the U.S. Atomic Energy Commission, then the sole U.S. buyer of uranium. The AEC bought the uranium for both nuclear bombs and power generation. It was a time when many thought that electricity from nuclear reactors would be so cheap it could abolish world poverty. After American prospectors found uranium in Arizona, Utah, Nevada, New Mexico, and Colorado, the AEC phased out its purchases of Canadian uranium.

To keep the Ontario mines from being abandoned and flooded, Ottawa and the miners began stockpiling production. When the AEC's buying monopoly ended in 1964 and U.S. utilities were allowed to buy uranium directly for their power plants, a total ban prohibited any imported uranium. The embargo was in violation of U.S. commitments under the General Agreement on Tariffs and Trade, the forerunner of the World Trade Organization. The embargo was announced as temporary. But despite repeated protests by Canada and other countries, temporary lasted 14 years until it was to be slowly phased out during a further eight years starting in 1977.

As with the quotas on imported oil, the embargo resulted basically in two prices: about $4.50 a pound for uranium produced in the United States, and $3.50 for uranium mined and milled elsewhere. To make matters worse, the AEC began to dump some of its surplus uranium stockpile on the already glutted world market. And because at that time it had the only facilities outside of the Soviet bloc to convert uranium

into fuel for nuclear power plants, the AEC was able to charge up to $10 a pound for its surplus stockpile, three times the price others could get.

Canadian members of the cartel included two government companies, Eldorado and Uranium Canada Ltd. (formed for the stockpiling program), plus Steve Roman's Denison Mines; Rio Algom Limited, controlled by Britain's giant Rio Tinto Zinc; Gulf Minerals Canada, a subsidiary of Gulf Oil of Pittsburgh; and Uranerz Canada, a subsidiary of Uranerzbergbau GmbH of Bonn, Germany.

Gulf Minerals was a member under duress. Together with Uranerz, it had developed large, low-cost uranium reserves in northern Saskatchewan on mining licences farmed out from a small oil company, New Continental Oil of Calgary. It was concerned that any participation in a price-fixing arrangement could get it into trouble with the U.S. Justice Department under antitrust laws, despite the fact that it could not sell any uranium to American buyers because of American laws. Ottawa was concerned that the cartel wouldn't be effective without Gulf.

Less than a week after the formative meetings in Paris, Austin phoned Nick Edigar, Gulf Minerals Canada president. According to Edigar's notes, he was advised by Austin that Gulf Minerals "would be acting irresponsibly if it chose to ignore discussions . . . to allocate demand and establish a floor price [for uranium] in the period 1972-77." When talk was not persuasive enough, Austin was instrumental in securing regulations that later sought to make the cartel more permanent than originally contemplated, and required the participation of all the country's uranium producers. Since Gulf was thereby acting in accordance with Canadian law, and since the embargo didn't allow it to sell any foreign uranium to U.S. utilities, it was hoped this would protect Gulf Minerals from any U.S. antitrust action.

As it turned out, the cartel was in business for just three years before it was overtaken by events. The final meeting of its members was held in March 1975. During its first couple of years it was thought to have had some effect in increasing the world price for uranium, but there was no indication that the cartel members in this period ever received prices as high as that paid to the protected U.S. miners. Then, starting in late 1973 with the Arab oil embargo, energy prices went ballistic. By 1975, uranium prices, in tandem with oil prices, had increased seven-fold.

The price increase threatened to bankrupt Westinghouse Corporation, the Pittsburgh neighbour of Gulf Oil Corporation, and the world's largest manufacturer of nuclear power reactors. Along with its reactors, Westinghouse had contracted to provide its utility customers with long-term supplies of uranium, but had neglected to contract for their purchase. In late 1975, Westinghouse advised 27 American and

European power utilities that it could not provide 65 million pounds of uranium it contracted to supply at an average price of $10 per pound. The uranium price was then $25 per pound, headed for $40. The shortfall might be enough to bankrupt Westinghouse.

The utilities sued Westinghouse for the default. Westinghouse sued 26 uranium producers, alleging that the price increase was the result of a conspiracy. The Justice Department also feared a conspiracy and launched a Grand Jury investigation. So did a Congressional subcommittee. The U.S. courts dealing with all the lawsuits, the U.S. Justice Department, and the Congressional subcommittee all issued subpoenas on the foreign as well as American uranium producers. Canada, Britain, France, Australia, and South Africa all formally protested these attempts at extraterritorial application of U.S. laws. South Africa called it "a challenge to the sovereignty of nations."

To thwart the U.S. investigations, Ottawa issued an order-in-council establishing the Uranium Securities Information Regulations which promised to jail any Canadian who revealed any information about the cartel's operations, or even talk about details that had already been splashed across the pages of American newspapers. Hoping to cool temperatures, Trudeau and President Jimmy Carter discussed the matter during their first two-day meeting in Washington. Trudeau, according to a State Department memo, "raised long-standing Canadian concerns about the extraterritorial application of American laws."

Donald Macdonald, who had succeeded Joe Greene as energy minister before becoming finance minister, was not mollified. When U.S. Attorney General Griffin Bell visited Ottawa for discussions aimed at relieving uranium-induced tensions, Macdonald had a message for him. In a television interview, the Thumper, as he was known, thumped:

> They have an ambassador here in Ottawa. Maybe he had better take a message back to Washington that there is not one law for the United States and a different one for everybody else. . . . We don't think Americans should use a big stick against Canadian policy which . . . was basically one to protect ourselves from the predatory policies followed by the American government.

Westinghouse essentially lost its battles in the courts. It never collected a penny from the uranium producers it had sued. By 1981 it paid US$950 million plus legal costs to settle 17 of the suits brought by the power utilities.

As the cartel passed from the scene, so too did the nuclear energy dream. With visions of low-cost electricity collapsed by reality, with the

disaster at Russia's Chernobyl nuclear power complex, continuing worries about the safe disposal of spent uranium fuel, and the growing threat of nuclear bombs in the hands of such terrorist organizations as Al Qaeda or states such as North Korea and Iran, construction of new nuclear power plants has been frozen for nearly three decades and the cartel has faded from memory, a short-lived but dramatic chapter in the history of energy relations.

The energy war

The uranium controversy was soon eclipsed by a fight over Alberta's oil wealth. That wealth started flooding in like a gusher even as Alberta's supply of low-cost oil began to diminish. The money gusher spouted when the Organization of Petroleum Exporting Countries began to find and exercise its power, more than a decade after its founding in Baghdad. As the OPEC-controlled world oil price climbed almost steadily for 14 years, from 1971 to 1984, it added tens of billions of dollars to the market value of Alberta's supplies of oil and gas. Throughout those years, the governments of Canada and Alberta waged a bitter fight for oil money and political power. It was a fight between centralized national government and provincial powers, a regional conflict between the interests of Eastern consumers and Western producers. It was a fight waged between two confrontational politicians with conflicting principles, Canada's Pierre Trudeau and Alberta's Peter Lougheed, and their political and bureaucratic allies. With the oil industry squeezed in the middle, it was a fight between two hogs rooting under a blanket for the same acorn, in the blunt analogy of Imperial Oil's Bill Twaits. Feeling robbed of billions of dollars in oil money they thought was theirs, hammered by a recession made worse for them by Ottawa's energy policies, Albertans sprouted separatism movements as Western alienation spread like a prairie fire. Feelings were so intense that they "threatened the very foundation of Confederation," according to an academic analysis. One 1981 poll claimed that 49 percent of Albertans favoured separation from Canada.

The energy bureaucrats

Having saved Home Oil from the clutches of foreign investors and organized a uranium cartel to fuel a nuclear energy future that still glimmered (if not glowed) on the horizon, Austin next recruited a bureaucratic brains trust for a new sector in the Department of Energy, Mines and Resources. Established in 1972, EMR's Energy Policy Sector quickly supplanted the National Energy Board as the government's principal advisor on energy matters. From 1972 to 1984, the Energy

Policy sector both influenced and drafted the Liberal oil policies that fed the fires of Western alienation. Many of the policy wonks, like Austin himself, had come from Harvard. In 1972, the first recruits in EMR's new Energy Policy Sector were Wilbert (Bill) Hopper, Ian Stewart, and Joel Bell. Six years later — after Austin had been shoved out of the bureaucracy in the wake of a parliamentary and media controversy — Edmund Clark and Marshall (Mickey) Cohen joined the brains trust.

Hopper was a geologist with an MBA degree from Western University in London, Ontario, who had worked for Imperial Oil, the National Energy Board (as a senior economist), and Arthur D. Little, an international consulting firm in Cambridge, Massachusetts. Ian Stewart was a Rhodes scholar and an economist with the federal Treasury Board. Joel Bell, a youthful 31, was a lawyer from an affluent Montreal family with a Harvard post-graduate degree in economics and law who had consulted for several government departments and agencies. He was the lead author of long-time cabinet minister Herb Gray's report on foreign investment that resulted in FIRA, the Foreign Investment Review Agency, intended to curb the extent of foreign ownership of Canadian business. Mickey Cohen, a Toronto lawyer, had come to Ottawa in 1970 as a special tax advisor in the Department of Finance, and eight years later assumed Austin's former post as deputy minister at EMR. Ed Clark had earned both his Harvard doctorate in economics and the enduring nickname "Red Ed" for his thesis, Public Investment and Socialist Development in Tanzania, before joining the finance department in 1974. When Cohen moved from finance to EMR, he brought Clark with him as assistant deputy minister for policy.

The first draft of the new sector's first major study, under the lead authorship of Hopper, failed to win unanimous approval in Trudeau's cabinet and was sent back for "careful editing." The cabinet wanted "a more neutral stand on major issues where government policy has not yet been decided, such as the establishment of a national petroleum company and the means of collecting economic rent." The brains trust had jumped the gun.

While Hopper, Stewart, and Bell worked on their revisions, the world of oil was turning upside down. World oil prices had been declining for most of the preceding two decades under the burden of the enormous Middle East oil supplies and the closure of most of the U.S. market, the world's biggest. In 1970, the price of imported oil laid down in Montreal reached a post-war low of $2.45 per barrel, down 39 cents or 30 percent in seven years. But conditions were already starting to shift. In the United States, energy shortages were showing up, caused by declining U.S. oil production, the quotas that limited oil imports, low regulated

prices for natural gas, and, in some cases, for electricity. In 1971, the price for oil imported into Montreal increased by 67 cents, and the next year by 44 cents. In two years, it had jumped nearly 50 percent from its 1970 low. The worst was still to come.

For OPEC, the policies and bottlenecks that caused the U.S. shortages were like spinach for Popeye. OPEC had begun to wrest control from the Seven Sisters, the big international oil companies that had controlled 80 percent of world oil production, refining, and marketing outside of North America and the Soviet bloc, expropriating the oil company concessions that housed the enormous oil reserves of the Middle East and Venezuela. OPEC, warned Britain's authoritative Petroleum Press Service, was creating a "producers cartel with virtually absolute control over the international oil trade. This will be a cartel the like of which the world has never seen." The impact of that cartel would soon fall on the Western world like a hammer blow.

As prices soared and shortages loomed, U.S. restraints on imports of Canadian oil were suddenly lifted. The Americans now wanted all the Canadian oil they could get. It was to no avail. Production of low-cost oil in Western Canada had already peaked and was about to go into a steady decline. No large oil fields had yet been found in the offshore or Arctic areas. Development of new oil sands plants would require billions of dollars and take many years.

It was a divided cabinet that faced these matters in a series of energy meetings starting on February 1, 1972. The ministers had already been advised by the National Energy Board that Western Canada did not have enough capacity to supply all the oil that Canadian and American refiners wanted to buy. Canadian needs would be met first and exports would be limited by licences. Now they were debating proposed controls to set lower prices for oil sold to Canadian refiners while charging American buyers the higher, world prices. Macdonald, Finance Minister John Turner, and External Affairs Minister Mitchell Sharp warned about "dangers which could arise." Macdonald said Alberta's reaction "was likely to be adverse." Defence Minister James Richardson was "opposed to any suggestion that the oil companies should be required to subsidize Canadian consumers," arguing that they should be paid out of general revenue or royalties on resource production. Richardson, a former head of Winnipeg's James Richardson and Sons, one of the West's largest investment and grain dealers, warned that reducing the price for Canadian oil "at the same time as Canadian tariffs maintained high prices for manufactured goods in Western provinces would be clearly resented in the West."

The debate spread beyond cabinet walls when EMR's toned-down, two-volume, 365,000-word Energy Policy for Canada was published in mid-1973. It expressed concern that the 91-percent foreign control of the oil industry could impair "Canada's ability to determine its own priorities." The terms of the federal government's petroleum permits and leases were said to "leave too much [economic] rent in the hands of the industry in the event of prolific discoveries and highly profitable operations." Economic rent was defined as revenues in excess of costs "and an adequate return on risk capital."

The case for a national petroleum company, the authors admitted, rested on non-commercial purposes: greater Canadian ownership of the industry; better insight into how the oil industry functions; help in determining appropriate "economic rent;" and development of Canadian research and managerial resources, among others. The required large investment, they warned, "would result in an increased tax burden" while "the multiplicity of goals and objectives would almost certainly ensure that any national petroleum corporation would be commercially less efficient."

Gazing into their crystal ball, the authors forecast that the world price for oil would climb to $7 per barrel by the year 2000. But almost before cabinet ministers had time to read the study, the price had exploded to $13, enroute to $44. It wasn't the first error in discerning the future of oil prices. Crucial policy decisions would later be based on inexorably rising prices, just as they began to dramatically fall.

Energy became the hottest political issue as prices climbed month by month, as concerns mounted about secure and adequate supplies, and as some began to worry that "excessive windfall profits" were about to be reaped either by Alberta or the oil companies while consumers were stuck with ever more costly fuel bills.

With or without unanimous agreement within the cabinet, some of the main features that would guide government energy policy for more than a decade had emerged by September 4 when Trudeau arose in the House to announce three energy measures. The Interprovincial pipeline would be extended to Montreal, even if the government had to build it. Prices for gasoline and other products charged by refiners and marketers would be "voluntarily" frozen for five months. A tax of 40 cents per barrel would be applied on oil exports, rising in lockstep with any further increases in world prices. The export tax was a mechanism designed to both increase Ottawa's share of oil production revenue, and subsidize consumers from the full impact of high-cost imported oil.

The adverse reaction from Alberta that Macdonald had anticipated was clearly spelled out by Lougheed in a public statement issued October

4. The tax, said Lougheed, was “an invasion of the provincial government’s jurisdiction over its natural resources” that would “siphon off millions of dollars from the Alberta economy.” He called it another example of the type of policies such as the “national tariff and transportation policies which favour Central Canada” under which “the scales are still heavily balanced against Western Canadian equity in Confederation.” The alienation temperature climbed a notch.

Lougheed had lobbed the first volley in a heated war of words. Two days later, the first shots were fired in a real war, when Syrian and Egyptian forces invaded Israel, launching the fourth full-scale Middle East war since 1948. Twelve days after that, the Arab members of OPEC cut their oil deliveries by one-quarter with further planned cuts of five percent per month and a total embargo of oil deliveries to Israel’s two strongest supporters, the Netherlands and the United States.

The energy crisis quickly reached its extreme stage. There were long lines and lengthy delays at service stations and gasoline shortages developed. Maximum highway speeds were reduced to 55 miles per hour. Energy Minister Macdonald urged Canadians to lower their house temperatures by 5∫ to 7∫ and cut back on outdoor Christmas lighting. To keep Eastern consumers supplied until the Interprovincial pipeline could be extended to Montreal, Western Canadian oil was shipped eastward from Ontario by seaway, by rail when the seaway was closed, by reversal of the products pipeline that normally pumped refined products from Montreal west as far as Toronto, and by tanker shipments from Vancouver via the Panama Canal to the East Coast.

“Not since the world collapse of 1929 has an economic event struck so quickly and on such a scale, or produced so potentially a dramatic difference in the lives and fortunes of Canadians,” Macdonald told Parliament.

As world oil prices soared, so did the tax on Western Canada’s oil exports to the United States. From an initial 40 cents per barrel it jumped to $1.90 two months later, $2.20 in January, $4.00 in April, and $5.20 in June. Through the export tax and controlled wellhead prices, Canadian oil producers and their host provincial governments, by mid-1973, were subsidizing Canadian consumers to the tune of $10 million a day.

Lougheed planned to void Ottawa’s control of oil prices by establishing a marketing board that would buy and sell all the oil produced in Alberta, at prices set by Alberta. At the cabinet meetings in Ottawa, fears were expressed that Alberta could capture revenues “so large as to possibly cause very significant changes in the distribution of population and the structure of the Canadian economy” while imposing “a heavy

burden on the federal treasury" for increased equalization payments. Marc Lalonde, the health minister from Quebec and future federal oil hawk, said the cabinet should consider taking over control of "the oil and gas industry on the grounds of public interest."

The prime minister and premiers sought to resolve the issue of oil prices and revenue sharing at a two-day First Ministers Energy Conference in February and again on March 27, when they finally reached an agreement to increase the price for Alberta oil from $3.80 to $6.50 per barrel, still well below the OPEC cartel price.

Price peace between Ottawa and Edmonton did not reign for long. One of Lougheed's responses to the initial 40-cent export tax was to raise the complex schedule of royalties the province collected on oil and gas sales, to as high as 65 percent in some instances. Trudeau wrote to Lougheed to protest that Alberta's "very high level of provincial royalties erodes the corporate tax base" on which federal revenues relied, "and narrows the scope of whatever incentives the federal government feels necessary to maintain exploration." Finance Minister John Turner followed up Trudeau's letter with an announcement in May that with the planned federal budget in November, royalty payments made by oil companies to provincial governments would no longer be deductible from taxable income. Lougheed wrote again to Trudeau protesting that this "drastic and extreme" proposal "would seriously jeopardize the Canadian petroleum industry," could result in "an energy shortage in Canada in about eight years," and would "strike at the very foundation of Alberta's basic acceptance of the March 27, 1974 international pricing agreement." When Ottawa followed through on its threat to disallow provincial royalty payments in the calculation of corporate taxes, Lougheed issued another public statement, asserting that Alberta "no longer considers itself bound" by the pricing agreement, which he said had been breached by "the harsh and punitive provisions" of the federal budget.

The harsh rhetoric was fortunately cooled for at least a few years by the pressing needs of reality which compelled compromise. Ottawa needed to reduce the growing burden of subsidizing consumers. The industry's crippled exploration efforts and stalled plans for further development of the oil sands and heavy oil were in no one's interest. Thus the initial 1973 increase to $6.50 per barrel in the controlled wellhead price for Alberta oil was followed by a further increase to $8 in 1975 and to $9.50 in mid-1976, with the bulk of these last two increases going to Alberta and the oil companies. And there were further increases in store — big ones.

While the period of relative calm prevailed, energy development proceeded, directed (often misdirected) by federal energy policies.The

extension of Interprovincial's oil pipeline to Montreal was completed before the end of 1974, its $247-million cost financed by government backstopping. Legislation creating Petro-Canada was passed by Parliament in early 1975. Offices were opened in Calgary the following year under the chairmanship of Maurice Strong, former stock promoter, energy investment analyst, oil executive, international development administrator and global environmentalist, and two former bureaucrats from EMR's Energy Policy Sector. Bill Hopper was initially vice-president before he succeeded Strong as CEO, while Joel Bell was initially on loan to Petro-Canada before becoming executive vice-president. Ottawa's Frontier Exploration Allowance under which it spent a billion dollars in foregone tax revenues to subsidize up to 100 percent (in some cases, perhaps even more) of costly wildcats on federal oil and gas lands in the far North, came into effect in early 1977. In 1978, the Syncrude consortium started production at 125,000 barrels per day of synthetic crude oil from the second plant in the Athabasca oil sands.

In the midst of all this, there was a changing of the bureaucratic guard in Energy, Mines and Resources that came with Jack Austin's 1975 appointment to the Senate, usually a home for the aged, at the tender age of 43. His career as a powerful bureaucrat had been shunted aside following controversy in Parliament and the media over a small, and legal but unseemly investment he made in a resource company while deputy minister, and a $70,000 tax dispute with National Revenue. "In political terms he was damaged beyond repair," according to Canadian Business. Austin, however, would emerge from the obscurity of the Senate as a person of power and influence once more. Meanwhile, he was succeeded as EMR's deputy minister by Mickey Cohen, who came from the finance department, bringing Ed Clark with him. Clark was followed by Ian Stewart, another academic economist who had served as an advisor in the Prime Minister's Office for four years.

The mandarins were soon faced with the task of drafting and implementing a new energy program for their political bosses, one of the most contentious government programs in Canada's history.

Chapter 22. The Birth and Death of the NEP

The consensus of economists is that the NEP was not economic policy, it was a political document. . . . The energy policies hit the petroleum industry by the discriminatory measures that discouraged the

investment of foreign capital; by the “Canadianization” measures which wound up bankrupting the Canadian-owned firms they were intended to help.

It was more conflict in the Middle East that set the stage for the National Energy Program. The Iranian revolution that started in December 1978 overthrew the autocratic regime of Shah Muhammad Reza Pahlavi only to replace it with an even more oppressive theocratic regime. The effects of the revolution on the world of oil were, at least temporarily, as profound as the impact of the 1973 Israeli-Arab war. That earlier war had strengthened the rise of world, or OPEC, oil prices from $2.45 to $17 in 1973. Now, with production from the world’s second largest oil exporter slashed, the price zoomed to $26 in 1979 and nearly $45 in 1980. Once more, there was a great increase in the latent wealth of oil to argue about.

Despite this, a measure of peace prevailed in Canada with the May election of Joe Clark’s seven-month Conservative government. Even so, Energy, Mines and Resources’ Energy Policy Sector was urging tough federal action. In a paper prepared for new energy minister Ray Hnatyshyn, Background to Energy Policy Choice, EMR argued once more that Alberta was getting too big a slice of the oil pie revenue while the federal government was getting only 10 percent. Big oil companies were holding up development of the oil sands. To increase Canadian oil supplies, even stronger direct federal government action was urged: the establishment of Petro-Canada, with a mandate to find more oil, was not enough.

The advice mostly fell on deaf ears. The Conservatives reached an accord with Alberta to peg oil prices closer to the now much-higher OPEC price. It was sweet music to the ears of Alberta and the oil producers. The notes sounded less harmonious, however, when Finance Minister John Crosbie brought down his ill-fated budget in December. Like the Liberals, the Conservatives too wanted a bigger federal slice of oil revenues, especially with the big increase in the controlled price. The export tax was to be abolished but replaced by an alternative tax on sales of crude oil to both American and Canadian refiners, plus an 18-cents-per-gallon ($6.30 per barrel) tax on gasoline and diesel fuel. None of it came to pass when the Conservative government fell on a budget vote on December 11.

Trudeau outlined the Liberals’ energy policy, and the main features in the coming National Energy Program, in an election speech in Halifax on January 25, halfway through the campaign. There would be a return to made-in-Canada oil prices, with lower rates for Canadian consumers and

OPEC prices for American buyers; an expanded role for Petro-Canada; greater Canadian ownership of the petroleum industry; measures to promote energy conservation and substitution of oil with alternative forms of energy. It was politically sexy. The Liberals won the election, just 68 days after they had defeated Joe Clark's government in the House.

The thrust of the Liberals' more aggressive energy policies had been developed by a committee of Liberal members of Parliament headed by Marc Lalonde, assisted by researcher Barbara Zulzenko, a New York consumer advocate who had no qualifications as an economist or knowledge about the petroleum industry. When the Liberals were back in office, Marc Lalonde was energy minister, directing the development and drafting of the National Energy Program by EMR's Energy Policy Sector. Because it involved so many taxes, it was unveiled as part of Finance Minister Allan MacEachen's October 28 budget. The two-price system and the oil export tax were re-confirmed. New taxes were designed to boost the federal share of oil and gas production revenue from nine percent to a projected 26 percent during the four-year period 1980 to 1983. Some $4.6 billion was budgeted for the PIPs, the Petroleum Incentive Payments under which Ottawa paid up to 80 percent of the cost of exploratory wells on its Canada Lands in the northern and offshore frontier areas and up to 35 percent of wildcats drilled in the West, the amount depending on the degree of Canadian ownership of the exploring company. The gas delivery pipeline from Alberta was to be extended from Montreal to Quebec City and the Maritime provinces. Natural gas prices were to be kept low to encourage switching from fuel oil. Canadian ownership of the petroleum industry was to be increased from 27 percent to at least 50 percent by 1990. Petro-Canada was directed to acquire the Canadian assets of at least one foreign-controlled multinational oil company (in fact, it already had). Petro-Canada was given the right to acquire, prior to the start of production, a quarter interest in any oil or gas discoveries on the Canada Lands, without having to pay for any of the prior exploration costs.

The NEP was festooned with an array of acronyms that denoted both taxes and spending. On the taxing side, in addition to the PIPs, there was NORP, the New Oil Reference Price, to encourage development of the oil sands; IORT, the Incremental Oil Revenue Tax, an additional tax on oil company revenue which would apply if prices rose more rapidly than expected, which never happened; COS, the Canadian Ownership Charge, a tax later applied to gasoline sales to pay the $1.7-billion cost of Petro-Canada's purchase of Canadian Petrofina; and PCC, the Petroleum Compensation Charge that subsidized the cost of oil imports. On the spending side was COSP, the Canadian Oil Substitution Program; UOOP,

the Utility Off-Oil Program; CHIP, the Canadian Home Insulation Program; and FIRE, the Forest Industry Renewable Energy Program. Including Petro-Canada, the PIP grants, and all the other items, in the five-year period 1980-85, Ottawa spent $13 billion on its energy programs. Also related to the NEP was the Western Development Fund, established to return to the West, under federal control, a portion of the funds taken from the West by the NEP, and to help bolster Western support for the Liberals. Much of the fund was spent to help resolve railway transportation issues that had been a Western complaint for more than a century, frequently mentioned by Lougheed in his discontents about Confederation's alleged Alberta discrimination.

The first reaction of the oil companies to the NEP was that they would have to review their spending plans. B.C.'s energy minister, Bob McClelland, said it was all a "disaster" and "a betrayal of the West." Lougheed's response was more action than words and was swift in coming. Alberta began to cut its oil production by a planned 15 percent in three stages over the next year. Approval of further oil sands development was withheld. A legal challenge to Ottawa's authority to impose an excise tax on natural gas sales was planned. But, as in the 1970s, the demands of reality compelled compromise and settlement. The country needed petroleum resources developed, not shut in. Ottawa needed money. Alberta could only suffer by cutting back its oil production.

Alberta's production cutbacks and oil sands restraint were removed within a year by another agreement. In the five-year pricing and revenue sharing agreement signed by Lougheed and Trudeau on September 1, 1981, nine months after the NEP announcement — with similar agreements signed with British Columbia on September 24 and with Saskatchewan on October 26 — there were dreams of gushing oil wealth for everyone. It was based on projections by the bureaucrats in Edmonton and Ottawa that world oil prices would keep climbing at a rate of 13 percent a year. The controlled price for Canadian oil would be capped at 85 percent of the world price. This would yield production revenues of precisely $212.8 billion during the five-year term of the agreement. The federal government would get 25.5 percent, Alberta would get 30.2 percent, and the oil companies would get 44.3 percent. "I regard the agreement as a triumph of the Canadian way," Trudeau later wrote in his memoirs. "Lougheed and I toasted the agreement with champagne and publicly agreed that it was good for Alberta and good for Canada."

They were dreaming in Technicolor. Even before Lougheed and Trudeau tasted their champagne, oil prices had started falling. In March,

OPEC had cut its prices by $5 a barrel, and an increase in the price for Canadian oil scheduled for July had been cancelled.

"What became of the energy crisis?" the Petroleum Economist asked a month after the champagne celebration. Plenty. High prices and the worst recession to hit the Western world since the 1930s had reduced world oil demand by more than eight percent in two years. Large new oil supplies in the North Sea, Alaska, Mexico, and elsewhere had loosened OPEC's monopoly grip and its ability to seemingly command what it wanted for its oil. Inventories of oil, bulked up because of jitters over possible further disruptions to Middle East oil supplies, were now being drawn down at rates up to four million barrels a day, adding more downward pressure on prices. Instead of climbing to $80 a barrel as bureaucrats, banks, and petroleum borrowers expected, the price of oil was on a steady eight-year skid from nearly $45 to $19 per barrel.

The price drop, Trudeau acknowledged in his memoirs, meant "we were underwriting subsidies to the Canadian oil companies and lower prices to the Canadian consumers with money we didn't get."

The death of the NEP

The National Energy Program lasted four years. It was killed by Brian Mulroney's Conservative government, elected on September 4, 1984 with a market economy and free trade agenda fundamentally opposed to the decade of government petroleum engineering in the Trudeau era. The funeral director was Patricia Carney, the former business journalist and economic consultant who was Mulroney's energy minister. The burial took place on March 28, the following year when Carney and the energy ministers of the Western provinces signed the Western accord. It abolished oil and gas price controls, effective June 1. Five federal NEP taxes were abolished immediately, while the annual $2.5-billion petroleum and gas revenue taxes were phased out over 3.5 years. No more PIP grants were to be issued, but those already approved were continued. Tax incentives to some extent replaced the PIP grants and ended the PIP discrimination against foreign investment and exploration expenditures in Western Canada. Petro-Canada's contentious 25-percent back-in privilege on Canada Lands was abolished. The changes were expected to cost the federal treasury half a billion dollars in 1985 but add $3 billion to oil company revenues. The industry gains didn't last long: the following year, the now decontrolled benchmark price for Canadian oil, in step with world prices, collapsed by more than 40 percent (from $37 to $20).

A quarter of a century later, for many Albertans the National Energy Program remains the shorthand phrase for the cause of all the blows the province suffered in the 1970s and 1980s: the alleged theft of billions of dollars in public revenues that should have stayed in Alberta; the collapse of drilling activity as rigs headed south; the loss of jobs and savings; the corporate and personal bankruptcies. Estimates of what the NEP cost Alberta range from $50 billion to $134 billion, which Robert Mansell, University of Calgary dean of economics, calculates as the net withdrawal from the province to the federal treasury and petroleum consumers from 1978 to 1985, as measured in 1990 dollars. In fact, the NEP was only the climactic part of detested federal energy policies that began with the energy crisis in 1973 and didn't end until 13 years later with the signing of the Western accord.

Those energy policies, however, were not entirely unique to Canada. Other countries with domestic oil production also capped their prices at less than OPEC prices in the 1970s, and applied taxes to capture rising oil revenue for the public sector. In the United States, the controlled price for "old oil" — oil produced from U.S. fields discovered prior to 1974 — were at times less than the prices Ottawa set for Canadian oil. Britain applied a schedule of taxes that took as much as 90 percent of the sales revenue from oil fields in its sector of the North Sea. The slump in industry expenditures for drilling for exploration was a function of supply and demand. Almost from the inception of the petroleum age, the cycle has swung from oil shortages causing prices too high to sustain economic prosperity to oil gluts with prices too low to sustain the search for and development of new supplies. The period of supply glut in the 1980s would have reduced industry activity regardless of the NEP; in fact, drilling continued to fall after the NEP was dead.

Regardless, the NEP and its predecessors had adverse economic consequences, and where they were not the cause of tough economic conditions, they made them worse. The consensus of economists is that the NEP was not economic policy, it was a political document. It "did not result in nor was it primarily intended to produce good economics," political analysts Bruce Doern and Glen Toner concluded. The energy policies hit the petroleum industry by the discriminatory measures that discouraged the investment of foreign capital; by the federal-provincial squabbles over revenue that squeezed the industry's revenues; and by the "Canadianization" measures which wound up bankrupting the Canadian-owned firms they were intended to help.

The dearly departed

It was the NEP's measures to increase Canadian ownership of the oil and gas industry to more than 50 percent that ultimately proved the hardest blow to many Canadian-owned firms; to their shareholders, who lost unmeasured billions of dollars; and to the employees who lost their jobs, as companies rushed to take advantage of Ottawa's incentives, particularly the PIPs.

Aside from the private sector incentives, the other NEP measure to increase Canadian ownership was Petro-Canada's mandate to acquire "several of the large foreign-owned firms." It was a mandate to increase not just Canadian ownership, but to increase federal government ownership of the oil industry based on the premise that "direct public sector participation in this sector remains too low."

Petro-Canada had already made a substantial start on this perceived problem before the NEP was introduced, and under the aggressive management of Bill Hopper — who had stepped up from vice-president to CEO six months after joining the firm — the pace was quickened. In a 10-year period, taxpayers invested $4.6 billion in Petro-Canada to buy the Canadian assets of the foreign oil companies, in addition to substantial expenditures for exploration, producing operations, oil sands development, and refining and marketing.

The value of the taxpayer investment in Petro-Canada is still debated. Peter Foster, Petro-Canada's best-known critic, claimed that the public debt associated with this investment, counting cumulative interest at 10 percent a year, amounted to $11 billion in 1992, while the stockmarket, following the first public sale of shares, pegged the company's value at little more than $2 billion. The record of the subsequent 13 years, however, has been dramatically different, with Petro-Canada's market capitalization by mid-2004 rising to $16 billion. Cumulative earnings during the 12-year period to 2004 were $5.9 billion for the company's government and private owners while expenditures of $72 billion rippled through the economy, directly and indirectly generating large, uncalculated public sector revenues in the form of production royalties, lease rentals, corporate and income taxes, sales taxes, property taxes, and other taxes. The government also netted $5 billion from the sale of its Petro-Canada shares in 1995 and October 2004.

In the private sector, there was nothing ambiguous about the results of the NEP's Canadianization incentives: they were bad. "The financial health of the Canadian-owned segment of the petroleum industry has been badly weakened by Canadianization takeovers," C.D. Howe Institute economists Ed Carmichael and James Stewart warned in an early assessment. Nine Canadian-owned firms, aside from Petro-Canada, in 1981 had borrowed $9.2 billion from Canadian banks to buy the

Canadian subsidiaries of U.S. oil companies and expand exploratory drilling to take advantage of the PIP grants. Burdened with $1 billion in annual interest payments, the earnings of the nine firms fell 49 percent in 1981, the first full year of the NEP, and they were left with "very poor credit worthiness." They had also, warned the economists, become "so highly leveraged that further declines in corporate earnings could jeopardize their continued operation."

That threat turned into some of Canada's biggest corporate bankruptcies, leaving behind in Calgary monuments of steel and glass to firms that no longer exist: the Home Tower, the Dome Tower, the Aquitaine Tower, Nova Tower, Hudson's Bay Oil and Gas Tower, Gulf Square. British historian Cyril Northcotte, in one of his famed Parkinson Laws, held that when impressive new headquarters were ready for a government or a corporation, its fate was sealed: "When the capital is complete, the empire is ready to fall."

Canadianization didn't exactly end with the passing of the NEP and the PIP grants. Like the NEP, other federal and provincial policies intended to increase Canadian ownership too often worked against it by impairing economic performance, which reduces wealth, which obviously diminishes ownership. The firms that wrapped themselves in the biggest Canadian flags to attract the biggest government support were often the ones that fell the hardest, the Maple Leaf becoming their burial shrouds.

Chapter 23. Casualties of the NEP: Goodbye to the Bay

The $4.3-billion acquisition of Hudson's Bay Oil & Gas by Dome Petroleum was not only the largest corporate takeover in Canada at that time, it also led to the biggest bust in the oil patch.

The most historic oil company to disappear under the impetus of the National Energy Program was Hudson's Bay Oil and Gas. It was gobbled up and gone, but the gobbler suffered such indigestion that it too was soon gone.

HBOG, as it was universally known in the oil patch, could trace its lineage to the 1670 founding of the Hudson's Bay Company and Ernest Whitworth Marland, an aristocratic wildcatter with a grand vision of competing with the Rockefellers and a spending habit even greater than his vision.

A native of Pittsburgh, Marland was the son of a Scottish mother and an English immigrant father who fought with the Confederate army in

the U.S. Civil War and later made a fortune manufacturing iron bands for bailing cotton. Marland inherited a lifelong worship of aristocratic English manners and a compulsion for social reform, combined with a taste for wealth and a paternalistic attitude. As a boy he started school dressed in kilts and sporan. As a youthful promoter he arrived in unsettled Indian country dressed in belted tweed jacket, knickerbockers, and white spats. As a prosperous businessman he introduced polo and fox hunting to the plains of Oklahoma.

At university, Marland specialized in poker, graduated with a law degree, set up a law practice in Pittsburgh, and sought his fortune acquiring leases and looking for coal. Instead of coal, he found some shallow oil and gas pools, and by his early 30s he had made and lost his first fortune. Not knowing that Marland was utterly broke, owners of the 101 Ranch in Oklahoma invited him to look for oil on their property. Despite his impecunious status, Marland had enough connections to borrow some money and organize the 101 Ranch Oil Company in Ponca City, Oklahoma. The Ranch company drilled eight successive dry holes. That put him so much further in debt that at one point he pawned his watch to pay for his room and board. In true wildcatter tradition, the ninth hole was a big gusher, on the sacred burial grounds of the Ponca City Indians. The 101 Ranch Oil Company became Marland Oil Company and by 1920 was one of the largest oil producers, refiners, and marketers in the U.S. mid-continent region.

At Ponca City, Marland spent millions to build a 400-acre estate and mansion while providing employees with social benefits unheard of in his day. Employees were offered subsidized housing at low interest rates, free medical and dental insurance, full salary not only during sickness but also during recovery from non-occupational accidents, recreational and study facilities, and the opportunity to buy company shares on generous terms. Every working man, said Marland, ought to have not only a “living wage, but a saving wage.” The Marland Industrial Institute provided technical training and “continuation of the educational opportunities . . . for all employees.”

On a 1926 visit to London, Marland signed a deal with Charles Vincent Sale, governor of the Hudson’s Bay Company, for a joint exploration program on HBC’s properties in the three prairie provinces. HBC — aka Here Before Christ — had retained ownership to its vast Rupert’s Land, from the Great Lakes to the Rocky Mountains, for 199 years. When it sold this property to Canada for $1.5 million two years after Confederation, HBC retained title to 7.5 million acres. The agreement gave Hudson’s Bay section eight and three-quarters of section 26 in each unoccupied township between Winnipeg and the Rocky

Mountains, mostly south of the North Saskatchewan River. In each fifth township it also got all of section 26. The land was eventually sold to settlers but after 1889 HBC followed the practice of the Canadian government in retaining ownership of any underlying minerals, winding up with 4.5 million acres of freehold mineral rights in the three prairie provinces. This was the property that launched Hudson's Bay Marland Oil Company in 1926. It was initially owned 83.5 percent by Marland Oil and 16.5 percent by Hudson's Bay Company, with an exclusive option to lease the Bay's 4.5 million acres of freehold mineral rights, subject to lease rentals and royalties on any production.

Marland Oil, however, was slipping out of the hands of E.W. Marland. To expand faster, Marland had sold $12 million in company shares with an option on an additional $90 million in stock to J.P. Morgan, the great investment banker, who was associated with J.D. Rockefeller. With the additional capital, a string of oil discoveries was matched by growing refining and marketing operations, while a trademark red triangle and the name "Marland" hung at service stations throughout 11 mid-continent states. But Morgan was now in control and when Marland Oil, top-heavy with staff and burdened with debt, began operating at a loss in 1927, E.W. Marland was eased out and Marland Oil was merged with Continental Oil Company, a former unit of the Rockefeller trust until the trust was bust in 1911. The red triangles were all repainted to read "Conoco."

Bitter over the loss of his company to the eastern bankers whom he now distrusted, Marland turned his energy to politics, was elected to Congress, and in 1934 was elected state governor of Oklahoma. His social reforms as a politician were as generous and trend-setting as his employee benefits had been when he was a capitalist, but the costs shocked taxpayers. He returned to Ponca City to retire in 1938 and, extravagant to the end, was forced to sell the great manor house, which had cost him millions, to the Carmelite Friars for $66,000. At age 69, he died in 1943.

With the change in ownership of the U.S. parent, Hudson's Bay Marland Oil Company became Hudson's Bay Oil and Gas. A few unrewarding years of exploration were followed by the Great Depression during which HBOG became inactive. By 1934 it had dropped all of its non-HBC leases and its books were sent to Ponca City to be kept. Discovery of crude oil at Turner Valley in 1936 brought some revival of exploration for HBOG in the Alberta foothills, but without encouraging results. It was not until 1948, following the Leduc discovery, that HBOG sprang back to life, spending hundreds of millions of dollars on land acquisitions, exploration, oil field development, gas plants, and pipelines.

HBOG earned its first profit in 1956, 30 years after its founding. As 1981 dawned, it was prosperous and debt free. Following a public share offering to Canadian investors and the acquisition of several smaller independent Canadian oil companies, HBOG was owned 52.9 percent by Conoco Inc. (which had shortened its name from Continental Oil Company), and 10.9 percent by the Bay (now controlled by Toronto billionaire Ken Thomson), while nearly all of the remaining 37 percent was held by private and institutional Canadian investors. With annual revenue of more than $600 million and earnings of $145 million, it was one of the most profitable companies in the Canadian oil patch. Conoco in Stamford, Connecticut may have been the majority owner, but HBOG was nearly 47 percent Canadian-owned, and essentially all Canadian staffed and managed. Gerry Maier, who came from Regina, and had joined HBOG in 1953, two years after leaving the University of Alberta as a petroleum engineer, had worked his way up to chairman and CEO. Dick Haskayne, an Alberta accountant, also from the University of Alberta, was president and chief operating officer. Despite the National Energy Program, on the top floors of the 42-storey HBOG Tower on Calgary's 7th Avenue, there was no inkling of anything in the future but stable management, growth, and profit.

Doomed Dome

The $4.3-billion acquisition of Hudson's Bay Oil and Gas by Dome Petroleum was not only the largest corporate takeover in Canada at that time, it also led to the biggest bust in the oil patch. It was not just investors who got hammered, taxpayers were hit even harder. Dome Petroleum simply cost the Canadian taxpayers more than any other oil company, much more than Petro-Canada. Taxpayers might have suffered a net loss with Petro-Canada, but they got back at least a good deal of their billions of dollars in the form of corporate taxes, dividends, and, with privatization, the sale of Petro-Canada shares. Virtually every penny of the billions that Dome cost the taxpayers was a dead loss.

The irony is that the government spent so lavishly largely based on a vision that Dome and the Beaufort Sea would generate vast petroleum wealth for the federal coffers. And the double irony is that Dome Petroleum founder Jack Gallagher, who sold the vision, truly believed it. The Beaufort Sea might yet yield great wealth for the development of the North, the Canadian economy, investors, and the federal government. But Dome is long gone, and so are those early taxpayer dollars.

In many respects, Dome now seems like a legal version of Enron Corporation, the Houston-based energy giant whose scandal-ridden demise rocked the corporate and financial world in the closing years of the 20th century and the early years of the 21st. There was never any

suggestion that Dome acted illegally, but there were still striking similarities. In both cases, the people in charge — at least during the climactic years at Dome — were fired with overwhelming ambition in pursuit of grandiose industrial empires. In both cases, reckless gambles ran roughshod over responsible prudence. Both wielded almost unprecedented political influence. Both were highly aggressive in seeking tax and legal loopholes — in Enron's case, extending beyond the bounds of legality. Both, in their heydays, were widely acclaimed as modern models of corporate marvel. Both recruited the smartest, most talented, most ambitious executives that money could buy. And they all worked incredibly hard and long hours, when they and the world would have been better off if they had simply stayed in bed.

During its five years of greatest glory, there were two contrasting and often conflicting officers on the bridge in charge of Dome. Ostensibly charting the course was Winnipeg geologist Jack Gallagher, founder, chairman, and CEO. At the helm steering the ship was Winnipeg lawyer and Dome president, Bill Richards.

They were contrasts, indeed. Gallagher, known as early as his school days as Smilin' Jack, the hero of a popular comic strip, was tall, charming, gracious, soft-spoken, as frugal with money as with the Spartan diet that helped keep him lean and trim. He didn't smoke, never drank coffee, seldom touched liquor, at 60 still ran a couple of miles or more most days. Richards, exuberant and voluble, round, rumpled, and rough-cut, chomped fat cigars and gulped fast food. He was reputed to have once driven his pickup truck from his ranch to his 33rd floor corner office in Calgary's Dome Tower with manure still stuck on his cowboy boots.

More important were the contrasts in management styles. Gallagher wanted to find oil, especially in the Beaufort; Richards wanted to buy it, a faster and more certain means than wildcatting, but sometimes just as risky. "You can become a large company but you grow slowly from within," Gallagher told Peter Gzowski on CBC radio's Morningside program after he had been ousted as CEO of Dome. "Philosophically, I was not in favour of growth by acquisition, mainly because people get hurt when you acquire another company." Yet Gallagher was CEO and did nothing to stop the acquisition of HBOG. Richards was not only at the helm steering the ship, he had de facto assumed a good deal of the CEO functions and was to a large extent charting the course. "I didn't resist because I was 65 years of age," Gallagher explained. "I wanted to step aside. I felt that the younger people would be carrying on." There was also the fact that Richards' acquisitions were at first highly successful, and who wants to argue with success?

Gallagher had brought to the founding of Dome a dozen years of experience searching for oil prospects in the far corners of the globe. Armed with his geology degree from the University of Manitoba and two seasons of field experience with the GSC in Northern Canada, he had set out at the tender age of 22 to work first for Shell and then for Standard Oil of New Jersey, working in California, Egypt, Ecuador, Guatemala, Honduras, and Panama. He returned to Calgary in 1948, where for two years he worked for Standard's Imperial Oil subsidiary. Two years later he left Big Oil to set up Dome Petroleum, initially as vice-president. Dome was financed with $250,000 in equity from gold miner Dome Mines and its controlling New York investment dealers, and $7.7 million in loans, principally from the endowment funds of Harvard, Princeton, and the Massachusetts Institute of Technology. For the first two years, Gallagher and his secretary were the company's only employees. During the next three decades, however, Dome Petroleum raised a modest $10 million in additional equity but borrowed billions to succeed Home Oil as the largest independent in the Canadian oil patch.

Under Gallagher's management, Dome grew if not slowly at least prudently. The go-for-broke wildcatting that marked oil's early decades was a thing of the past among the successful and more enduring of the new oil companies that sprang up in the wake of the Leduc discovery. Instead of gambling start-up capital on wildcatting, the approach was to invest it in the acquisition and development of proven or semi-proven leases or other opportunities to generate cash flow. A portion of the cash flow could then be used for wildcatting, and risks further reduced by participation with others. That was a fortunate approach for Dome, because its wildcatting proved to be spectacularly unsuccessful, except for discovery of the substantial Provost gas field in central Alberta, and oil and gas finds in the Arctic, too small, too remote, and too costly to be profitably produced.

The unglamorous job of building Dome's cash flow turned out to be in the business of extracting, transporting, and marketing natural gas liquids — NGLs, propane and butanes for fuel, condensate for refinery feedstock, and ethane for petrochemical feedstock. With some stunning technical achievements engineered by Don Wolcott, who was hired in 1957 to bring the Provost field into production, Dome became Canada's largest NGL producer, pipeliner, and marketer. Major projects included a $17-million system in southeastern Saskatchewan to collect and process gas that was being flared in individually small amounts at hundreds of oil wells, near Edmonton, the first "straddle plant" to extract more NGL from gas being shipped through major gas transmission systems, followed by two more straddle plants at Cochrane west of Calgary and

Empress on the Alberta-Saskatchewan border; a pipeline grid to move NGL from processing plants in central Alberta to Edmonton where it was "batched" for delivery through the Interprovincial pipeline as far as Ontario, cutting transportation costs from 10 cents per gallon by railway to 1.5 cents; a 2,500-mile NGL pipeline that eventually stretched from Edmonton to Sarnia. Dome also got into the oil pipeline business with the purchase in 1970 of 1,300 miles of oil field gathering lines in southeast Saskatchewan, complementing its gas gathering grid. This was one of the first major acquisitions engineered by Richards. Producing NGLs may have been an unglamorous business but it was not far short of spectacularly successful and it was primarily this that made Dome a growing and profitable business throughout the 1960s and early 1970s.

Dome's management became essentially bifurcated after 1974 when Richards, who had joined the company to set up its legal department in 1956, became president and chief operating officer. For the next seven years, Richards was fixed on spectacular growth by acquisition while Gallagher was focused on bringing in the multi-billion-barrel oil fields that beyond any doubt in his mind lay beneath the Beaufort ice, where Dome had acquired its first permits in 1967 while still exploring in the Arctic Islands.

Gallagher was the Beaufort salesman, pitching his vision to anyone who would listen, especially the politicians and civil servant mandarins in Ottawa. It was more than just the seismic picture of gigantic structures capable of holding as much oil as Prudhoe Bay, or even more. There was also the fact that this great wealth was owned by all Canadians. This was not like the oil and gas of southern Canada that was owned by Albertans, British Columbians and Saskatchewanites. The Beaufort could bring the federal government oil money surpassing even the revenues the Alberta government had reaped. To accompany the Beaufort seismic and geological picture that he showed in Ottawa, Gallagher offered extensive projections demonstrating that every dollar Ottawa spent to help find this treasure would return scores of dollars for the federal treasury from royalty and rental payments, from income and other taxes, and just from the great economic development it would generate. Of course, it was in Ottawa's hands to help bring this about.

When this author once suggested to Gallagher that the Inuit, and all northerners would sooner or later demand the North's petroleum wealth, just as Albertans had claimed the wealth beneath their sod, he would have none of it. "No," was his response. "This is different. This belongs to all Canadians."

While Gallagher was spinning visions and Gordon Harrison was launching drill ships in the Arctic, Richards was on a breathtaking

buying spree that in the three-year period 1978-1980 included an additional 15 percent of Dome Mines, bringing Dome Pete's ownership to 39 percent; 49 percent of TransCanada PipeLines; a $700-million purchase of Kaiser Resources, the former Ashland Oil Canada, the jilted suitor of Bobby Brown's Home Oil; the 4.5 million acres of Hudson's Bay freehold mineral rights under lease or option to HBOG, together with interests in about another 20 million acres, acquired from Siebens Oil and Gas; and the Canadian properties of Mesa Petroleums of Amarillo, Texas.

The complex and controversial Siebens and Mesa acquisitions were unwittingly subsidized by the taxpayers by the clever discovery of a tax loophole, to the great annoyance of the tax authorities in Ottawa.

Siebens Oil and Gas was not an oil explorer or producer but basically a dealer in petroleum leases and permits. It was founded by Harold W. Siebens who sold the family sporting goods business in St. Louis in 1948 and planned to move to Alaska but never got farther than Alberta. Attracted by the frantic activity of Alberta's oil boom, he became an instant speculator in oil and gas leases and permits. Because he could move fast, he was able to pick up low-cost leases and permits in new areas of exploration interest, from the Montana border to the Arctic Islands, then turn them over to big oil companies, retaining carried interests or production royalties. He parlayed his initial $50,000 stake into millions, and was later joined in the business by his son, Bill, a petroleum engineer.

Siebens Oil and Gas had acquired the Bay's 4.5 million acres, at the instigation of the Bay, in exchange for shares, so that the oil company became owned 46 percent by the Siebens family and 35 percent by the Bay. Dome's 1979 acquisition of Siebens Oil and Gas involved Canpar, Canadian National Railway's giant employee pension fund. It was Canpar that actually bought Siebens Oil and Gas, then sold 76 percent of the assets — not the shares — to Dome for $400 million (just $4 million cash and $396 million in preferred shares, essentially a form of debt). Because of its pension fund status, Canpar received the money and shares from Dome tax-free, while Dome was able to get a fast tax write-off on its purchase of the assets, which it could not have got by buying shares.

The use of a pension fund in a corporate acquisition was considered both clever and audacious. Tax collectors in Ottawa had other terms to describe it and the government moved to close the loophole with the December budget of Finance Minister John Crosbie that brought down Joe Clark's Conservative government. In his budget speech, Crosbie announced new rules "to ensure that tax-exempt institutions cannot be used as vehicles to circumvent the income tax rules relating to resources

taxation." The new rules didn't entirely stop Dome. The following year, with the friendly Liberals back in power, Dome was able to win a special provision that allowed it once more to make use of pension fund money in a similar manner with its $600-million acquisition of the Mesa assets.

October 28

For a horrible few hours on the evening of October 28, 1980, the announcement in the federal budget of the National Energy Program seemed almost certain to blow Dome out of the water, specifically the icy water of the Beaufort. Gone was the Frontier Exploration Allowance that had heavily subsidized and made possible the search for Beaufort's hidden oil and gas fields. In its place were the Petroleum Incentive Payments, of little value to Dome since it was 60 percent American-owned. Worse still was the back-in provision under which Petro-Canada could help itself to a quarter interest in any promising Beaufort discoveries. But before he went to bed that evening, Richards felt confident he had the solution. Dome would create a subsidiary with majority Canadian ownership that would qualify for the maximum PIP grants of as much as 80 percent of the cost of each exploratory well on its properties in the Beaufort. Richards and his lieutenants began working on the creation of the subsidiary the next morning. In less than five months, Dome Canada was launched with a record $459-million stock offer that made it 52 percent owned by Canadian private and institutional investors, 48 percent owned by Dome Petroleum, and about three-quarters Canadian owned. Like water into wine, disaster had been turned into stunning success and blessed by Ottawa.

With the confidence of invincibility, Richards and his acquisition staff then focused on their most audacious gamble, a $4-billion bid to take over Hudson's Bay Oil and Gas. HBOG offered a number of attractions. There were large cash flows and earnings that Dome could certainly use. The National Energy Program, with its adverse impact on foreign investment in the oil business, had reduced the price at which HBOG might be bought. HBOG, with its years of profits, was paying a high tax rate, while Dome's aggressive exploration expenditures had created a pool of tax credits that could be used to reduce the taxes on HBOG's revenue. Geologists might search for oil pools but lawyers looked for tax pools. Politically, buying out a controlling U.S. parent based in Connecticut and merging HBOG with a Canadian company based in Calgary, would be a winner, based on perception. In reality — unless Dome sold more shares to Canadian investors — buying HBOG would actually reduce Canadian ownership of the oil industry, because of Dome's 60-percent American ownership. The most important factor in

the HBOG purchase was Richards' conviction that rising oil prices would make borrowing to buy a profitable undertaking.

To acquire HBOG, Dome, in May, made a public offering to buy up to 22 percent of the outstanding shares of Conoco, then later traded those shares plus $400 million to buy Conoco's 52.9 percent of HBOG, using some $2 billion borrowed from the Royal Bank, the Toronto Dominion, the Bank of Montreal, and the Canadian Imperial Bank of Commerce.

Dome's debt was now enormous but it was essential to acquire the remaining 47 percent of HBOG; it was needed in order to add HBOG's cash flow and earnings to its own, and to use its pool of tax credits. No more money could be counted on from Toronto's Big Four banks which, in fact, had now become concerned about the amount they had loaned Dome and were demanding a change in terms. They wanted the $2-billion loan repaid by September 30 the next year, 1982 — rather than as late as 1992, as originally provided. Negotiating a deal with the Bay to acquire its 10.1 percent would be crucial to completing the acquisition of HBOG, and finding the money would not be easy.

Dome, however, seemed in no rush to strike a deal with the Bay and, unconcerned about its pile of debt, blithely allowed it to grow by raising no objection when HBOG borrowed $485 million to purchase Cyprus Anvil Mining Corporation, operator of an open-pit lead, zinc, and silver mine at Faro in the southern Yukon. This would not only add to Dome's debt when it acquired the other half of HBOG, it was also a bad investment. Ten months after it was purchased, the mine was shut down and abandoned because of high operating costs and low metal prices.

Five months after it had bought Conoco's block of HBOG shares, Dome finally completed a deal with the Bay and other minority shareholders to buy the balance, at a considerably higher price. Dome had paid just over $2 billion for 53 percent of HBOG purchased from Conoco, but now the price for the remaining 47 percent was $2.3 billion. The deal negotiated with the minority HBOG shareholders still faced a couple of formidable problems. There was almost immediately a problem with a tax loophole. An even bigger problem was that Dome had to find $4.3 billion in 1982, including the $2.3 billion to buy the second half of HBOG, and $2 billion by September 30 to repay the loan for the first half.

Like almost every Dome deal, the agreement to purchase the remaining HBOG shares was a complex arrangement. Instead of paying cash, the agreement called for Dome to issue special, interest-bearing "retractable" shares that could be cashed three years later in a loophole that would make the $2.3 billion exempt from any capital gains taxes. One week after the agreements were signed, Finance Minister Allan

MacEachen brought down a federal budget with a provision designed to kill the type of tax loophole that Dome had just used. As it stood, the deal to complete the acquisition of HBOG was dead, and with it, Dome itself might very well be pulled under.

On Friday, November 13, 1981, the day after MacEachen's budget, Richards, his executive assistant, a tax lawyer, and Dome's lobbyist flew to Ottawa to seek Marc Lalonde's help in undoing the fatal budget provision. The government could hardly afford to see Dome collapse. Dome was widely perceived as a vital element in the National Energy Program, almost an instrument of government policy. Lalonde, who had publicly expressed support for the Dome Canada initiative, would personally be politically damaged if Dome fell. MacEachen was not at all happy to accommodate the oil men from Calgary, but under pressure from Lalonde, had little choice. Fifteen minutes before he entered the House to announce that the Dome-HBOG deal would be grandfathered, he is reported to have turned to Richards and his associates to bitterly exclaim, "You people sure know how to put pressure on a guy."

Having averted a fatal blow, the next problem was to borrow that $2.3 billion. Although it was to pay the Bay and other HBOG minority shareholders with retractable shares, Dome still had to put up the cash at the outset. The HBOG shareholders wanted to see the colour of Richards' money, and they wanted it placed in an untouchable trust account until the shares were retracted.

A little deception-by-omission was practiced to secure the money needed for that trust account. A loan was arranged with the giant Citibank in New York and involved a total of 27 international banks. It was at the time the world's largest oil production loan. But if Citibank had known that the four Toronto banks now wanted $2 billion repaid by September 30, Richards would not have got the loan. He omitted to inform the folks at Citibank about the changed terms of the Canadian loan. Dome also pulled a fast one on the Toronto bankers. As collateral for the Citibank loan, Richards agreed to assign HBOG's oil and gas wells. The HBOG shares had already been assigned to the Canadian banks, but without the revenue from the oil and gas wells, the collateral held by the Canadian banks was potentially worthless. To make matters worse, Dome pledged a payment of $400 million to Citibank from the anticipated sale of certain HBOG assets, money that the Canadian banks had expected to receive. When it all came out in the wash, the Canadian banks were annoyed with the Citibank group, the Citibank group was annoyed with the Canadian banks, and everyone was thoroughly annoyed with Dome.

It took some time — until March 10, 1982 — before all these agreements were completely finalized by the simultaneous signing in New York and Calgary of hundreds of pieces of paper by scores of people. By that time, Dome was $7 billion in debt and interest charges were eating up $800,000 every day, weekends and holidays not excluded. Far from being saved, Dome's troubles would grow for years, as threatening as the Perils of Pauline. Less than three weeks after the Citibank loan had been secured, the threat of imminent bankruptcy was so great that Energy Minister Marc Lalonde had to be woken by a midnight telephone call for yet more help.

The Canadian banks were in a position to put Dome into receivership on April 1 if the company could not come up with $100 million before the close of business on March 31. Dome had been scratching hard for the money. It had been thrashing about to speed up money coming in and delaying money going out, to the point that some of its scores of suppliers were also in danger of being pushed to the wall of bankruptcy. To no avail. The money was not there.

At three in the morning of March 30, with bankruptcy less than 48 hours away, Richards and three of his lieutenants took off from Calgary in the company jet in search of the $100 million. After a few fruitless hours with the bankers in Toronto, it was on to Ottawa with nighttime telephone calls to rouse bureaucrats from their beds, and finally a phone call from Richards to Lalonde shortly after midnight. Unless the money could be found that day, Richards told Lalonde, Dome could go under, pulling scores of companies with it and creating a major financial crisis. Once more, Lalonde felt compelled to help, like it or not. In the morning, he phoned the Toronto bankers. The money was forthcoming. But the bankers had their conditions. One was that all of Dome's operations would be subject to their surveillance. Another condition was that both Gallagher and Richards would have to go. It didn't happen immediately, but before the end of the following year, both Gallagher and Richards had resigned their Dome offices.

Dome would again face the bankruptcy threat unless it could come up not just with a paltry $100 million but a grand $2 billion within six months. In keeping with the high-drama tradition now associated with Dome, it was another just-in-time rescue, an Agreement in Principle fashioned by Mickey Cohen, now deputy minister of finance, and the four banks, and signed at 7 p.m. on September 29 — just 22 hours before the deadline — by Jean Chretien, now energy minister, Jack Gallagher, and the four bankers. It was a billion-dollar bailout. The government and banks each agreed to buy $500 million in new Dome debentures that, if later converted into common shares, would give them majority ownership

of Dome. Again, it was not enough. The Agreement in Principle would later be replaced by another deal that cost the taxpayers even more, in the endless resuscitations to keep Dome breathing.

The market price for Dome shares had now fallen to barely more than $3, down from their 1980 peak of $25. Profit of $369 million in 1981 had turned into a loss of $199 million in 1982.

Dome's annual meeting of shareholders in Toronto on June 28, 1983, was the last one chaired by Gallagher and the first one attended by his successor as chairman and CEO, John Howard Macdonald, a 55-year-old accountant described by the media as a "jolly Scotsman." MacDonald was a 25-year-veteran of the Royal Dutch/Shell Group, serving the last seven years in London as group treasurer. He had been lured by a four-year, $4-million contract to attempt to salvage Dome, and a promise of a $1.5-million bonus if he succeeded. Dome was now, in effect if not in name, in receivership and Macdonald was the receiver.

The resuscitation that replaced the 1982 Agreement in Principle was announced early in 1985. Dome's remaining debt, still $6.4 billion, was spread out over a 12-year period. Dome was called on to sell at least $100 million in assets and raise $100 million from a public offering of shares. The taxpayers and the banks never did invest the $1 billion in Dome debentures called for in the Agreement in Principle, but the new agreement stuck the taxpayers with an ever-bigger bill. This involved a 10-year "remission" of taxes otherwise payable by Dome's HBOG, resulting in an estimated $1-billion loss in tax revenues.

"There is something very wrong with a system that allows a one billion dollar policy decision to be made by way of a tax expenditure with Parliament having so little information on the transaction," Auditor General Kenneth Dye declared later. "We are, after all, talking about public money, provided by Canadian taxpayers." A House of Commons committee called this tax break "unconventional and unprecedented," and noted that "Officials of the Department of Finance withheld from the staff of the Auditor General an economic analysis of the Dome remission prepared for cabinet."

Crushed by its debt and the continued fall of oil prices, Dome limped along the brink of bankruptcy for another year until Macdonald announced a "moratorium plan" to keep it alive by deferring payment on interest and principal for 14 months, until June 1987. The 56 creditors were to receive "interest deferral certificates," that could be cashed in later, if Dome managed to survive in the interim. Macdonald did not seem too hopeful. "We may be kidding ourselves," he told the news media. "I don't think anyone knows how long this oil price scene is going to last." Oil prices, in fact, continued sliding down.

The end of the saga was signalled six weeks before Dome was scheduled to resume debt payments when a “definitive agreement” was signed to sell Dome to Amoco Corp. of Chicago (aka American Oil Company, Stanolind Oil and Gas, Standard Oil of Indiana) for $5.1 billion, later raised to $5.5 billion by the time the deal was completed 14 months later. It was enough to pay Dome’s secured creditors 95 cents on the dollar, unsecured creditors 45 cents, and common shareholders $1.47 per share. Dome was merged into Amoco Canada, which was elevated into Canada’s largest oil and gas producer. There were assurances of little or no reduction in the combined staff of 5,800 employees.

It was not a profitable acquisition. It had been based on the assumption that oil prices would quickly rebound from US$18 in 1987 to US$33 but five years later, they were still at $US18. Amoco Canada was forced to retrench. “It became apparent to us in October of 1991 that we would be in default of our obligations in 1992,” Don Stacy, Amoco Canada president told the Calgary Herald. “We had restructured our financing to start repaying the principal as well as interest in 1992.” To avoid default, Amoco sold 1,500 of its 2,400 oil field properties and slashed its staff from 5,800 to 2,700, paying $170 million in severance packages.

Amoco itself disappeared in the tidal wave of mergers that swept through the oil industry in the final years of the 1990s, gobbled up by British Petroleum in a US$60-billion share swap. BP Amoco (as it was briefly called before it also swallowed Arco for US$33 billion) pulled out of Western Canada, except for its gas holdings and prospects in the deep part of the basin along the Alberta foothills and in northeastern British Columbia. Most of its oil and gas properties, including holdings in the Athabasca oil sands and the former properties of Dome Petroleum, were sold in 1999 for $1.6 billion to Canadian Natural Resources and Penn West Petroleum, two of the winners in the stable of Calgary lawyer and financier Murray Edwards, the Warren Buffett of the Canadian oil patch.

The Dome debacle was a sad end to a shimmering vision and a depressing lesson for taxpayers who paid more than $3 billion in exploration expenditures and subsidies on Dome properties in the Arctic Islands and Beaufort Sea, another estimated billion dollars in the special remissions of taxes on revenue generated by HBOG’s properties, and hundreds of millions of dollars in lost revenues from the authorized exemptions of capital gains taxes on $3.3 billion paid to acquire the properties of Siebens Oil and Gas, Mesa Petroleum, and the HBOG minority shareholdings.

The National Energy Program and declining oil prices from 1980 to 1998 were important contributing factors in Dome's fall, but in the author's opinion it was mostly the management style and methods under the direction of Bill Richards. In its glory years during the 1970s, Dome was no less admired than Enron, which had been high on the list of Fortune Magazine's "most admired companies," described by the New York Times as "a model for the new American workplace," and lauded by the Harvard Business Review for "its ability to create a line of products and service options by using financial engineering." "We hire very smart people and we pay them more than they think they are worth," an Enron executive once boasted. Dome did likewise, searching for the brightest that money and generous stock options could lure, and subjecting potential executive recruits to gruelling 14-hour psychological tests to evaluate intelligence, quickness, communication skills, ambition, and energy.

They worked incredibly hard and long hours, with 24- and even 36-hour stretches almost common, usually over weekends, at the final stages of the endless string of big deals. In the negotiations to acquire Siebens Oil and Gas, Jim McGrath in Dome's acquisition department flew from Calgary to Toronto on a Sunday morning and did not get to bed until he was back in Calgary on Tuesday. Ian Barclay, chairman of British Columbia Forest Products Ltd. and one of the representatives of minority shareholders in the final negotiations for the HBOG takeover, flew from Vancouver to Toronto on a Monday, checked into his hotel at 5 p.m., and after working non-stop for 34 hours, finally got back to his hotel room at 2 a.m. Wednesday. "We always seemed to be meeting on Saturdays and Sundays and we always seemed to be going until the early hours of the morning," Barclay told author Jim Lyon. "I don't know whether it was meant to be the survival of the fittest or what the hell it was."

"What I.Q. doesn't pick up is effectiveness at common-sense sorts of things," observes Florida State University psychologist Richard Wagner. And therein lay a fatal flaw in the Dome management method. It failed to recognize that intelligence is not the same as wisdom, energy is not necessarily effectiveness, and activity doesn't necessarily mean accomplishment.

The Canadianization of Husky

One important survivor of the Canadianization binge was Husky Oil, the leading producer of heavy oil and in the late 1970s the only fully integrated operation in Canada, from wellhead to gasoline pumps, that was not controlled by one of the international majors. It was already

widely considered Canadian, and its takeover left it only briefly fully Canadianized before it became fully foreign-controlled, while Husky's pioneering founder was left financially scarred and bitter.

Glenn Nielson had come off a sheep ranch in southern Alberta to build Husky Oil from a tiny rundown refinery with earnings of $50,000 in its first year to annual revenues of $600 million 40 years later. Born on the ranch of his Mormon father near Cardston, Nielson was 25 when he took over the ranching after his father's death. For several years he divided his time between running the sheep ranch and seeking a sheepskin scroll from the University of Alberta, where he graduated in 1933 with a degree in agriculture economics.

It did not require a degree in economics, however, to realize that sheep ranching in Alberta during the Depression years was an unprofitable business. The price of lamb had sunk as low as 2.5 cents per pound with wool at four cents. When the bank foreclosed on the ranch, Nielson moved in 1934 with his wife and family to Montana and a job selling tractor fuel for the tiny Cut Bank Refining Company. Four years later, with the help of several partners, he scraped up enough money to buy the assets of Park Refining Company, which consisted of a shut-down, 900-barrels-per-day refinery at Cody, Wyoming and four oil wells producing less than 400 barrels a day of heavy oil. Husky Oil and Refining was thus born on January 1, 1938, with 19 employees.

Husky prospered during the Second World War. "We had a refinery at Riverton, Wyoming," Nielson later recalled, "which we had built in 28 days to supply much-needed fuel oil to the Navy." When the war ended, Nielson received a terse telegram from U.S. naval secretary James Forrestal: "Effective as of 7 a.m. cease all further shipments." The Riverton refinery was shut down.

Nielson was lured back to Alberta by Walter Thorne, a Moose Jaw promoter who painted a picture of glowing opportunity that awaited Husky by duplicating in the Lloydminster oil field its success with heavy oil production and refining in Wyoming. Straddling the Alberta-Saskatchewan border, Lloydminster housed a great deposit of heavy oil, but so difficult and costly to produce and refine with the equipment and technology then available, that production was limited to a trickle. Nielson, however, was convinced that Husky could profitably produce fuel oil for the Canadian Pacific and Canadian National railways from Lloydminster's black guck. With an exemption from the duty on imported steel, and financing from the Chase Bank of New York, the Industrial Development Bank of Canada, and the Royal Bank, the Riverton refinery was moved to Lloydminster. The rebuilt refinery began operating in 1947 with a rated capacity of less than 2,000 barrels a day, producing both

fuel oil and asphalt for paving. The heavy oil trucked from the pumping wells to the new refinery contained “as much as 50 percent water, sand and salt,” according to Nielson. The oil supplied by one operator, who stored his production in open pits, “not only had water, sand and salt, but a few jackrabbits, coyotes, and tumbleweeds that had to be extracted.”

Initially wholly owned by Husky Oil of Cody, the Canadian subsidiary was spun off in 1953, and became 60 percent owned by the U.S. parent. The two companies were reorganized again in 1959 when the Canadian firm acquired the U.S. firm on a share exchange basis. Husky Oil Ltd. became the parent organization with head office in Calgary and Husky Oil Company became the U.S. operating subsidiary with headquarters in Cody. The head office might be in Calgary but effective control was in Cody with Glenn Nielson, who had become a U.S. citizen shortly after moving south. The Nielson family held 19 percent of the shares, the largest block.

By the end of the 1960s, Husky had spread its wings well beyond heavy oil, with aggressive exploration, substantial light oil and natural gas production, five refineries, and 1,600 Husky service stations in 18 states and five provinces, from Ontario to British Columbia. In the 1970s, two things made Husky’s large heavy oil resources much more valuable. New production methods — particularly those involving steam injection — enormously increased the amount of oil that could be recovered at Lloydminster and other heavy oil deposits in the region. And the great increase in oil prices made them worth much more.

Husky, with its U.S. control, its substantial earnings, and the great potential that lay in its heavy oil properties, was a great fit with Petro-Canada’s mandate to buy foreign-owned oil companies, no matter that it was already substantially Canadian-owned. As a first step to making a planned all-cash public offer, in 1978 Bill Hopper met with Glenn Nielson and son Jim, Husky’s president, in Calgary. The Nielsons didn’t like the offer, first because they really didn’t want to sell, and secondly, because with a cash sale a large chunk of their $90-million share, Glenn Nielson’s life work, would go in taxes to the U.S. government. The Nielsons approached Armand Hammer, the 80-year-old chairman of Occidental Petroleum in Los Angeles. A deal was agreed on. Occidental would make an offer to acquire Husky with a swap of shares, a more acceptable deal than cash for the Nielsons.

A third suitor, however, was already in pursuit of Husky, Bob Blair, the enigmatic head of Alberta Gas Trunk Line (later Nova Corporation). While Hopper, the Nielsons, and Hammer were busy plotting their moves, Blair was quietly buying up Husky shares on the Toronto and New York

markets, and in a final burst of activity, wound up with 35 percent. That was enough to shut out both Hopper and Hammer. Blair eventually got all the Husky shares, including the Nielson family's, for nearly half a billion dollars. Husky was now thoroughly Canadianized — Canadian owned, controlled and managed — but not for long.

Nova's Maple Leaf shroud

Bob Blair's Nova Corporation wrapped itself in the biggest of all Canadian flags, the 40-foot Maple Leaf emblems that emblazoned hundreds of Husky Oil service stations and truck stops across Western Canada and Ontario. Nova began life in 1954 as Alberta Gas Trunk Line, an instrument of the provincial government with a can't-lose, money-making monopoly that wound up with close to a billion-dollar loss in the year that Blair lost management control.

When Alberta first considered selling large volumes of gas to other Canadian and American buyers, Edmonton was worried that the federal government's jurisdiction over items in interprovincial or international trade would travel along the pipelines to control gas prices at the wellhead, in the same way that the Federal Power Commission already controlled U.S. gas prices. The answer was to block the interprovincial and international gas lines at the Alberta border. Trunk Line's job was to build and operate an Alberta-controlled monopoly grid that would deliver the gas to the long-distance carriers at points on the Alberta border. Whether or not this could really insulate Alberta from an invasion of federal jurisdiction was never tested in the courts, but it did not stop Ottawa from controlling both oil and gas prices under the National Energy Program. Although it was owned by private shareholders, Edmonton was able to ensure that Trunk Line's operations conformed to government policy by its ability to appoint, until 1994, four of the company's board of directors.

Sidney Robert Blair, a dour pipeline engineer, joined Trunk Line and became CEO in 1970; renamed it Nova; won the political battle to build the pipe that never got laid, the multi-billion-dollar gas pipeline from Prudhoe Bay and the Mackenzie Delta; and expanded Nova with a string of highly-diversified and largely disastrous acquisitions. In addition to Husky, other diversifications included a truck manufacturer; a valve maker; a half interest with the Alberta government in a cellular phone company that lost $540 million in 10 years; a mining exploration company; and Polysar, the giant Sarnia-based petrochemical producer that started out as a government operation during Second World War, to produce synthetic rubber.

Staggering under a debt of $4.2 billion, declining earnings, and a collapse in the price of its shares that diminished the wealth of its shareholders by a few billion dollars, Nova was compelled in 1990 to sell all its subsidiaries. Polysar alone was sold for $440 million less than Nova had paid to buy it just 12 months earlier. Earnings fell from $400 million in 1998 to a loss of $937 million in 1991. Blair was replaced as CEO by J.E. (Ted) Newall, who resuscitated the company in the following years by trimming costs and restructuring. But Nova Corporation disappeared in 1998 when it was swallowed up by TransCanada PipeLines in a $14-billion share swap.

There was a final irony in Nova's sad fate. In the 1970s and 1980s, Bob Blair was widely seen as the champion nationalist in the Canadian business establishment; his political links in Edmonton and Ottawa were impeccable (a close association with Alberta Premier Peter Lougheed, a Liberal candidate for Parliament, a recipient of the Order of Canada); and his corporate acquisitions at Nova were applauded for protecting Canadian ownership of important business assets. But in the 1990 sale of Nova's subsidiaries, the valve manufacturing company was sold to an Italian bank; Western Star Trucks, the only Canadian-owned truck-maker was sold to Australian investors; Husky Oil was purchased by Hong Kong billionaire Li Ka-shing; and Polysar was bought by German pill-maker Bayer AG. It really is true: you can't increase ownership when wealth is diminished.

The energy mandarins depart

With the December 1984 election of Brian Mulroney's Conservative government, the key energy mandarins who had helped shape then implement Ottawa's dozen years of energy engineering were soon gone from the bureaucracy.

Jack Austin, the deputy minister who transformed the energy department, then was banished to the Senate in 1975 because he was politically "damaged beyond repair," would make not one but two political comebacks. When they resumed office in the 1980 general election after their brief respite on the opposition benches, the Liberals had not a single elected member to represent British Columbia in the cabinet. Trudeau reached into the Senate to select Austin, who for nearly five years was a powerful minister in charge of social development with an annual $35-billion budget. He was also the minister responsible for the Canadian Development Investment Corporation, set up to manage and later sell the government's investments in such ventures as Canadair, deHavilland, Eldorado Nuclear and (subsequent to Austin's term in the cabinet) Ottawa's 8.5-percent interest in the Hibernia oil

field. After Brian Mulroney's government came to power, Austin was just another senator until 2003. When Paul Martin became prime minister late that year, he appointed Austin, a long-time family friend, government leader in the Senate.

Bill Hopper, who helped launch the energy engineering era as lead author of the 1973 Energy Policy for Canada, followed Ottawa's mandate for 20 years as Petro-Canada's CEO. When the mandate was to find oil, help develop the oil sands, and increase Canadian ownership of the industry, that's what Hopper did. When the mandate changed, Hopper wrote in Petro-Canada's 1984 annual report: "The corporation has now been given a new mandate by its shareholder — to operate in a commercial, private-sector fashion with emphasis on profitability and the need to maximize return on the government of Canada's investment." Hopper cut Petro-Canada's staff from 10,000 to 8,200, sold $850 million worth of assets, reduced debt by $1 billion, and turned a 1991 loss of $603 million into a slim 1992 profit of $5 million. Hopper had set Petro-Canada on the road to profitability, but it was too late. At a meeting on the evening of Thursday, January 28, 1993, the directors of the now partially-privatized company abruptly relieved Hopper of his responsibilities, and he was gone with a $2.4-million golden handshake.

Mickey Cohen, who served as deputy minister at both the energy and finance departments during the era of energy engineering, left the bureaucracy in 1985 to become president of Olympia & York Enterprises Corp., a unit of the Reichmann family's vast real estate and energy empire. At its peak the Enterprise unit headed by Cohen embraced Gulf Canada Resources, Consumers' Gas, Home Oil, and Interprovincial Pipe Line. Before parent O&Y crashed under a debt load of nearly $19 billion, Cohen had left for the CEO's job at Molson Cos. Ltd. He resigned after Molson recorded a 1995 loss of $305 million, leaving his successor, according to Canadian Business magazine, "to repair the damage Cohen inflicted during his eight-year tenure."

Joel Bell, Trudeau's former economic advisor who helped Maurice Strong set up Petro-Canada as executive vice-president, left in 1982 for three years as head of the CDIC, the government investment agency that lay under Austin's wing. Bell was later a founding shareholder and CEO of MaxLink Communications set up in 1996 to invest $1 billion in wiring 1,600 buildings across Canada for "high-speed symmetrical two-way data, video, voice and multi media services." It fell into receivership in December 2000.

Ed Clark, "Red Ed," thought by some of his critics to be a socialist, also left the bureaucracy in 1982 for the world of high finance, climbing

the corporate capitalist ladder to become, 20 years later, president and CEO of Toronto Dominion Bank, Canada's fourth largest

Part Four: Survivors

Chapter 24. The Largest Independent Producer

With Gwyn Morgan as trail boss, a seasoned crew of Alberta hands, and a record of success, EnCana joined a growing band of Canadian energy companies — Petro-Canada, Talisman, Suncor, Nexen, Canadian Resources, Enbridge, Atco, and others — that from their Calgary offices are increasingly making their presence felt in operations that span the globe

On the tumbleweed prairie of southern Alberta, then just part of the North-West Territories, where the brown grass shimmers in the haze of summer heat and aside from tiny cactus plants the only green is seen in the coulees, the Canadian Pacific Railway Company was having no luck finding a source of water for its steam locomotives that would soon trundle all the way across the continent on the tracks its contractors were busy laying.

Thirty-five miles west of Medicine Hat, the bit of a cable tool drilling rig in 1883 was slowly pounding a hole in the ground at CPR Langevin No. 1 in search of water. It was winter by the time the bit reached a depth of 1,120 feet when "a rather singular phenomenon presented itself," a Calgary newspaper reported. It was "gas, which rushes out of the tube, which, on taking fire emits a flame sufficient to light up the surrounding country." The cable tool kept pounding the hole down, still looking for water, but less than a month later, escaping gas caught fire, demolishing the drilling rig and its frame building in a ball of flame. "Prospects for water between Medicine Hat and Moose Jaw are not very encouraging," CPR general manager William van Horne reported to the company's head office in Montreal after the failure at Langevin.

The CPR may have failed to find water on the parched southern prairie, but discovered Canada's first large natural gas field, one of the largest that would ever be found in Canada. From that emerged, over more than a century, one of Canada's two largest energy companies that would ultimately join forces to form the world's largest independent oil and gas producer.

Following its first Langevin well, the CPR next year drilled a second one nearby, this time not for water, but for gas. Instead of coal, gas from the first well was used to fire the boilers at the rig pounding the second hole. When it was completed, gas from this well was used for heating and cooking at the railway's section house and other nearby buildings. The CPR thus became Alberta's first gas producer.

With apparently more gas than water beneath its prairie railway lands, the CPR decided that perhaps this might be worth developing, and in 1906 brought Eugene Coste from Ontario to direct the effort. Coste, as we saw in chapter three, discovered the big Bow Island gas field on CPR lands and founded a company to pipe it 170 miles to Calgary. The CPR began to collect royalty and lease revenues.

But resource development was not — at least at first — the CPR's real interest in its subsidy of 25 million acres of railway lands between Manitoba and British Columbia, some of which was turned back to the government to settle construction loans. The CPR wanted the West developed so there would be traffic for its railway, and to attract settlers offered farm lands at low prices and easy terms. Initially the subsurface mineral rights went with the lands, but when the government in late 1887 began reserving ownership of subsurface rights on lands it gave to homesteaders, the railway followed suit. At first it reserved the rights to coal, then "coal and valuable stone," then "coal, petroleum and valuable stone," and finally, "all mines and minerals" under the lands it sold.1 By 1912, when Canadian Pacific formed its Calgary-based department of natural resources, it had ownership of 9.6 million acres of freehold oil and gas properties — 8.26 million acres in Alberta, more than one million in Saskatchewan, and some 266,000 acres in Manitoba. Outside of provincial and federal governments, it was the largest Canadian owner of prospective oil and gas properties. CPR's new department of natural resources was organized just in time to benefit from the prolonged development of the Turner Valley field. Slowly its petroleum lease and royalty revenues began to grow.

Leduc brought an acceleration of revenue, but still the CPR continued to operate its oil properties as a passive landlord, collecting rents and royalties for another 11 years at rates that built up to $8 million in 1957 ($60 million in 2004 dollars). The following year, CPR president Noris (Buck) Crump steered the railway on an aggressive diversification program focused on transportation and resources development, setting up its own oil company, Canadian Pacific Oil and Gas.

Heading CPOG's management was English-born John Taylor who had come to Canada to visit relatives in 1937, decided to stay, and spent the war years as a flight lieutenant with the RCAF, including four years as a

prisoner-of-war in Italy and Germany. After earning a degree in petroleum engineering at the University of Oklahoma, Taylor joined CPR's natural resources department three years before CPOG was formed. Under Taylor's management, CPOG was soon one of the most active oil explorers in Canada, from the U.S. border to the Arctic Islands.

CPOG's parent, Canadian Pacific Investments, in 1964 began buying shares in one of the most successful post-Leduc wildcat firms, eventually resulting in a merger that would change CPOG's name and accelerate its fortunes. The acquisition was Central-Del Rio Oils. Its founder was Neil McQueen.

A few months after he had resigned his job as managing director of Pacific Petroleums, Imperial Oil had started drilling its Leduc well. With the first whiff of oil at Leduc, McQueen rushed to file on 16,000 acres of CPR leases south of Edmonton, at 10 cents an acre. He then shared these leases with his friend D.C. (Skinny) McDonald. McQueen promoted a well on a 40-acre sublease just 400 feet from a dry hole, and brought in a small oil well on the edge of the Leduc reef. With that and other nearby CPR leases, he formed an oil company. "The thing that sold stock at that time was the name Leduc," McQueen has said. "There was already a West Leduc oil company and an East Leduc oil company, so we decided that we would call our company 'Central Leduc.'" A public offering of shares at 28 cents in 1947 raised working capital of $112,000. McDonald, meanwhile, had formed Del Rio Producers and the two firms eventually became Central-Del Rio Oils.

McQueen had a theory that the Mississippian rocks that housed the big oil and gas reservoir at Turner Valley might yield some oil fields in southeastern Saskatchewan, and in 1950 filed on 400,000 acres of permits. Four years later, Central Leduc and Del Rio discovered the Weyburn field, Saskatchewan's biggest oil field which is now expected to yield nearly half a billion barrels of oil.

This was the plum that Canadian Pacific Investment sought, the major asset among a spread of exploration and production properties throughout Western Canada that by then was Central-Del Rio. After buying 52 percent of Central-Del Rio's shares on the open market, Canadian Pacific Investments arranged a merger with CPOG to create PanCanadian Petroleum in 1971. By the time of the merger, Central-Del Rio had grown in 12 years from assets of $280,000 to $47 million ($230 million in 2004 dollars), with revenues of more than $9 million a year, earnings of more than $3.5 million, and no debt. It was one of the very few post-Leduc penny oil stocks that ever made a penny of profit, except for the promoters.

Bob Brown had just lost his fortune with his last, desperate, extravagant wildcat gamble on the North Slope of Alaska. Non-gambler Okah Jones at Consumers' Gas had just acquired control of Home Oil. Canadian Pacific was looking for a known leader to head its newly minted PanCanadian. Bob Campbell, Brown's top man at Home, was available. Under Campbell's management for a dozen years, until he moved up to head Canadian Pacific Investments, PanCanadian spread its wings and flew. Each year it drilled more wells in Western Canada than any other outfit; it expanded its operations from the West to the East Coast offshore, to the Gulf of Mexico, the North Sea, the Mediterranean, and grew its market price from $9 to $145 per share. After Campbell's reign, PanCanadian continued to grow during the next two decades under a succession of CEOs: Bart Rombough, another Home Oil expatriate; David O'Brien, before he stepped up as president and chief operating officer of Canadian Pacific Limited; and David Tuer.

From the cauldron of energy politics

Briefer, but even more spectacular, was the trajectory of the enterprise that would later join forces to create EnCana Corporation. Alberta Energy Company was initially a creature of the Alberta government, cooked up in a boiling cauldron of energy politics.

AEC arrived, as we saw in chapter 16, in 1974 in the midst of global energy turmoil. Peter Lougheed's Conservatives had swept into power three years earlier with interventionist policies that contrasted sharply with the laissez faire, staunchly free-market approach that had marked most of the 36-year rule of the Social Credit government. Peter's pals were egged on by a bureaucracy in Edmonton that lamented the export and depletion of non-renewable resources, a supposedly damaged environment, and the "ever-increasing foreign control" of Canadian resources. The Arab oil embargo had triggered the explosion in energy prices that shook world economies and threatened the most "dramatic difference in the lives and fortunes of Canadians" since the onset of the Great Depression, in the words of federal Energy Minister Donald MacDonald. The governments of Canada, Ontario, and Alberta were desperate to revive the stalled second oil sands plant that had been planned by Syncrude, which they resuscitated with several hundred million dollars of taxpayers' money.

From this, AEC emerged with surefire assets. It was an all-Canadian, almost all-Albertan venture, a 50-50 public-private venture with half the $150 million start-up capital raised mostly from small Alberta investors. Its constitution decreed that no one, other than the Alberta government, could own more than one percent of the shares, and no foreign investors

were allowed in. AEC was endowed by Lougheed and his cabinet with assets that made it the only certain winning investor in the multi-billion-dollar Syncrude project. AEC got the right to build the pipeline to carry Syncrude's production from Fort McMurray to Edmonton, and two-thirds of the power plant, the two aspects that could hardly lose. Better yet, it had an option to back into as much as 20-percent ownership of Syncrude, after production established profitability. AEC wound up owning 13.75 percent of Syncrude, including 3.75 percent acquired from troubled Amoco Canada, burdened with debts from its Dome Petroleum acquisition.

AEC's other legacy was an oil and gas permit covering the entire 1,000-square-mile Suffield block a short distance northwest of Medicine Hat. Suffield had been a training ground for British, Canadian, and NATO military forces since the 1940s. Alberta owned the subsurface mineral rights but prohibited access to an area where tanks and troops roamed with the antelope had precluded oil and gas exploration until Lougheed managed to change that by cutting a deal with the federal and British governments. The Suffield block was then leased exclusively to AEC for $54 million. AEC drilled some 4,700 shallow gas wells and established one of North America's major gas storage and marketing hubs on the Suffield block.

AEC's third legacy property, acquired a few years later, embraced 1,400 square miles of oil and gas rights on the Primrose Lake Air Weapons Range in northeastern Alberta, where it drilled another 350 gas wells and in 2001 began in situ production from an estimated 1.5 billion barrels of recoverable oil sands bitumen, at rates scheduled to build up to 100,000 barrels per day by 2007. As in Suffield, the door to development of the Primrose property was opened when the Lougheed government obtained surface access to this military property from the federal government.

David Mitchell was in the process of leaving his post as president of Great Plains Development Company, a unit of Britain's Burmah Oil that was winding down its operations, when he agreed to take the top job at AEC in the fall of 1974. Mitchell's father had lost the family's Calgary home and bakery business in the Depression, and young Dave earned his way digging ditches before he earned his degree as a petroleum engineer. "I knew I was going to be in the oil business since I was 10," Mitchell told Oilweek editor Gordon Jaremko.2 When the Mitchell family visited relatives at nearby Turner Valley, "we used to collect the beer bottles," Mitchell recalled. "They were worth two cents each. I remember saying, 'Uncle Joe, who are these people so rich they can afford to throw away beer bottles?' He said, 'oil men.' I was so impressed."

Mitchell has said that from the outset “my objective was to have the government ease out,” adding that this was “extremely difficult.” By the late 1980s, the government stake had been reduced to 44 percent but it took 18 years before its final interest in AEC was sold. By 1993 Ralph Klein was steering the Conservative government on a far more laissez faire, market-based course that resembled the old Social Credit regime more than Peter Lougheed’s interventionist rule. With the government shackles removed, Mitchell retired as CEO that year, succeeded by Gwyn Morgan.

Morgan had joined AEC within months of its formation to manage its first operations, development of the Suffield-block gas resources. Like Mitchell, Morgan’s work ethic was forged early in the demanding crucible of hard realities, in this case a hardscrabble farm south of Calgary which meant growing up with hours of chores every day and where he, too, discovered the working end of a shovel, digging the ditch that brought running water to the family’s farmhouse.

Growing revenues from its legacy properties at Suffield and in the oil sands, debt financing, and a multi-billion-dollar spree of corporate acquisitions and investments propelled AEC’s growth for 27 years. Not all the investments were crowned with glory. Diversifications into steel, coal mining, petrochemical products, and forestry brought mixed results at best, until these properties were finally all disposed of by 1995, allowing AEC to focus on oil and gas exploration, production, and marketing.

By the 21st century, AEC and PanCanadian were the largest Canadian-owned oil and gas producers. PanCanadian, with a 90-year headstart, was somewhat larger than its crosstown rival in terms of production, revenue, earnings, and exploration holdings — in terms of everything except debt, of which AEC had more.

The door was opened for a merger when Canadian Pacific in 2001 spun off PanCanadian together with its mining, hotel, and forestry businesses to focus on its original transportation job. When David Tuer suddenly resigned as PanCanadian CEO after Canadian Pacific had spun it off, Morgan initiated talks that culminated in PanCanadian’s acquisition of AEC on a share swap that gave PanCanadian shareholders 56 percent and AEC shareholders 44 percent of what was then named EnCana Corporation, suddenly the world’s largest independent oil and gas producer.

With Morgan as trail boss, a seasoned crew of Alberta hands, and a record of success, EnCana joined a growing band of Canadian energy companies — Petro-Canada, Talisman, Suncor, Nexen, Canadian Natural Resources, Enbridge, Atco, and others — that from their Calgary offices are increasingly making their presence felt in operations that span the

globe. Little talk is heard anymore about the menace of foreign ownership and control.

Chapter 25.Births, Obituaries, and Two Survivals: The Fate of the First Oil Ventures

Of the scores of oil enterprises that arose in Ontario in the late 19th and very early 20th century, only two now survive. One is Canada's largest, the other is one of the smallest. The year before Confederation, a 19-year-old entrepreneur arrived in London, Canada West, to plant the seeds of what became Imperial Oil, laundering money from bootleg whisky. His efforts were later rescued by a scion of what later became the wealthiest Jewish family in the United States. But faded now from memory are once household names across Canada: British American Oil, McColl-Frontenac, White Rose gasoline.

To Ian Sclanders, in the Imperial Oil Review, he was "The Amazing Jake Englehart."1 To Hugh Grant, in Ontario History, he was "The 'Mysterious' Jacob L. Englehart."2 To biographer Michael Barnes, "Jake Englehart is the man nobody really knows."3

Jacob Lewis Englehart arrived in London, Canada West, in 1866 — the year before the birth of Canada — to establish an oil producing, refining, and export business. It would become Canada's biggest oil business and Englehart would become the principal founder and largest shareholder of Imperial Oil,4 until Imperial became another unit in Rockefeller's Standard Oil Trust.

The mystery is where, at age 19, did Englehart get the money to set up J.L. Englehart & Company, "engaged in refining, producing and exporting petroleum"?5 Englehart was certainly not about to tell. He was said to be publicity-shy and had declined to say where he "had acquired enough cash to come to Canada and set himself up in business."6 The blunt answer is that Englehart was laundering money from bootleg whisky.

Englehart was just 13 when he moved from his hometown in Cleveland to New York for a job as office boy with the firm of Sonneborn, Dryfoos and Company on Pine Street, general merchants and "whiskey rectifiers," firms that blended and sold whisky from various distilleries. The firm's partners were Abraham Dryfoos, former owner of a failed linen goods store, Leopold Beringer, a tobacco dealer, and Solomon

Sonneborn, who had accumulated some capital during five years as European director of the American Rubber Company. The firm also enjoyed the financial backing of Solomon's uncle, Jonas Sonneborn, who operated a dry goods business on Broadway and was said by the R.D. Dun credit agency to be worth more than a million dollars.7 Englehart's rise in the Sonneborn firm was rapid; within six years, he was a partner.

In New York, whisky sold for 24 cents a gallon when Englehart arrived there in 1860. Three years later, it was taxed at 20 cents a gallon under the Revenue Act, passed by Congress to help pay the cost of the U.S. Civil War. In the next year, the tax was increased to $1.50 a gallon, and the year after that to $2.00 a gallon.8

Many of the distillers were wealthy and politically powerful men who formed a "Whiskey Ring" that bribed the government's revenue agents "and, if bribes did not work, they used coercion and any other drastic measures needed to accomplish their goals," according to a report by the U.S. Bureau of Alcohol, Tobacco and Firearms.

> [From] July 1864 to November 1865, nearly every honest distillery of any importance suspended operations; it was impossible to manufacture and pay the tax on spirits for the price that it was being sold for by illicit dealers. . . . Seizures included 62 distilleries and rectifying houses, along with other property. The total estimated value of the property was over one million dollars.9

Sonneborn, Dryfoos and Company was not one of the legitimate distillers that was pushed into bankruptcy by the whisky tax, but the firm's partners were charged with violating U.S. revenue laws. "By management and by some of them leaving the country, they were enabled to escape the penalties of law," Dun's New York correspondent reported. The government was said to be "determined to pursue them, and this firm will be likely to suffer if their property can be found." The report continued:

The antecedents of the concern are somewhat notorious in the whiskey trade, they having without doubt made more money in illicit whiskey in a given time than any other house in the trade, which is saying a good deal. They established themselves in Canada in 1869 [it was actually 1866] and the move was regarded as the establishment of an Asylum for the men who had hitherto been employed illicitly here [New York], and for the investment of means which might otherwise [have] been pursued by the U.S. government.

Thus Jacob Englehart arrived in London with enough money to build a small refinery that produced kerosene from the oil pumped from the nearby wells at Oil Springs and Petrolia. He was also a broker, buying kerosene from the numerous small Ontario refineries for shipment to Sonneborn, Dryfoos and Company in New York, who in turn sold it to export markets in Europe and Asia. From 1869 to 1873, about two-thirds of the production of Canadian refineries was sold to buyers in Europe and Asia, and most of this was said to pass through the New York facilities of Sonneborn, Dryfoos and Company.

While his London refinery was being built, Englehart trooped around the oil wells at Oil Springs, possibly also Petrolia where oil had been found that year and where production would soon exceed that at Oil Springs, looking to buy oil both for his new refinery and for export. He was not immediately well received. A Vandyke beard, mustache, and sideburns that ran from ear to chin hopefully disguised the fact that Englehart was still a teenager. He was an immaculate dresser, in dark, vested suits with a flower in his lapel, high-starched collars, and shiny thick-soled shoes, while a ribbon dangled from a pince-nez that clung to the bridge of an angular nose. To the farmers and drillers at Oil Springs, splattered with mud and oil, he looked like a city slicker. It could not have helped that he was a Jew in an era when racial prejudices were still very much overt. Englehart later became a member of the Anglican Church and, at a time when there was no such thing as Canadian citizenship, a British citizen. Meanwhile, good salesmanship, personality and persistence prevailed and Englehart soon had under contract the first of what would become a substantial portion of Ontario's oil supplies.

Despite this auspicious start, Englehart & Co. remained a struggling enterprise throughout its first decade. The oil business was volatile. The dozens of small refineries kept blowing up and prices, too, exploded and collapsed, in a range between about 10 cents and 10 dollars per barrel during the final four decades of the century, wiping out many of the producers and refiners. Englehart's refinery, less than three years old, exploded twice within a seven-week period, causing $8,000 in damages. Englehart rebuilt it, but the next year he suffered a greater setback when a German buyer refused to pay for a shipment of smoky, smelly kerosene. To minimize his loss, Englehart dismantled his refinery, shipped parts to Germany, and re-distilled the coal oil to the buyer's satisfaction.

The chaos in the oil fields called out for a cartel that could impose order, stability, reliability, profitability, efficiency, and product quality, as Rockefeller was doing in the United States. Both producers and refiners made numerous, unsuccessful attempts. In 1869, the year his refinery

twice exploded, Englehart and his New York associates joined with a Chicago judge, Ebenezer Higgins, and several others in an effort to corner the market by buying or leasing all 52 Ontario refineries, limit sales to the export market, and drive up prices. That effort lasted just six months, but Judge Higgins "made a fortune in Canadian oil," according to his obituary.10 The Monetary Times, however, noted that the infant export business was controlled by just two firms, "Parsons & Williams [James Miller Williams] and Englehart & Co."11 The following year, Parsons & Williams had become Parsons & Swinburn and Englehart was reported to be associated with the U.S. Swinburn brothers; "if so, most of the export business will be controlled by Englehart & Co."12

Englehart's business, along with many others, suffered from a six-year economic depression that began in 1873. Canadian kerosene was pushed out of the overseas markets by superior product from American refineries, crippling Englehart's business. Dun's Ontario correspondent noted that Englehart & Co. had "only been moderately successful and they have had to get assistance from their friends."13 Englehart severed his relationship with the Sonneborn firm, and his oil business was temporarily suspended.

In New York, matters were in even worse shape. Sonneborn, Dryfoos and Company had been taken over by Solomon's uncle Jonas who formed Jonas Sonneborn & Co., oil and produce merchants, exiting from the dry goods business he had operated for some 25 years.14 Uncle Jonas was no more successful than nephew Solomon. His first setback — or perhaps it was an opportunity — was a fire in 1871 that destroyed the Hamilton, Ontario refinery of the Carbon Oil Company, with a reported loss of $40,000, only half of which was covered by insurance. The Carbon Oil Company owed $150,000 to Jonas Sonneborn, who pushed it into bankruptcy then bought the assets from the creditors for 20 cents on the dollar.15

Three years later, Jonas Sonneborn & Co. was bankrupt. "As the firm was known to do a very large business, and to stand very high in the commercial community, the report of its failure created great alarm," the New York Times reported. Jonas Sonneborn told the Times that the trouble had started with the collapse of the Carbon Oil Company, and estimated his firm's losses at between $500,000 and $800,000. "Still, he thought it likely that ultimately they would be able to resume business." It didn't turn out quite that way. A month after the collapse, the U.S. government entered suits against Sonneborn and three associates to recover $21,911.26 in income taxes which allegedly "were designedly withheld. These amounts are sought to be recovered by civil process, as criminal suits are barred by limitation."16 And the month after that,

Sonneborn was arrested in a suit brought by a foreign exchange dealer who sought to recover £2,000 stemming from a worthless bill of lading. Sonneborn was freed on bail of $15,000.17

That seemed to be the way matters stood for the next two years until a scion of what would become one of America's wealthiest families arrived in New York to marry Jonas Sonneborn's daughter, take over the Sonneborn oil business, and become Jake Englehart's newest and most helpful partner.

The Guggenheim rescue

Eighteen forty-eight. For two months, the steerage passengers aboard the ship sailing from Hamburg to Philadelphia, jammed tight in rat-infested quarters, survived on hardtack, dried fruit, fish, and small rations of wine and water. There was nothing to suggest that a small 21-year-old peddler from the Jewish ghetto in the village of Lengnau, Switzerland would soon establish a fortune that would make the Guggenheims the richest Jewish family in the United States. Meyer Guggenheim, his widowed father, and five sisters were fleeing the Swiss tyranny that barred Jews from any profession, from owning property, from living where they chose, from accumulating wealth, that confined them to hovels, that compelled the vast majority of them to become either tailors or peddlers, and confiscated much of what little they earned.

Meyer, slightly stoop-shouldered from years of trudging through Switzerland, Germany, and later Pennsylvania, with a heavy peddler's pack on his back, "was a caricature of the nineteenth-century Jew," according to one biographer, "a small, reticent, suspicious loner" who had a single-minded devotion to making money that bordered on the pathological.18 From a working class suburb of Philadelphia, Meyer Guggenheim carried his peddler's pack to the coal mining towns of Pennsylvania where he sold to housewives shoestrings, lace, ribbons, pins, spices, needles, and — his best seller — stove polish, on which he made one cent per tin. With the help of a German chemist and a second-hand sausage machine, Meyer started manufacturing his own stove polish, on which he made eight cents a tin. Success after success quickly followed: a cheap blend of coffee and chicory; a grocery store; sales of clothing and food to the U.S. Army during the Civil War; a lye-making business that turned a quick profit of $150,000; and speculation in railway stock that turned an even quicker profit of $300,000. Even much greater profit came from importing Swiss laces and embroidery. Then, in 1881, a $5,000 investment in a struggling Colorado mine turned into an unexpected silver bonanza. From Cripple Creek in Colorado to Chile and

Alaska, the Guggenheim family was on its way to becoming owners of the world's richest copper, lead, and silver mines.

Isaac Guggenheim was the eldest of Meyer's seven sons and three daughters, and the only son who did not start his career working in the family business. At 17, Isaac worked at a Philadelphia wholesale grocery business owned by an uncle, then spent three years as a salesman for a dry goods firm. Five years later, in 1876, he moved to New York, married 17-year-old Carrie Sonneborn, took over his father-in-law's oil export business with his own firm, Guggenheim and Company, and became Englehart's partner, investing $25,000.19 The Guggenheim family at this time was prosperous, but not wealthy: the embroidery business and after that the Colorado mines, were still in the future. But the money that Isaac Guggenheim put up to refinance both the Englehart and Sonneborn businesses was undoubtedly "a loan from his father, a well to do importer in New York and Philadelphia," according to Dun's ubiquitous New York correspondent.

Isaac was a hard worker with an eye for detail and a cautious approach to business. Six years after arriving in New York, he did join the family business, as the trusty manager of the New York office of M. Guggenheim's Sons. Despite the fact that he was the eldest son, he was not Meyer's second-in-command and presumptive leader of the family enterprises. That role fell to the second son, Dan, who was considered more imaginative and bolder than Isaac. Besides, in 1882 "Isaac was too busy with his oil affairs to give full attention to the embroidery firm."20

The entry of Isaac Guggenheim marked a turning point in Englehart's affairs. He sold his London refinery to Frederick Fitzgerald's London Oil Refining; he and Guggenheim bought the defunct Carbon refinery in Hamilton and shipped parts to Petrolia where they built the Silver Star, "the world's largest and most sophisticated refinery."21 Englehart's office was also moved from London to Petrolia.

In the first four years of his partnership with Guggenheim, Englehart was busy starting up the Silver Star, growing the business, and leading the effort to combine Ontario refiners in the face of a perceived threat from Rockefeller's Standard Oil Trust.

The Imperial struggle

The efforts of Englehart and others to roll up Ontario's entire oil industry into one large combine fell on receptive ears. Tired of glutted markets, of being whipsawed by gyrating prices, and fearful of being swallowed by Rockefeller's Standard Oil Trust, most agreed to join forces. Notable exceptions were James Miller Williams' Canadian Oil Company with its Hamilton refinery, Canada's first integrated oil producer, and

John Henry Fairbank, the largest oil producer who also controlled two small refining companies. The 19 founding shareholders contributed a dozen refineries, oil wells, and $25,000 to establish Imperial Oil on April 30, 1880. Its mandate, issued four months later, was sweeping: it was chartered "to find, produce, refine and distribute petroleum and its products throughout Canada."

President was Frederick Ardel Fitzgerald, prominent London businessman who, with partner Joseph Seymour Fallows, controlled the London Oil Refining Company and Ontario's second largest refinery, the Victor Works. Englehart was vice-president and managing director and the largest shareholder, owning about 12 percent of the company. His Silver Star refinery in Petrolia was the country's largest. Other founders included William Spencer, one of the first oil men who had helped Williams bring in the first oil wells and who had built his own refinery as early as 1862; Spencer's two sons, William Melville and Charles Norman; John Minhinnick, a plumber and former president of the London Board of Trade, and his two partners in London Oil Refining, John Geary, lawyer and farmer, and William English; Thomas Hodgins, a carriage builder, and his brother Edward, a cooper, who had devised a process to remove the smell if not the sulphur from Ontario coal oil; Herman and Isaac Waterman, former London clothiers; Lt.-Col. John Walker, a Scot who had helped chase the Fenians out of Canada, a member of Parliament, and a vice-president of the newly formed CPR, and his refinery partner Thomas Smallman; William Cooper, one of the most experienced oil men in the group; and Isaac Guggenheim, the only founding shareholder outside of Ontario.22

The shareholders collected big dividends from fat profits in Imperial's first few years. On shares of $100 par value, it paid dividends of $10 per share in its first six months, $18 the following year, and $28 the year after that. Englehart, the largest shareholder, collected $37,000 in two-and-a-half years on shares that cost less than $58,000 in cash and assets. But after that, dividends ceased for the next two years as prices and profits slipped.

Ten of the 12 refineries Imperial acquired from its founders were dismantled. Only the former Englehart Silver Star refinery in Petrolia and the Victor Works in London were kept in operation, and the latter for only a few years. When the Victor Works was destroyed by lightning and fire, Imperial didn't rebuild it and instead expanded its Petrolia plant. Within three years, Imperial was marketing its products through 23 branch offices from Halifax to Victoria, and its coal oil, packed in five-gallon tins or oak barrels, lumbered across the prairies on Red River

carts drawn by oxen. Settlers hung on to the oak barrels, turning them into rain barrels, wash tubs, and armchairs.

To the extent that Imperial was organized to curb competition, it didn't succeed. It faced growing competition from new producers and refiners and even founders John Minhinnick and the Spencers. But the biggest competitive threat came from Standard Oil which was perhaps even more aggressively building a coast-to-coast marketing network through a string of subsidiaries. To counter Standard's Queen City Oil Company, Ontario's largest petroleum wholesaler, and to capture some of the middleman profits for itself, Imperial established the Royal Oil Company which sold kerosene for coal oil lamps under its Royalite brand name. Imperial's ownership was kept a secret, just as the Standard Trust hid its ownership of Queen City and its many other wholly- or nearly wholly-owned subsidiaries. It wasn't illegal — at least not until the breakup of the Standard Trust in 1911 — and it was the way the oil business worked in the coal oil era.

Failure to obtain a patent on a process to remove smelly, smoky sulphur from the kerosene made from sour Ontario oil, after paying the development costs, was a costly and bitter setback for Imperial in its competitive battle with Standard. The process was developed by Herman Frasch, a brilliant 33-year-old, larger-than-life German-American chemist. Imperial paid $10,000 plus company shares for the right to use a distillation process developed by Frasch that enabled it to get more kerosene from each barrel of crude oil. Frasch was then hired by Imperial at the same salary as president Fitzpatrick, $208.33 a month, and made a director, with an assignment to solve the skunk oil problem. He worked 14 hours a day, while teaching Sunday school in London and pursuing his zest for living with a passion for food, drink, the theatre, and storytelling, while his hair-trigger temper made him a difficult man to work with. Then after 10 months, he was gone, in a venture that manufactured Canada's first wax paper, which he had invented.

The year he left Imperial, 1885, Frasch made his crucial discovery: a way to remove the sulphur by adding large amounts of copper oxide to the crude oil during distillation. To put the process to work, Frasch and John Minhinnick, while still an Imperial shareholder, formed Empire Oil Company and built a refinery that inexpensively produced kerosene that was 30 times cleaner than any other lamp oil produced in Canada.23

Imperial was not the only company with a sour oil problem. The oil produced from the wells in Pennsylvania was free of sulphur, and coal oil made from it burned in lamps without smoke or smell. Then much larger oil fields were found in the Lima area of Ohio, southwest of Lake Erie. Standard gained control of more than half of Lima's oil production. But

Lima oil, like Ontario's, had a high sulphur content, so Standard had the same problem that faced Imperial. After leaving Imperial Oil, it was not long before Frasch returned to the United States where the patent to his process for removing sulphur was acquired by Solar Refinery, a Standard subsidiary. Imperial was unable to fully solve its skunk oil problem until it became another Standard subsidiary and had access to the process that it had hired Herman Frasch to develop.

Standard had yet another bullet to add to its competitive arsenal in Canada, wresting secret, preferential railway rates from the Canadian Pacific and Grand Trunk railways, even as it negotiated to acquire Imperial Oil. It was early Rockefeller strategy dating back to 1868. Historian Allan Nevins summed it up: "Of all devices for the extinction of competition, this was the most deadly yet conceived by any group of American industrialists."24

In Canada, the deadly device was achieved at secret meetings called by Standard and held at the Windsor Hotel, Montreal, in August 1898. It was aimed at the competition from imported petroleum products from Ohio. George Bosworth, CPR's freight manager and a Grand Trunk representative met with Howard Page and other Standard people, while the next day CPR president Thomas Shaughnessy and Grand Trunk president George Reeve joined the meeting. Standard threatened to move products from its Sarnia refinery to Montreal by water rather than rail unless it got a special deal. Standard (and subsequently Imperial) wound up paying the railways 21 cents per hundredweight for moving product from Sarnia to Montreal, while importers of petroleum products paid 35 cents from Windsor to Montreal, a distance that was 77 miles shorter.

Sun Oil Refining Company of Hamilton complained to the Railway Commission that CPR and Grand Trunk had "violated the law. . . . They charge more on American oil for the same haul than they do on Canadian oil and there is unfair discrimination."25 Sun Oil Refining was the Canadian marketing arm of Sun Oil Company of Philadelphia which had been launched in the Lima-area oil fields of Ohio in 1886 when founder Joseph Newton Pew and his partner paid $4,500 for a pair of leases. Lima was now the largest U.S. oil producing area, and with oil production and a refinery at Toledo, Sun was eager to sell its products in Ontario, Quebec, and the Maritimes. Sun was later joined by Montreal petroleum marketer Gall Schneider Oil Company. Hearings were held by the Railway Commission. Gall Schneider's counsel L.P. Brodeuer questioned CPR's Bosworth: "You were not forced in any way in changing that tariff by the Standard Oil people?"

Bosworth: “Well, I think we were very much forced. Forced, why we would lose all of our business, which is quite an argument to a railway man.”26

Standard was relentless. Between 1886 and 1889, through its Bushnell Oil Company subsidiary, it bought up eight of the nine remaining oil refineries in Ontario, all but Imperial’s Silver Star in Petrolia. It dismantled seven of its new refineries, then spent $150,000 to make an idle refinery at Sarnia, Canada’s largest, surpassing Imperial’s plant in capacity, with lower refining costs and better-quality products.

It was becoming increasingly clear that Imperial was losing the fight. Standard had overwhelming competitive advantages: a marketing edge almost everywhere except in Western Canada; lower transportation costs; a superior product, thanks to its patent of the Frasch process; and, most importantly, far greater financial resources. It could simply keep cutting prices until it crushed Imperial, as it had so many other competitors.

Imperial needed help. Two days before Christmas 1895 that help seemed to be secured when shareholders approved a conditional agreement to sell controlling interest to the Colonial Development Corporation of London for $585,000. But the English firm dithered for more than two years, seeking a series of extensions of the agreement while it inspected almost every nut and bolt of Imperial’s operations. Finally, on March 31, 1898, Fitzpatrick wired Colonial Development managing director Frederick White: “You must guarantee immediately by substantial deposit to our credit or positive assurance from proposed Imperial board that Company will be launched before 18 April unless this arranged extension will not be given.”27 When he received no reply from London, Fitzpatrick travelled to New York where Rockefeller’s trust was more than eager to acquire on generous terms the only Canadian coast-to-coast integrated oil company.

Under the agreement dated October 13, 1898, Standard acquired- 75-percent ownership of Imperial Oil; Imperial acquired all of Standard's Canadian subsidiaries; and Imperial shareholders collected $810,187.86 or about $324 per share over a period of 31D 2 years when all payments were completed, in addition to retaining a 25-percent minority interest in the expanded company. For Englehart, the largest founding shareholder, this meant nearly $190,000 cash; nearly four-percent ownership of a big, profitable oil company; and a generous salary as vice-president under an exclusive service contract.

Thirty-two years after arriving in London to launder bootleg booze, Jacob Lewis Englehart was at last a moderately wealthy man, a respected business leader noted for his role in resource development, business acumen, participation in community and civic affairs, and his

philanthropies. He was a director of the Bank of Toronto, vice-president of the Crown Savings and Loan Association in Petrolia and the London and Western Trust Company, president of the Liberal-Conservative Association in the Petrolia riding, and served for a time as governor of the University of Toronto.

Three years after Standard's acquisition of Imperial, Englehart, at age 44, married Charlotte Eleanor Thompson. The bridesmaids were each presented diamond rings and the bride wore a rich sable coat as the newlyweds left for a honeymoon in England.28 It was a happy, but rather brief marriage.

Englehart is today remembered as much a railway man as an oil man. The still uncompleted, three-year-old government-owned Timiskaming and Northern Ontario Railway, built to serve the mines and mining camps of northern Ontario, was in a mess when James Whitney became premier of Ontario in 1905. Englehart took on the task of cleaning up the mess, and in 15 years as chairman, saw the railway completed, put it on a paying basis, got to know every mile of track and every town and mining camp along the way, and had the town of Englehart named after him. When a great fire in 1911 destroyed camps and towns along the line, Englehart led the effort to raise relief funds for homeless mining families who were forced to flee, supervised its distribution, put the full resources of the railway into the relief effort, and posted a sign at Englehart that read: "No one need pass here hungry, J.L. Englehart."

When Charlotte Englehart died after 17 years of marriage, the big red brick Englehart mansion was donated to Petrolia as a memorial hospital, together with $36,000 worth of Imperial Oil shares, which financed the hospital's operation for more than half a century. The Englehart mansion, Glenview, expanded somewhat, is still Petrolia's hospital.

And Isaac Guggenheim? He joined his brothers in their mining ventures, after turning his oil marketing business over to his brothers-in-law, who operated it as Sonneborn Bros. He was certainly not the wealthiest of the 10 Guggenheim siblings but when he died a year after Englehart, he left an estate of more than $10 million, a fabulous sum in 1922.

With the acquisition of its new Canadian subsidiary, Standard shut down Imperial's refinery in Petrolia, and built a pipeline to move Petrolia oil to Sarnia, where its plant became the only oil refinery in Canada. Petrolia was devastated by the refinery shutdown and the move of Imperial's head office to Sarnia. The town languished. But Standard had "acquired an absolute monopoly of oil refining in Canada," complained the Kingston News.29 It would retain an overwhelming position for quite some time. As late as 1920 Imperial still had 90 percent of Canada's oil

refining capacity and supplied nearly two-thirds of the market, its main competition supplied by importers, especially Shell.

John D. Rockefeller's dominance of Canadian oil merely reflected the position he had attained in the United States. Starting in 1861 by selling coal oil in a merchant business, Rockefeller soon set out deliberately to create a monopoly, because he saw this as the only means of stability in a chaotic industry. His string of Standard Oil Companies were placed under the centralized control of Standard Oil of New Jersey with offices at 26 Broadway in New York. In the 1880s, Rockefeller controlled 80 percent of U.S. petroleum refining capacity, 90 percent of the pipelines, and 90 percent of the marketing. Rockefeller was, said the New York World, "the father of the trusts, the king of monopolists, the czar of the oil industry."

New oil companies, however, were springing up faster than even Rockefeller could buy them or put them out of business. But in 1911 the many Standard companies still sold two-thirds of the oil products used in the United States while ownership of parent Standard Oil (New Jersey) was held by just 10 men, and Rockefeller alone had 25 percent. That, of course, was the year that the U.S. Supreme Court, under the 1890 Sherman Anti-Trust Act, upheld President Theodore Roosevelt's trust busters. Standard of New Jersey was fined $29 million and given six months to dissolve its holdings in 34 separate subsidiaries, each of which was to be operated completely separate. Jersey's ownership of Imperial was not affected.

The dark side of Rockefeller's moon was the ruthless establishment of a monopoly that for a time completely destroyed competition. But there was more to Standard's success than that. Standard Oil was well named, for it brought to a disorderly industry new standards of reliability, productivity, and economy, in all its subsidiaries, including Imperial. For shareholders — not just Exxon but for thousands of Canadians, directly and through pension and mutual funds — Imperial has been one of the most secure, dependable, and rewarding Canadian investments for 124 years. For thousands of workers, for managers, professionals, and clerks, it has been among the nation's best-ranked employers. For consumers, Imperial brought new standards of quality, savings, and safety. Before the era of the horseless carriage when kerosene was by far the main product, gasoline was a dangerous and unwanted by-product. Too many refiners added gasoline to their coal oil, causing lamps to explode. Not the coal oil of Standard or Imperial. All this was the bright side of the Rockefeller moon.

Seventy-seven years after the breakup, the Rockefeller legacy, now named Exxon, re-acquired one of the subsidiaries Rockefeller had been

forced to spin off in 1911, becoming ExxonMobil. The merge reassured its position as the world's largest oil company with a market capitalization of US$240 billion, even though it was now far from a monopoly.

At the start of the 21st century, ExxonMobil held the commanding heights in Canadian oil, with 28 percent of the refining capacity in its 79-percent-owned Imperial Oil, and nearly one-quarter of the oil production between Imperial and its 100-percent-owned ExxonMobil Canada.

Texaco, coming and going

While Imperial has survived and thrived, all but one of its contemporaries that Ontario spawned in the industry's early years have disappeared from the scene. Gone are what once were familiar, household names across Canada: British American Oil, McColl-Frontenac, White Rose gasoline.

One of the longest-lasting firms to emerge from Ontario's hour of oil fame predated Imperial Oil by 19 years. The McColl and Anderson partnership, organized in 1873, was said to have never had an unprofitable year in 46 years of operation as a Toronto distributor of kerosene, gasoline, and other petroleum products. On December 12, 1918, it became McColl Brothers, Limited and continued to prosper as one of Ontario's leading petroleum marketers, with a Toronto refinery, service stations, railway tank cars, and a tanker ship. A decade later, John W. McColl was ready to sell and "on the advice of his physician . . . [had] decided to take an extended vacation."30 In Montreal, investment dealer Nesbitt, Thomson and Company was ready to take its first big plunge in the oil business, where it would be an important player for the next three decades. It bought McColl Brothers for $9.75 million and merged it with bankrupt Montreal refiner Frontenac Oil Company. McColl-Frontenac, with a $7.5-million issue of public financing, started off with a promising future. Its Montreal refinery was the largest in Quebec. Crude oil supply was provided by production in Trinidad through its wholly-owned subsidiary, Antilles Petroleum Co. Its marketing position in Ontario was further strengthened in 1929 when it issued shares to acquire the Perfection Petroleum Company of Toronto. It quickly became Canada's third largest oil marketer, exceeded only by Imperial Oil and Shell. McColl-Frontenac shares sold as high as $45 in 1929 and earnings the following year hit $1.4 million. Then the Depression hit. The company still managed to turn a profit, but earnings were cut in half while the price of shares crashed to less than $8 within three years. McColl-Frontenac faced increased competition with the construction of new Montreal refineries by Shell and British American;

its Toronto refinery was no longer able to compete with larger, more modern plants, and was shut down; the Antilles Petroleum Company was operating at a loss in Trinidad, and the company was faced with a squeeze on capital.

In the United States, the Texas Corporation (later Texaco Inc., one of the famed Seven Sisters that once dominated the world of oil) saw a profitable opportunity in the struggling Canadian company. Although it was hard pressed to raise the capital it needed for growth, McColl-Frontenac still had a solid base and its shares were selling at just nine times annual earnings. The Texas Corporation began buying shares of McColl-Frontenac on the open market, and two years later disclosed that it had acquired a "substantial interest."

At the annual meeting of shareholders in Montreal in March 1938, representatives of the Texas Corporation showed up to announce that the U.S. firm owned 35 percent of the McColl-Frontenace shares, and also held proxy statements from other shareholders. The Texas representatives voted down the slate of directors nominated by the company management, then nominated and elected a new board of directors.

During the next three decades, Texaco acquired almost full ownership of its Canadian subsidiary, trading other Texaco Canada refining and marketing properties and some of Alberta's most profitable oil wells for shares of McColl-Frontenac, which eventually became Texaco Canada.

Then parent Texaco ran into a barrel of trouble over its 1985 purchase of Getty Oil for US$10.2 billion. The problem was that Gordon Getty, son of founder J. Paul Getty who died in 1976, had already agreed to sell to Pennzoil, a large U.S. independent. Gordon Getty, who preferred making music to managing business — he had just completed setting some Emily Dickinson poems in song — wasn't much interested in his father's business, and had apparently agreed to the offers of two different buyers. Pennzoil, which was first in line, sued Texaco, and won a staggering US$10.5 billion award from a Texas jury. Texaco was forced to file for bankruptcy protection, while it set about to appeal the Texas decision to the U.S. Supreme Court. It was a high-stake gamble; if Texaco lost, it would be ruined. The risk was too great for Texaco shareholders who pushed reluctant CEO James Kinnear to negotiate with Pennzoil. It took nearly three years before a settlement was reached. Texaco wound up paying US$3 billion to Pennzoil, while its business faltered under bankruptcy protection, management distraction, a mountain of legal fees, and falling oil prices.

These were the circumstances under which Texaco was happy in 1989 to receive an infusion of cash from the sale of its Canadian subsidiary to

Imperial Oil for $4.9 billion. With the acquisition of Texaco Canada, Imperial strengthened its position as Canada's leading oil company, Texaco got enough money to pay Pennzoil, and the oil seed that McColl and Anderson planted 116 years earlier reached another stage. Eleven years later, Texaco Inc. itself got swallowed up by Chevron Corp., the former Standard Oil Company of California, which issued US$36 billion worth of shares to become ChevronTexaco. This, after Chevron had acquired Gulf Oil of Pittsburgh for US$13 billion cash.

Shell shock for White Rose

A bare nine months after Nesbitt Thomson lost control of McColl-Frontenac to the Texas Corporation, it purchased another Canadian pioneer firm that had grown from the oil fields of Ontario. This, too, would suffer a similar fate.

Petrolia was in a slump at the turn of the century, with the refinery that Jake Englehart had built dismantled after Standard had acquired Imperial and moved its head office to Sarnia. Four of Petrolia's leading citizens — oil producer James McCourt, store owner John Kerr, banker W.D. Ross and businessman E.E. Grant — were resolved to do something about it. They were joined by four other businessmen in Toronto, a lumberman in Barrie, and W.S. Calvert, a member of Parliament for Strathroy, who were all concerned about dependence on the Standard-Imperial monopoly in the midst of complaints over declining petroleum product quality and increasing prices.31 The Canadians were joined by three Americans: refiners Hugh Jamieson and W.D. Todd of Philadelphia, and oil producer R.G. Stitt of Titusville. They chartered Canadian Oil Refining Company on August 7, 1901 and audaciously built at Petrolia the only refinery in Canada to challenge Imperial's Sarnia plant. It produced the first White Rose products and managed to stay in operation for 55 years. That was more than Canadian Oil Refining Company managed.

Facing stiff competition, the new venture sought strength to fend off Standard Oil by merging three years later with nine other firms to form Canadian Oil Company, Limited, moving the head office to Toronto. Those brought into the fold included marketers Gall Schneider Oil Company and Sun Oil Refining (the two companies that had lodged complaints about Standard's secret rate deal with the CPR and Grand Trunk railways), U.S. refiner Sterling Oil Works of Marietta, Ohio, and three oil jobbers in Toronto, Petrolia, and Winnipeg.32

It was still not enough. In late 1908, the fledgling enterprise was rescued from bankruptcy by Cleveland's National Refining Company, which bought slightly more than half ownership for $400,000, with Canadian investors continuing to hold the remaining interest. Built from

a shoestring by founders J.I. Lamprecht and Frank Fretter, National Refining had become one of the larger U.S. refiners and marketers by selling to farmers and rural dwellers who still accounted for more than half the population of North America. Once more the name was changed, this time to Canadian Oil Companies, Limited, which it would remain for more than half a century. Head office remained in Toronto and Calvert, the MP who had been one of the founders of the 1901 predecessor company, was the first president.

With its constantly expanding Petrolia refinery and service stations coast to coast, Canadian Oil Companies prospered, selling White Rose gasoline, Elastic Barn, Bridge and Roof Paint, and Black Star Harness Oil. Motorists were lured by the distinctive White Rose emblem and by the Boy and Slate signs that for 20 years stood outside each of the company's service stations with constantly changing aphorisms: Plump women are often penny wise and pound foolish, Girls with dream eyes often lose lots of sleep, Don't wait for the hearse to drive you to church. In a period of 13 years, from shortly after the start of the First World War to the eve of the 1929 stock market crash, the value of Canadian Oil shares had increased 15-fold.

While Canadian Oil prospered and grew, National Refining, its controlling U.S. shareholder, shrank and shrivelled, focusing its efforts for too long on the farm and rural market while North America was rapidly urbanizing. After Fretter, the last of the two founders, died in 1935 (Lamprecht had died in 1920), National began selling its assets one by one, finally putting its share of Canadian Oil on the block.

The buyer that emerged was Montreal's Nesbitt Thomson Company, buying National Refining's block of Canadian Oil stock in December 1938, nine months after it had lost control of McColl-Frontenac to the Texas Company. It was now, after 30 years of U.S. control, once more almost 100 percent Canadian owned, in what a company brochure later described as "the most important event in Canadian Oil's history." John Irwin, who had headed McColl-Frontenac until he was ousted after the Texaco takeover, became Canadian Oil's new CEO.

Canadian Oil proudly proclaimed itself "the All Canadian Company." By 1962 it had replaced its Petrolia refinery with a new $23-million plant in Sarnia; built a products pipeline from Sarnia to Toronto in partnership with Sun; spent another $23 million to purchase Anglo-Canadian Oil Company, a Turner Valley producer with additional wells post-Leduc that were producing oil at a rate of one million barrels a year, as well as a small refinery and a string of service stations in Manitoba; achieved even greater wildcat success in Alberta where it built another small refinery, and had 3,000 service stations coast-to-coast. Then it all abruptly

vanished shortly after a morning in July that year when Shell Oil representatives arrived at the Toronto home of Canadian Oil president Harold Rea with an offer to buy the company for $116 million.

The Royal Dutch/Shell Group had arrived in Canada in 1911, and butting heads against Standard Oil, its long-time global arch-rival, its progress here was tough slogging. It started by building bunkering facilities in Montreal to handle shipments of gasoline brought in from Borneo by Shell tankers. Two years later another Shell firm built a small bulk plant at Vancouver to distribute products by horse-drawn tank wagons to a handful of service stations. The first Shell refineries in Canada, at Montreal and Vancouver, were placed on stream in 1932. Slowly Shell built up its marketing operations across Canada.

After failing in 1917 to obtain a concession covering nearly half of Alberta, including the Athabasca oil sands, plus the Mackenzie River Valley, Shell's search for oil reserves and production in Canada did not get started until 1939 when an exploration office was opened by Shell Oil Company, the U.S. subsidiary owned 65 percent by the Royal Dutch/Shell group. The search failed to find any oil, but it did result in the discovery of the large, sulphur-laden gas field at Jumping Pound in the Alberta foothills near Calgary.

It was in 1946 that Shell almost missed the boat in Canada. It had been exploring for six years, with discouraging results, and in the aftermath of the Second World War, it had been forced to retrench. Large producing properties in the Far East, which had been the foundation of the enterprise, were lost. Throughout Europe, much of the group's extensive refining and marketing facilities had been devastated by war. Spending in other areas was cut back to help pay for a major rebuilding program. The decision was made to drop all holdings of exploratory acreage in Canada and concentrate in Venezuela, where there seemed to be better prospects for a more immediate return. That was just one year before Imperial discovered Leduc, and in 1948 the billion-barrel Redwater field, where Shell had dropped options on leases from Eric Harvie's Western Minerals.

Shell was back again exploring for oil in Canada in 1950. During the next dozen years, it consolidated its Canadian interests in Shell Canada, with minority Canadian ownership, and spent more than a billion dollars in exploration, acquisitions, and downstream expansion. But Shell paid a penalty for its absence in the years immediately following the Second World War. The most attractive looking exploratory holdings had already been picked up, and it was not until 1953 that Shell made its first, modest oil find in Canada. Even then its oil finding costs were higher than that of other majors who had been in on the ground floor, either

before or immediately after the pivotal Leduc discovery. But Shell persisted in its quest, and slowly built up appreciable reserves and production of both oil and gas.

That was where matters stood on that Saturday morning in July 1952 when the Shell representatives came calling on Harold Rea. Shell's bid for the only Canadian-owned, national, integrated oil company was a thundering surprise to Canadian Oil, but Shell, in its typically thorough fashion, had been preparing the bid for months. A 30-man task force drawn from all company departments was assigned to the project, with a nine-member working committee and others acting as advisers. To assure secrecy the project was given a code name, "Guardian," and the task force worked at a separate office building. Up to 100 people were involved at different times in various aspects of the project. The job of the task force was to prepare an exhaustive evaluation of Canadian Oil, recommend the manner in which the bid should be made, and plan for the later integration of the operation of the two companies.

Canadian Oil directors and Power Corporation of Canada, which together held about 30 percent of Canadian Oil stock, resisted Shell's offer. Once Shell had tipped its hand, the bidding for control of Canadian Oil became intensive. Shell upped its offer from $116 million to $152 million, in addition to assuming long-term debt of $28 million. Shareholders accepted the offer. The "only major Canadian-owned oil company with completely integrated facilities" was no longer. The attractive White Rose signs came down.

The demise of British American, and its takeover U.S. parent.

The British American Oil Company Limited was founded in 1906 by a man who seemed always afraid that some day his company might be gobbled up by a big American oil company. It was. But the gobbler was also later gobbled up.

One day BA's founder appointed an American as executive vice-president of his company. Later the American left BA to work for Gulf Oil Corporation in the United States, and became president and then chairman of the board. The British American Oil Company Limited became a 69-percent-owned subsidiary of Gulf Oil Corporation. In 1969, its name was changed to Gulf Oil Canada Limited. British American Oil Company Limited, a name known to Canadians for more than half a century, was no more. It was instead, "the Canadian member of the worldwide Gulf family." At least until the worldwide Gulf family was no more.

It took British American Oil just 20 years from its founding to rise from a small kerosene marketer to the second largest oil company in

Canada, a position which it held until 1968 when Shell Canada pulled into the number two spot.

Albert Leroy Ellsworth was 30 when he returned to Ontario in 1906 to establish British American Oil in Toronto, after working for 10 years as a statistician and cost accountant for Standard Oil at its Buffalo refinery. It was considered an inopportune time to start an oil company, since every wise investor knew that the electric light bulb would soon trim the wicks of the kerosene lamps and put the oil companies out of business. But Ellsworth found seven other misguided investors, and between them they put up a total of $135,200. Silas Parsons, prominent Canadian businessman and first president of the Canadian Manufacturers Association, became president of the new firm. Ellsworth, although the founder and driving force of the organization, was secretary-treasurer for the next 21 years until he succeeded Parsons as president in 1927.

It was a lean business, peddling kerosene and lubricating oils in Toronto, and in the first couple of years there were times where there was not enough cash on hand to fill the weekly pay envelopes. Then Ellsworth would climb into a company wagon and call on customers until he had collected enough money to get past payday. From the start Ellsworth vowed that “no one shall sell better products nor give better service”33 than BA, but soon found that if the pledge were to be kept, the firm had better start making its own products. So in 1908, BA built its first refinery, a Toronto plant consisting of two second-hand cheese-box stills that produced primarily kerosene.

The new refinery was BA’s pride and joy, but it did not solve the shortage of cash and the company soon found itself in debt to its American oil suppliers. Parsons and Ellsworth persuaded Charles L. Suhr of Oil City, Pennsylvania, and another associate to accept BA stock as collateral for the money it owed for the oil it had purchased. William Whiteford, a former BA president and later chairman of Gulf Oil Corporation, once recalled that the loan continued to build up as conditions remained rather difficult for the new company, and the day came when Mr. Ellsworth realized that he had pledged enough stock to Mr. Suhr and Mr. McSweeney that they now owned control of the company. He was quite suspicious of American business and he was sure that he would soon be advised that they were taking over the company.34

They did not, but Suhr became a director in 1909 and at the time of his death 59 years later was still a director emeritus.

Suhr and McSweeney were not the only ones to pose a takeover threat to Ellsworth’s pride and joy. Shortly after the 1911 breakup of the Standard Oil trust, Imperial Oil acquired about 30-percent ownership of

BA and was tempted to go the whole way, in typical Standard takeover fashion. But in the wake of the breakup of the Standard trust in 1911, there was a new-found sensitivity to both public and business concern about monopoly control, and Imperial prudently decided to sell its BA stock.35

A demanding employer, Ellsworth had a bookkeeper's passion for detail. He reportedly even checked the junior clerks to make certain that they fixed the postage neatly to the company's mail because he hated slipshod work. But he lacked nothing in breadth of vision. Three years after the company was formed it obtained a federal charter and started selling its kerosene and lubricating oils in Quebec. Henry Ford had started mass-producing his automobiles just three years before BA was formed, but the impact was not yet great; there were fewer than 1,000 automobiles in Canada and a survey showed that five out of six Canadians preferred Old Dobbin for transportation. But by the end of the First World War the demand for gasoline had increased from 10 to 26 percent of the total petroleum market, and BA had enlarged its refinery to keep pace. In 1920 it purchased the Winnipeg Oil Company from Imperial Oil with its 115 outlets and extended its marketing operations across the three prairie provinces.

Its rapidly growing market requirements created a need for additional supply sources, which BA sought to provide by establishing, in 1924, the Toronto Pipe Line Company to build and operate crude oil pipelines in the United States, and the following year establishing another subsidiary to explore for and develop U.S. oil production. This was BA's first step to a fully integrated operation, and it met with immediate success. Initial investment in the two U.S. subsidiaries was $405,000. BA's U.S. oil production was built up to a rate of nearly 30,000 barrels per day by 1958. In 1966, BA sold its U.S. subsidiary to parent Gulf Oil for $196 million, providing funds for further expansion in Canada.

BA's second refinery was opened in Montreal in 1931. In 1934 it opened its Moose Jaw refinery in Saskatchewan; purchased a refinery in Coutts, Alberta and connected it by pipeline with nearby oil fields in Montana; purchased another small refinery in Calgary from Bell Refining Company; and built the first absorption plant in the Turner Valley field to extract condensate from the gas that was being flared. In 1936, BA helped finance the wildcat well that discovered the large oil segment in the Turner Valley field, and three years later built a new refinery at Turner Valley to replace the small plant purchased from Bell.

It was in 1935 that BA hired Whiteford as vice-president of its U.S. subsidiary. Whiteford had attended Stanford University and graduated from the roughneck school of drilling. In 1942, he moved to Toronto as

executive vice-president of the parent company, and three years later recalled the event in a speech in Montreal:

> Mr. Ellsworth told me that it was with a great reluctance that he was asking me to come to Canada. First of all, because he never wanted an American in charge of his Canadian company and second, he wasn't sure I would be accepted by the employees of that company or by the industrial world. Upon arrival I was told that, in order to ease the blow, there would be no announcement of my title, but that I would be assigned an office where I could get acquainted with the employees and that in time they would come to understand what my new position was. Furthermore, in order to keep the matter entirely confidential, I would not be paid a salary but could file an expense account to take care of any necessary expenses. . . . It was four months before my title and responsibilities were announced and my salary commenced.36

Despite this inauspicious start, Whiteford was named president the following year when Ellsworth became chairman of the board, and the company's growth continued. Following the Second World War, and up to the mid-1950s, BA proudly advertised itself as the largest Canadian-owned oil company. But the basis for that claim was already being eroded. Immediately after the war, Gulf Oil purchased a minority 20-percent interest in the Canadian company. In 1951, Whiteford left BA to join Gulf in Pittsburgh, where he later became president and then chairman. Then in 1956, BA purchased Gulf's oil and gas producing and exploration properties in Canada by issuing shares worth more than $300 million. The acquisition increased BA's land holdings in Western Canada from one million to 11 million acres, multiplied its Canadian oil production tenfold, and made BA the largest owner of natural reserves in Canada. But the shares it issued for these properties gave Gulf nearly 70-percent ownership of BA.

Gulf's turbulent affairs from that point have already been told, but can be briefly recapitulated in this obituary. Briefly, it features the sale of parent Gulf Oil to Chevron, the former Standard Oil of California; Chevron's sale of Gulf Canada to the Reichmann family, and the Reichmann's sale of the downstream properties to Petro-Canada; its role, now named Gulf Resources, in the Reichmann's grasp of a liquor distillery, Canada's largest gas utilities, its largest oil pipeline, and Turner Valley pioneer Home Oil; the Reichmann's bankruptcy; the control by Houston's J.P. Bryan who moved the head office to Denver, Colorado and left Gulf Resources to stagger with a heavy load of debt; its

repatriation to Calgary and rehabilitation under new/old management; its final disappearance in 2001 with the $9.8-billion purchase by Conoco Inc. (later ConocoPhillips). It was a long, dramatic journey for the venture that bookkeeper Albert Leroy Ellsworth had launched 95 years earlier as the British American Oil Company Limited.

The oldest survivor

Tucked in the southwest corner of Ontario, at Oil Springs, is the world's oldest continuous oil producing business, pumping oil with the same technology and equipment used at Canada's first oil wells nearly a century and a half ago. It would be a fabulous museum of mid-19th century technology except for one fact: it isn't a museum, it's a commercial operation with 350 wells pumping oil worth more than a million dollars a year at 2004's sharply escalated prices.

The oil business of Charles Fairbank Oil Properties Ltd. has been in the Fairbank family for four generations, launched by a tenacious surveyor and farmer who gambled everything he had, became Canada's largest oil producer in the late 19th century, one of its country's respected businessmen, and reputedly the wealthiest Canadian oil man when he died in 1914.37

John Henry Fairbank was 29 in March 1861, when he left his Niagara farm for a surveying job at Oil Springs. It was less than a decade after Charles Tripp had organized the world's first, but ill-fated, oil company to produce asphalt from bitumen dug out of the gum beds in Enniskillen county and three years after James Miller Williams completed North America's first oil well. Fairbank was at Oil Springs to survey 100 acres of bushland that a wealthy Mrs. Julia Macklem had purchased from a bankrupt Charles Tripp. Mrs. Macklem wanted the 100 acres parcelled into 198 lots to sell or lease to the 500 wildcatters, prospectors, gamblers, and promoters who had flocked to Oil Springs for a piece of the action at North America's first oil field. In July, after he had finished the job for Mrs. Macklem, Fairbank borrowed $500 from his father-in-law, paid off his current debts, and had $351 left to bring in his own oil fortune. He leased a half acre from Williams for $300, with $30 down, and figured to spend the rest to produce some oil and distill some coal oil. During the next three years, Fairbank gambled his farm and everything he owned, everything he could borrow from his mother and father-in-law, and all the credit he could wring from suppliers in a desperate effort to make a paying proposition out of oil production. He came within a whisker of losing it all.

Digging a well "meant digging down about 50 feet into heavy clay with a shovel, loading the clay into buckets, hauling the buckets up to the

surface with a pulley, unloading them into a wagon and having a horse cart the clay away."38 After cribbing, the wells at Oil Springs were deepened with black ash, foot-operated spring poles that hammered the drill bit down another hundred feet or so. If a well was successful, the spring pole could also be used to pump up the oil.

After cribbing his first well, which he called "Old Fairbank," Fairbank and his partner, J.H. Eakins, suspended work on the lease while they speculated in lubricating oil, which they sold to farmers along the Great Western Railway, clearing more than 15 cents on each gallon that sold for 25 cents. "Don't I hope to own a small refinery or part of one," Fairbank wrote to his wife, back home on the farm in Niagara.39

Fairbank got his wish. Drilled from below the log cribbing, his Old Fairbank well was a producer. A year after he had leased his half-acre he built his refinery, a still made by fastening two large kettles to form a sphere. Keeping it from exploding, the fate of so many Oil Springs stills, was a challenge. Between nursing his oil well, cursing his refinery, cutting firewood for fuel, building a skid road through the heavy clay swamp of Enniskillen, hauling barrels of kerosene by wagon to Sarnia or the railroad at Wyoming, Fairbank's days were filled with toil and trouble.

"Rather quiet Christmas minus turkey and such like. At work in mud and oil all day," he confided to his journal on his first Christmas at the lease. "Received nothing from somebody, gave, something to nobody, total 0."

"As miserable a day as I ever put in," he recorded in October. "Run till dark and quite resolved that I won't run a damn leaky old kettle that acts as if would 'go up' at any minute. . . . Can stand work as well as anyone but damn a leaky still them's my sentiments."

On February 11, 1863, he recorded the death of Hugh Nixon Shaw, who 13 months earlier had brought in Oil Springs' first flowing oil well, at a rate of some 2,000 barrels a day. "Drowned in his well today," Fairbank wrote. "In him I have lost one of my best friends in Enniskillen. . . . Sad, sad, sad calamity."40

After boarding at Oil Springs for a year, Fairbank built a 12- by 16-foot cabin, and his 75-year-old mother came to look after the housekeeping and Fairbank's four-year-old son, while his wife Edna and his eldest son remained at Niagara Falls where Edna managed the farm with the help of five hired hands. To keep his business alive, Fairbank borrowed more from his mother, and from his father-in-law, who mortgaged his Niagara Falls real estate to help out. He was sued four times in 1863, once by his mother for $400. That was a ploy to stall his creditors. His mother's $400 suit took precedence over a suit for a

smaller debt of $350. At the Sheriff's auction, Fairbank's goods were purchased by friends, with the understanding that his mother, Mary Fairbank, would promptly buy them back.

Despite his troubles, Fairbank turned down an offer of $600 for his property, then worried that he might have been foolish.

A glimmer of daylight started to show by November that year when Fairbank noted in his journal that he had coaxed 45 barrels of oil from his well in 24 hours. "Net profit of day $150, a big day's work, the biggest ever made by me or probably that I shall ever make."

That was a turning point. The Old Fairbank well began pumping oil at a regular rate of about 10 barrels a day. The price of oil went up. Fairbank sold the well in 1865 for $6,000 in gold, which he carried to the bank in a bag, then moved seven miles north of Oil Springs to Petrolia where much greater oil production was being developed from deeper wells. Fairbank drilled more oil wells at Petrolia and built two bigger refineries, later sold to Imperial and dismantled. By 1880, he was Canada's largest oil producer. At Petrolia he also speculated in real estate, opened "the largest hardware store west of Toronto,"41 helped finance a five-mile railway spur to connect the Petrolia oil wells with the railway at Wyoming, headed producers' efforts to curb excess oil production and stabilize prices, founded a bank with a partner as well as a savings and loan institution, acquired a business that made boilers, tanks and stills for the oil fields, served as chief of the volunteer fire brigade, and was elected for one term as the federal Liberal member of Parliament. Shortly before his death in 1914, he had 485 oil wells at Petrolia and Oil Springs that were still producing at an annual rate of 25,000 barrels.

Fairbank's great-grandson, Charles Oliver Fairbank III, a former high school science teacher, bought the Fairbank properties in 1973 from his father, who had consolidated the interests of all the family relatives so that the property could be operated efficiently. It was far from certain that the 70 idle wells and an equal number producing a trickle of oil on 350 acres would yield a profit.

To achieve economies of scale, Charlie bought more property and two decades later had 350 rehabilitated wells on 600 acres of scattered parcels. The wells now produce 25,000 barrels of oil a year, an average of less than seven gallons of oil per day from each well, and 20 times as much water that must be pumped back down disposal wells.

From the start it was a gamble, a bigger gamble than Charlie first realized. Without the price boost triggered by the 1973 Arab oil embargo, he says the business would never have been viable. And so many wells

pumping so much water and so little oil has required a constantly sharp pencil to keep costs under control.

One hundred and fifty of the 350 wells are still produced by the jerker rod system that John Henry Fairbank first developed in 1862 and which became almost universal in the early oil fields of both Canada and the United States. The wooden jerker rods fan out like spokes from six powerhouses, referred to as “rigs,” to the 150 wells. Six-foot-diameter bull wheels in the powerhouses pull the twin jerker rods back and forth, activating the teeter-totter walking beams that pump up the oil and water. The only significant difference in the technology of more than a century ago is that the bull wheels are now powered by five-horsepower electric motors, rather than steam engines.

When enough oil has been collected in the storage tanks, it is delivered by truck 20 miles to Imperial Oil’s Sarnia refinery. Fairbank remains Imperial’s oldest crude oil supplier. Canada’s largest oil company has been buying oil from one of the smallest producers since at least August 1880, almost one month before Imperial actually achieved its charter.

Charlie Fairbank plans to replace the more conventional pump jacks at some 200 wells, each of which is powered by its own electric motor, with the jerker lines. He claims it is cheaper to have just one motor and gearbox pumping multiple wells. But Charlie, a dedicated promoter of pioneer oil technology heritage, admits his real reason is that “Oil Springs is a legacy that transcends the individual. It is the creation of all the men who ever worked here.”

Dr. Emory Kemp, head of West Virginia University’s Institute for the History of Technology and Industrial Archeology, is in accord. He wants the Fairbank property declared a United Nations World Heritage site.

Meanwhile, the Fairbank property, if oil prices hold up, might well keep on pumping its trickle of oil for a few more decades. Petroleum engineers calculate that as much as one million barrels of oil, or even more, might still be recovered from the first oil field in North America.

That begs a question. Will the world ever completely run out of oil? No more than the Stone Age ran out of stones

Epilogue. The End of the Oil and Gas Age?

All things must end sooner or later, and the end of the oil and gas age looks to be later rather than sooner. But already the industry is preparing for a peak and a transition to a new and probably more varied energy era.

Canada's petroleum experience can be a paradigm for the transition. It was here that the oil age was born, with Abraham Gesner's development of hydrocarbon refining in the mid-1840s and with North America's first commercial oil well at Oil Springs a decade later.

The end of the oil and gas age will be later rather than sooner because there is as yet no adequate alternative energy source — or combination of sources — available at affordable economic, environmental, and social costs. Even if such an alternative fuel was available now, it would still require decades to duplicate more than $12 trillion in worldwide facilities that produce, transport, process, market, and use oil products and natural gas, from wellheads to refineries, to petrochemical plants and cars.

The fact is that nothing in the past century has contributed more than oil and gas to the improvement of human life in the industrialized world and to safeguarding the global environment.

In this essay, we will briefly consider the legacy of the petroleum age; the challenges confronting a presumptive new energy era; Canada's place in the evolving world of energy; and finally, a few lessons from Canada's petroleum experience.

The economic and social legacy

Imagine for a moment a group of 100 people representative of all gainfully employed Canadians at the time of Confederation. Half of this 1867 congregation of workers would be farmers.1 The fact that half the work in Canada was devoted to providing just food was a major factor in limiting the availability of goods and services to little more than Spartan necessities, to an extent that we would today find totally unacceptable. Imagine now a similar group 137 years later. Only three are farm workers, 97 are engaged in providing a vastly expanded range of goods and services, from medical services to symphonies.

This is the agricultural revolution that was spawned by petroleum energy and products, helped by electric power, much of which in turn is fuelled by oil and gas. Petroleum not only fuels farm tractors and machinery, it's also a major component of the fertilizer. To provide the corn feed to raise a 1,250-pound prize steer requires almost six barrels of crude oil for fuel and fertilizer. A five-pound roast of beef represents a gallon of crude oil, not including the fuel used in butchering, transporting, and retailing.2

Petroleum's contribution is hardly any less when it comes to shelter, from asphalt shingles on the roof to PVC piping in the basement, insulation between the walls and vinyl siding on the exterior. If a house were built today with no petroleum products, it would burn to the

ground because there would be no plastic insulation on the copper electrical wiring.

As for clothing, most people would be half naked if, with the wave of a magic wand, synthetic materials made from oil and gas were suddenly to vanish. Women would have to replace their nylons with silk stockings, something that, except perhaps for seniors, very few Canadian women have ever worn, or even seen.

A big role in providing food, shelter, and clothing is just the icing on the cake of petroleum's major job of providing 60 percent of the world's energy needs.3

The environmental legacy

When Frank and Isobel McMahon drove from Vancouver to nearby Abbotsford to option a Turner Valley oil and gas lease in late 1936, the smog was so dense that Isobel walked part of the route with a flashlight so that Frank could see the edge of the road, as we saw in chapter 11. That was not unusual in the smoke- and smog-darkened Vancouver in the first half of the 20th century.

A greater hazard than the lack of visibility was the toxicity of the potent brew that shrouded the city, locked in by mountains and hemmed by the Pacific Ocean. The smog was mostly harmless water vapour that drifted in from the Ocean, but laced with ash, soot, sulphur, and nitrogen oxide spewed from the tail pipes of cars but mostly from the furnaces that burned coal and wood to heat homes, fuel factories, manufacture coal gas, and generate electric power. The smog blackened the city's buildings and the lungs of its people. No one knows how many people have been killed by Vancouver's smogs, or the smog in other major cities where coal and wood accounted for most of the fuel that was burned half a century ago.

There's less uncertainty about London's most notorious killer fog in 1952. For one week, London was so darkened with smog from the coal burned in homes, shops and factories that even in midday, motorists drove off roads onto lawns and into ditches. During a two-week period, 4,000 Londoners were killed by that one week of smog, while the number of deaths it later caused over a period of months has been estimated at 12,000.4

Air pollution — bad though it be — is far less now than it was half a century ago, thanks to oil and gas. Yet people still die from air pollution caused by burning fossil fuels — coal, oil, and gas. The Ontario Medical Association claims as many as 20,000 Ontario residents die premature deaths each year from smog pollution.

It would be worse if the use of highly polluting coal and wood had not been largely displaced by much cleaner oil, and especially natural gas which results in virtually no air pollution. Coal and wood provided nearly two-thirds (64 percent) of the energy used in Canada in 1946 while oil and gas provided only 28 percent. But 57 years later, coal and wood (virtually all coal) provided only 11 percent of Canada's energy needs, while oil and gas provided 60 percent. Hydro and nuclear power also helped reduce the demand for and pollution from coal.5

Almost 62 million tonnes of coal were burned in Canada in 2002. If coal had still provided some 60 percent of the energy, we would have burned not 62 million but more than 1.8 billion tonnes of coal. Despite scrubbers that now remove much of the sulphur at coal-fired power plants and the promise of "clean coal," coal remains North America's and the world's dirtiest fuel, in terms of impaired air quality and greenhouse gas emissions. It would have been a tough task to avoid killer fogs in major Canadian cities, like those in England half a century ago, if oil and gas had not displaced the leading role of coal.

More threatening than air pollution, in the view of most climatologists, is the entirely different and controversial issue of global warming.

An energy transition

A new energy era in which other fuels displace the dominance of oil and gas might be as little as 10 years away, according to some energy analysts, or as long as 100 years away, according to others. The timing will be determined by a host of factors: air pollution, global warming, the adequacy of oil and gas reserves, supply security in the face of turmoil, terrorism, and violence in the areas that house at least three-quarters of the world's known remaining reserves of conventional oil, and costs. Here are snapshots of some transitional developments, and Canada's participation in the scheme of things.

Petroleum supplies and the oil sands

Some energy analysts say the world's supply of conventional crude oil has already peaked and natural gas won't be far behind.6 Reserve estimates, however, suggest that peaked production isn't that imminent, especially if rising prices curb future energy demand growth. And the supply outlook is even better when Alberta's oil sands and Venezuela's heavy oil deposits are factored in.

In the 20-year period to 2004, the world's remaining discovered reserves of crude oil increased nearly 60 percent, from 723 billion barrels to more than 1.1 trillion barrels, according to British Petroleum figures.7 The crucial reserves-life index (the volume of proved remaining reserves

divided by the annual production volume) increased from 30 years to 40 years during the same period.

It is true that it has become more difficult and costly to find new oil fields, and perhaps production of conventional oil will soon start to outstrip the discovery and development of new reserves. But the oil sands and Venezuela's heavy oil will do much to offset this. With an estimated 175 billion barrels of recoverable oil, Alberta's oil sands are exceeded only by the oil reserves of Saudi Arabia. Alberta's oil sands plus an estimated recovery of at least 78 billion barrels of extra-heavy Venezuelan oil increase the world's remaining oil reserves by almost one-quarter. And that's likely just the start. With 1.6 trillion barrels of bitumen locked into the oil sands, "there is considerable potential" to increase that 175-billion-barrel figure "as advances are made in recovery technology," according to the National Energy Board.8

While the world's supply of conventional low-cost oil reserves looks adequate, it's different in North America where U.S. reserves and production have been declining for more than three decades. Canada's conventional oil production is forecast to fall by 700,000 barrels per day during the 13-year period to 2016, but this is more than offset by an increase of 1.7 million barrels per day from the oil sands.9

Relative to demand, gas with a reserves-life index of 67 years is more abundant than oil worldwide, but not in North America where the reserves-life index is only 9.5 years. Both Canada and the United States will almost certainly need gas from the Arctic and imported liquefied natural gas to meet future needs.

All the fossil fuels — oil, gas, and coal — can be interchanged with existing technology. Germany fuelled its Luftwaffe airforce with gasoline made from coal during the Second World War; Imperial Oil was on the verge of manufacturing gasoline from natural gas before it discovered Leduc; and the United States already manufactures from coal what has oxymoronically been called "synthetic natural gas." With coal resources vastly greater than oil and gas, the potential resource base of fossil fuels — in North America and worldwide — is virtually inexhaustible. The limiting factors are cost and environmental impacts: but ultimately cost, since environmental factors, and possible disruptions of supplies from the Middle East and other politically volatile areas — not the resource base — remain the limiting factors in future availability of petroleum energy.

Greenhouse gases and global warming

Greenhouse gases (GHG) in the atmosphere keep the earth from becoming so cold that human life would be impossible. Now atmospheric

scientists are worried that excessive heat caused by global warming could make life impossible.

Not all scientists subscribe to global warming theories, the large majority who do have widely varying projections of how much the earth might warm in the 21st century, and knowledge about the cycle of greenhouse gases back and forth between the earth's surface and atmosphere is still so incomplete that substantial uncertainty remains, despite models generated by some of the world's most powerful computers.

Yet the possibility of widespread devastation caused by global warming is widely seen as this century's greatest energy challenge. The oil and gas industry is already acting to curb the emission of greenhouse gases, and will beyond doubt greatly increase its efforts if research during the next few years confirms the worst fears about global warming.

By far the most prevalent of greenhouse gases seems harmless enough. Carbon dioxide is the gas that puts the fizz in your soda pop, the stuff you exhale with every breath, and what plants breathe in order to grow through photosynthesis. Other greenhouse gases include methane (CH4, essentially the same stuff as natural gas), nitrous oxide (N2O), and tropospheric ozone. Total GHG emissions are usually measured in CO2 equivalent. (The principal villains in smog and air pollution, as distinct from global warming, are sulphur dioxide (SO2) and nitrogen dioxide (NO2.)

On a unit-of-energy basis, coal is the greatest contributor to anthropogenic CO2 because it is almost pure carbon. For every BTU of energy, burning coal emits roughly 50 percent more CO2 than burning oil or its products, and twice as much as burning natural gas.

Until less than 200 years ago, in pre-industrial society the oceans and the earth's plant and animal life each year emitted the equivalent of about 209 billion tons of CO2 and absorbed some 212 billion tons in the natural carbon cycle. But so-called anthropogenic sources of carbon dioxide emissions — mostly from burning fossil fuels but also from deforestation — now amount to some 6.3 billion tons a year, exceeding the earth's absorption capacity by more than three billion tons. Transportation, mainly cars and trucks, accounts for one-third of anthropogenic GHG emissions, with coal-fired powerplants the biggest single factor in the balance. Atmospheric concentrations of GHG rose from a pre-industrial level of 280 parts per million to 368 ppm by 2000. In the 20th century, the surface temperature of earth warmed by 0.6∞C (1∞F) to the warmest levels since readings began in 1861, with most of the increase on land and the greatest increases in the Arctic and sub-Arctic areas. In the final quarter of the 20th century, sea levels rose by

10 inches and the world's ice caps shrunk by 15 percent. Part of the global warming may have been due to natural variations in the climate cycles but "there is new and stronger evidence that most of the warming observed over the last 50 years is attributable to human activities," according to the third report of the UN's Intergovernmental Panel on Climate Change.10

For the 21st century, the IPCC says temperature increases are "very likely to be without precedent during at least the last 10,000 years," although its forecast covers a wide range of possible change "because of the incomplete state of knowledge." It forecasts an increase in the concentration of GHG to a level of 490 to 1,250 ppm, with a temperature rise of anywhere from 1.4 to 5.8^0C (2.5 to 10^0F). In the worst-case scenario, "tens of millions of people" would be displaced by rising ocean levels, there would be more and more violent killer storms and floods, increased spread of tropical diseases, drought, reduced availability and quality of water in some areas, heat stress like that which killed thousands in France during the summer of 2003, thawing of Arctic and sub-Arctic permafrost, which would release more carbon dioxide to the atmosphere. A rise of just half a metre in ocean levels would inundate all of Bangladesh and displace its entire population of eight million. While global temperatures rise, there could be colder winters, perhaps even mini-ice ages, along the Atlantic seaboards of Europe and North America caused by changes in ocean currents.

A minority of scientists disagree with the theory that human activity will cause the earth to continue warming this century. Skeptics such as Dr. Theodore L. Anderson of the University of Washington and MIT meteorologist Dr. Richard S. Lindzen accuse designers of computer climate models of choosing values that tend to confirm their predictions.11 Others point to a possible self-correcting mechanism: as ocean temperatures rise, more clouds are formed, cutting off sunlight, cooling the earth. Researchers at the New Mexico Institute of Mining and Technology, using satellite data to estimate the amount of water vapour in the upper atmosphere, concluded that while temperatures will continue to rise, the increase is likely to be at or near the bottom of IPCC's wide-ranging forecast. That, however, would be devastating enough.

Hot shower, cold beer, and energy efficiency

Reduced energy consumption, primarily achieved by greater energy efficiency, could cut GHG emission by 2.5 billion tons a year and save money, too, according to IPCC's third report. Amory Lovins, co-director of the Rocky Mountain Institute in Snowmass, Colorado, and the most

prominent advocate of energy efficiency, agrees. He claims that the $220 billion Americans spend each year for electricity could be cut in half with savings "that would mostly pay for themselves within a year," by such simple measures as replacing incandescent light bulbs with compact fluorescent bulbs, and replacing old, inefficient refrigerators.12 As much as half the lighting in office buildings is wasted by lighting up unoccupied offices or when there's ample daylight, according to Russ Leslie of the U.S. Lighting Research Centre.

Aside from electric power, Lovins in 2001, with financial backing from Shell Oil and others, unveiled a prototype SUV said to go 99 miles on one U.S. gallon of gasoline.

A genius who was admitted to Harvard at 16 and became an Oxford don in physics by 21, Lovins draws a distinction between the older concept of energy conservation, which asked people to shun Christmas tree lights and wear a sweater in the house, and energy efficiency. You don't need to sacrifice lifestyle to achieve energy efficiency, Lovins claims: you can still have hot showers and cold beer.

Toronto Star consumer columnist Mag Ruffman offers an example of what Lovins is talking about. Ruffman has calculated that replacing two older refrigerators and an upright freezer in her house with a new, large, efficient refrigerator/freezer will cut her power bill for cooling things from $340 to $44 a year.13 Businesses, too, are finding ways to save energy and money, especially as energy prices go up. DuPont claims to have saved US$2 billion in energy costs over a 10-year period. Dow Chemical saved $2.5 million in 2003 with a system that turned off employee computer monitors when not in use. Office-supply retailer Staples saved $6.5 million in two years with a centralized system that controlled lighting, heating, and air conditioning at its 1,500 stores.

Carbon sequestration

Trillions of tons of carbon dioxide that might otherwise be added to global warming can be securely stored for millions of years in old oil and gas fields with a process that also promises to increase Canada's oil supplies by billions of barrels. It's called carbon sequestration and Canada is a world leader in the development and application of the technology.

"Carbon sequestration appears to be the quickest and cheapest route to fighting global warming," in the assessment of Business Week.14 Massachusetts Institute of Technology researcher Howard Herzog claims that "carbon sequestration is the only technology that can wean us off fossil fuels without too much of a shock to the system."15

The process involves capturing CO2 emissions, primarily from coal-burning plants, before they are vented into the atmosphere and injecting the gas into deep underground formations. If the gas is injected into an oil reservoir, it can act as a solvent in a process called miscible recovery to help clean out trapped molecules of oil that remain after other recovery methods have been completed. Primary production, which makes use of a reservoir's original pressure, typically enables the recovery of about a quarter to a third of the oil in place. Water flooding to restore reservoir pressure might double that, still leaving vast amounts of oil, some of which might be produced with miscible recovery using CO2.

EnCana and Dakota Gasification Company of Bismarck, North Dakota, began development in 1998 of one of the world's largest carbon sequestration and enhanced oil-recovery projects in the Weyburn field of southern Saskatchewan. Since October 2000, EnCana has been injecting CO2 into Weyburn's oil reservoirs at a rate of 5,000 tons a day, gas that would otherwise add to the accumulation of greenhouse gases in the atmosphere. During a 25-year period, EnCana expects to inject 14 million tons of CO2 at Weyburn, equivalent to taking 3.2 million cars off the road for one year. In the process, EnCana expects to recover an additional 130 million barrels of oil from a field that would otherwise be abandoned about now.

The CO2 injected by EnCana is supplied by Dakota Gasification through a 202-mile pipeline from its Great Plains Synfuels Plant at Beulah, North Dakota. The Beulah plant annually converts six million tons of coal into 50 billion cubic feet of synthetic natural gas, emitting CO2 into the process.

The Weyburn operation, described by Natural Resources Canada as "the world's largest sequestration and research project," is being closely studied by the International Energy Agency.16

Weyburn might be just the start of much more extensive carbon sequestration and enhanced oil recovery. In Alberta, Enbridge Pipelines foresees a possible 1,200-mile pipeline system that would collect 11,500 tons a day of CO2 now being emitted by the province's coal-fired power plants, and petrochemical and oil sands plants for sequestration to increase recoverable oil reserves at some of Canada's oldest and largest oil fields, including Pembina and Swan Hills.17

Fuel cells delayed but hybrids are here

Hydrogen, the ultimate clean fuel that might some day drive vehicles and generate electric power with zero pollution and no GHG emissions to warm the earth, now seems further down the road than had once been widely expected. "In the best-case scenario, the transition to a hydrogen

economy would take many decades, and reductions in carbon dioxide emissions are likely to be minor during the next 25 years," the U.S. National Academy of Engineering and the National Research Council concluded early in 2004.18

Major scientific breakthroughs, not just improvements to existing technology, will be required before hydrogen can be widely used as a fuel, according to the American Physical Society. One major problem is that no material now exists to make safe and economic hydrogen fuel tanks for motor vehicles. "Hydrogen storage is a potential show stopper," according to Columbia University Professor Peter Eisenberger. Other aspects of the most promising hydrogen-engine technologies reportedly must be improved anywhere from 10- to 100-fold in cost or performance to be competitive with internal combustion engines.

Hybrid electrical vehicles, powered alternately by gasoline or diesel engines and rechargeable batteries, do not eliminate air pollution or the emission of GHG like the promised hydrogen fuel cells, but they do achieve substantial reductions. More importantly, the hybrids are here now, their numbers are growing, they may remain the bridge to a hydrogen economy for several decades, and at least one Canadian oil company is among those active in promoting their development and use.

Hybrids offer their greatest reductions in fuel consumption and tailpipe emissions in stop-and-go urban traffic, the target of a $1-million, 18-month pilot program sponsored by EnCana in 2003. The program is testing Azure Dynamic Corporation's technology for hybrids using seven re-fitted Canada Post delivery fans. Unlike other hybrids that use gas or diesel vehicles to charge batteries, Azure's technology uses energy created by a vehicle's brakes. The technology is aimed at delivery step-vans because they do a lot of braking with their constant starts and stops.

Azure's "Smart Energy Management Technology" is said to cut fuel consumption by more than half and reduce air pollution emissions by up to 90 percent from urban step-van vehicles.

Cars that drink alcohol

Drinking and driving don't mix well, unless your vehicle is drinking a little alcohol mixed with its gasoline. Ethanol, the alcohol, has to date been made mostly from agricultural crops, and while its use with gasoline is friendly to the environment, it has it limits. Iogen Corporation of Ottawa, with a US$29 million equity investment from Shell Chemicals Canada, has developed a process that promises to overcome many of these limitations in what is considered a major breakthrough in biomass fuel.

Ethanol has been fermented and distilled from farm crops such as sugar cane and corn cereals, and added to gasoline in concentrations up to 10 percent — up to 25 percent in Brazil where vehicles have been adapted for the higher concentrations. Because it is low in carbon and air pollutants, ethanol burns cleaner than gasoline and emits less CO2. But ethanol is costly and its use heavily subsidized by taxpayers; growing the crops from which the alcohol is produced requires a lot of oil for farm machinery and fertilizer; and the available and potential supply is limited, especially since agricultural crops are needed for food.

Iogene believes it has an answer to these problems with the world's only demonstration plant to produce a cellulose ethanol, brand-named Eco-Ethanol. Iogene uses a special enzyme to ferment agricultural or forestry waste, such as straw and corn or wheat stocks or wood chips. Because it uses waste, its raw material and final costs are less than regular ethanol and it does not compete with the provision of food. Iogene claims that, compared with gasoline, each gallon of its Eco-Ethanol reduces GHG emissions by 90 percent, while conventional ethanol achieves only a 30 percent reduction when fuel used to grow the crops is considered. Cellulose ethanol, Shell claims, offers "greater potential to reduce the high cost of bio-fuels," while also increasing the potential supply.

When the wind don't blow

In the song about the Big Rock Candy Mountain, "the wind don't blow," and when it don't, the windmills don't generate electricity. Despite the variability of winds, high costs, environmentalists who oppose wind farms in pristine wilderness areas, and affluent homeowners with "not in my backyard" opposition, wind power is seen by British Prime Minister Tony Blair as "the most proven green source of electricity generation." Others, including several Canadian energy companies, agree that wind power is the most immediately promising source of clean, renewable energy. But Britain's plan to generate 10 percent of its power needs from wind by 2010 is said to face "unprecedented criticism," not least because it's expected to cost taxpayers as much as $2.3 billion a year in subsidies.19 Yet a goal of using wind and solar power to generate 10 percent of North America's power needs within 20 years is considered achievable.

In Canada, TransAlta, the country's largest private power producer, also claims to be the leading wind power producer. Its goal is to harness wind for 10 percent of the total power it produces. Suncor Energy, in 2001, launched a five-year $100-million renewable energy program focused on wind power. In partnership with Enbridge, it has completed a

$20-million, 11-million megawatt wind power project at Gull Lake, Saskatchewan, and a $48-million, 30-MW operation at Magrath in southern Alberta. The two wind farms are expected to eliminate about 100,000 tons of CO2 emission per year, equivalent to the emissions from 16,000 vehicles.

Solar power and nanotechnology

Solar power is an even more costly way to use renewable energy to generate electricity, but nanotechnology might change that.

Connie Hughes, a commissioner with the New Jersey Board of Public Utilities, and her professor husband James, figure that lower power bills will recoup within seven years the $20,000 they paid to install rooftop photovoltaic panels that provide supplementary electricity for their 3,200-square-foot rural home. But that ignores the full $72,000 cost of the solar system, for which taxpayers, who will never recover a penny of their investment from lower energy costs, paid $52,000.

Solar power produced by silicon-based panels costs four to 10 times as much as electricity from conventional power plants, but Kanarka Technologies of Lowell, Massachusetts figures it can cut solar-power costs in half with photovoltaic material so thin it rolls off in sheets like Saran wrap.

Kanarka's photovoltaic film is a product of nanotechnology, the art of creating new materials — and potentially, machines the size of human cells — by manipulating particles smaller than 100 nanometres. A nano is one-billionth of a metre and a cluster of 100 nanos is 10,000 times smaller than the head of a pin. Nanotechnology is now used to make such products as sunscreens, car parts and clothing, with the exploding market for nano products forecast to reach US$1 trillion by 2015. Firms such as General Electric and Seimens are reportedly developing photovoltaic film to power laptop computers and cell phones, eliminating the need for batteries. One far-out concept calls for adding solar cells to automotive paint, which could generate the juice to power hybrid cars. They would be solar-powered hybrids.

Trading smokestack smog and hog manure methane

Carbon trading aims to reduce GHG emission by the least costly means. It is the proverbial biggest bang for the buck, and should thereby make larger reductions economically feasible.

In a nutshell, a GHG emitter facing high costs to reduce emissions pays someone else facing lower costs to cut emissions under the "cap-and-trade" arrangement. It buys "emission credits" from the firm with the lower reduction costs.

To date, there are no caps nor quotas requiring Canadian energy companies or other large emitters to reduce emissions, nor any provisions for carbon trading under Canadian law. But TransAlta Corporation, which releases some 30 million tonnes of CO2 equivalent per year at its Canadian power generating stations, has seen the writing on the wall. In August, the Calgary firm signed a deal to pay Chilean hog producer Agricola US$9 million over 10 years for 1.75 million tonnes of GHG emission credits. The credits will be purchased under provisions of the Kyoto Protocol's certified emission reductions, which allow companies in the industrialized world to buy credits from companies in the developing world. Agricola has spent $20 million to enable it to cut its emissions of methane gas by the equivalent of about four million tonnes of CO2 during the 10-year period. A Japanese power company has agreed to buy about two million tonnes of emission credits from Agricola.

Four lessons from the oil patch

From the century and a half since Canada launched the petroleum age with Abraham Gesner's hydrocarbon refining process and North America's first commercial oil well by James Miller Williams, there are lessons that can be learned. Here are four of them.

Lesson one. It isn't success that breeds success, it's failure that breeds success. And no sector proves that more than the oil and gas industry, particularly in Canada.

"Nothing fails like success because we don't learn from it," U.S. economist Kenneth Boulding has observed. "We learn only from failure."

The petroleum industry has been spectacular in learning and building success from failure. Exploratory drilling, the industry's foundation, is largely a matter of failure, with the old rule of thumb that nine out of every 10 wildcats are dry holes. Imperial Oil failed with more than 130 unsuccessful wildcats over a 30-year period before it made its first major, seminal oil discovery at Leduc. Nearly 40 costly dry holes were drilled off Canada's Atlantic coast before the first substantial oil discovery was made at Hibernia. Scores of geologists, scientists, entrepreneurs, and promoters persevered unsuccessfully for more than eight decades before commercial production from the world's largest oil deposit, the Athabasca oil sands, was finally achieved. Wildcatter Frank McMahon drilled nothing but dry holes for five years before he finally found success with a 40-acre lease at Turner Valley that provided the seed for one of Canada's leading independent oil companies and the country's first major gas pipeline.

The failure-to-success route worked because the rewards were worth the risks and, overall, the successes finally more than paid for the

failures. There were, of course, individual winners and losers. For four decades, British investors sought oil wealth on half a million acres of freehold mineral rights in Alberta until, with their venture in receivership, the property was sold to Calgary lawyer Eric Harvie for $10,000 and back taxes. Four years later, the properties yielded some of Canada's most prolific oil wells and laid the basis for one of the country's major philanthropies.

While there were some big, individual winners, the biggest winner was the national interest. The oil and gas resources of the West provided a domestic source for the bulk of the country's energy needs in the second half of the 20th century, fuelling economic growth and prosperity and providing the public sector, the real owner of nearly all of Canada's petroleum resources, with tens of billions of dollars in net revenues.

With a wide range of different approaches to an emerging new energy era, there are certain to be more failures in store in the 21st century — and more opportunities to succeed by learning.

When EnCana and Shell Canada abandoned Canada's most costly wildcat in early 2004, Calgary energy analyst Brian Prokop offered a trenchant comment. The Weymouth offshore well, 150 miles southeast of Halifax was drilled in 5,000 feet of water to a depth of 20,000 feet below the seabed, at a cost of more than $100 million. "You only learn from a dry hole," Prokop observed. "If it's successful, you haven't learned anything, because it's exactly as you expected."20

Lesson two. Let the market pick the winners.

Cost, development of adequate resources, security of supply, air pollution, and global warming are the major challenges confronting the industry early in the 21st century.

The range of approaches to the challenges is wide and varied, from wind power to carbon sequestration to photovoltaics in automotive paint and solar-powered hybrid vehicles. Competition in an effective market economy is the most certain way to shake out the winners and losers. Any "national strategy" that focuses on a putative winner would almost certainly be disastrous.

Governments, both national and globally, will continue to set benchmarks governing such matters as greenhouse gas emissions. But the market is the best means to meet those benchmarks.

British economist Barbara Ward once observed that the blessing of centralized planning is that it concentrates a range of economic activity in a certain direction, while the bane is that it's usually the wrong direction. The greater the number of possible directions, the greater the risk that national strategists will pick the wrong one. Better to have a

multitude of players working on different approaches until the best ones emerge.

Lesson three: We can't again afford to allow political policy to trump economic policy when it comes to energy, whether it's narrow party politics or broad political ideology. That's what happened with the National Energy Program. It was, as economists and political analysts have confirmed, firmly rooted in politics. The result was an economic disaster and a national divisiveness that shook Confederation to its core and left a bitterness that lingers a quarter of a century later.

The political risk today is the ideology that says all green energy is good and all fossil fuels are bad, ignoring the vital role that oil and gas have played, and will be required to continue playing, in meeting economic, social, and environmental needs.

Lesson four. Price is the key to meeting current energy challenges. Low market prices mask external costs, such as air pollution from coal-fired power plants, and inhibit every approach to a problem, whether it's energy efficiency, carbon sequestration, or renewable energy.

If half the energy used is wasted, as the UN's Intergovernmental Panel on Climate Change and others have suggested, it's because the price is too cheap. When energy prices soared throughout much of the 1970s and early 1980s, waste and energy demand were reduced. European motorists pay twice the price of North Americans for their gasoline, petrol, or diesel, but their vehicles go twice as far on every gallon or litre. Continued and remarkable improvements in the efficiency of internal combustion engines enable vehicles to get increasingly better mileage. Average North American vehicle fuel consumption declined with rising prices during the '70s and early '80s, but increased in the final years of the 20th century as prices once more declined — until very recently. Instead of choosing vehicles with better gasoline mileage made possible by better engines, low prices encouraged buyers to choose vehicles with more power, such as the Ford Excursion sports utility vehicle that gets just 4.6 miles per U.S. gallon in city driving, or Chrysler's two-passenger, 330-horsepower supercharged SRI-16 sports vehicle that can zoom from a standing start to 60 miles per hour in less than six seconds and is built to be driven much faster than any highway speed limits.

If, as widely expected, energy prices continue to rise, energy efficiency will increase, waste will be reduced, the gap between fossil and alternative fuels will narrow, and the incentive to capture CO2 emissions and sequester them to recover more oil from old fields, will increase.

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Oil	491 (25%)	2,405 (54%)	3,433 (32.7%)
Gas	55 (3%)	874 (19%)	2,814 (26.8%)
Coal	1,148 (58%)	710 (16%)	1,155 (10.5%)
Hydro	131 (6%)	430 (9.6%)	2,447 (23.3%)
Wood	160 (8%)	67 (1.5%)	NA
Nuclear	NA	3 (0.7%)	599 (5.7%)
Totals	1,985	4,489	10,492

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