The Harkness Files



Volume XIV

Unpublished Manuscripts

- THIS PAGE CREATED BY OGSR LIBRARY -

Index

Click text below to navigate document

PREFACE

CHAPTER I.....BOTHWELL

CHAPTER II.....OIL SPRINGS I

CHAPTER III.....OIL SPRINGS II

CHAPTER IV.....CANADA'S OIL INDUSTRY (1850 - 1860)

CHAPTER V.....MAKERS OF OIL HISTORY (1850 - 1880)

CHAPTER VI.....ONTARIO'S PART IN PETROLEUM HISTORY

CHAPTER VII.....PRODUCTION

The Harkness Files
Volume XIV
Unpublished Manuscripts

- THIS PAGE CREATED BY OGSR LIBRARY -

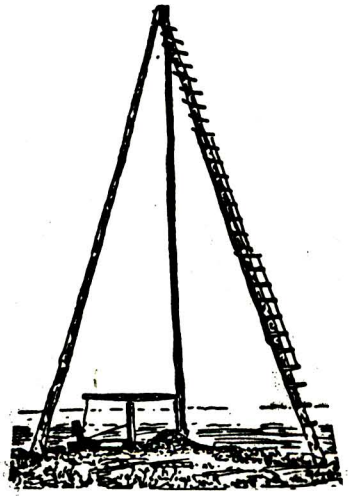
Preface

The Harkness Files
Volume XIV
Unpublished Manuscripts

- THIS PAGE CREATED BY OGSR LIBRARY -

Early Historical Record of First Oil Well in America

The William's Well, Oil Springs



Centennial Celebration at Oil Springs
June 28th to July 4th, 1958

(Prepared by Col. Bruce Harkness, former Oil and Gas Commissioner for Ontario)

Williams Well at Oil Springs

The Centennial to be held at Oil Springs is not to commemorate the drilling of the first oil well drilled, bored or dug in North America, it is to do honor to the man who dug his well nearly as deep as Drake's and of greater volume, produced crude oil, refined it, and marketed it. Drilling wells for water and salt had predated drilling for oil by a hundred years. The only reason that J. M. Williams didn't drill a well at Oil Springs in 1855 or 1857 was that it was so much easier to bring a shovel and an axe through the swamps of Enniskillen than to haul a boiler and engine over the bottomless road. The St. Catharines mineral water well was drilled to 500 feet in 1855.

J. M. Williams apparently didn't realize that Canada would do him honor on the 100th anniversary of his achievement or possibly he would have left some record or talked to some newspaper man. The fact that he didn't, has left us with nothing but an occasional reference that in most cases doesn't mention him by name.

Very definitely the first man to exploit the Gum Beds at Oil Springs was Charles Nelson Tripp. He had the advantage of two men's opinions of the possibilities of using the gum beds to advantage before he entered the picture.

Sterry Hunt, Chemist to the Geological Survey, made report in 1850 (Geological Survey Report of 1849-1850, pp. 99) that there was "from 78 to 81 per cent combustible and volatile matter" in the gum beds; and Alexander Murray, Assistant to Sir Wm. Logan, visited the spot in autumn of 1851 and described the gum beds as they can be seen today. He says in part "The upper portion of the clay was observed to be more or less penetrated with Petroleum. and small black globules of the same were scattered through the mass for a depth of four or five feet." "Bituminous oil was observed to rise to the surface of the water on Black Creek in two places on the 17th lot of Concession III of Enniskillen..."

Charles Tripp was on the scene at a very early date, as early as 1851. The writer of the Atlas of Lambton County 1880 says that "in 1852 he (Tripp) erected buildings and machinery for the manufacture of asphalt which enterprise didn't succeed; in his dilemma he enlisted the aid of Mr. Williams, since M.P.P. of Hamilton and now Registrar of Wentworth County..." "It is stated authoritatively that as early as 1854 or 1855 Tripp sank a well for obtaining water but at a few feet it filled with oil..." Tripp exhibited a sample of asphalt at the Paris Exhibition in 1855. (Canada at the Universal Exhibition, Paris, in 1855, pages 41, 48, 155, 372 and 395.) He received honorable mention for his sample. Tripp's venture came before the Railways were built to Windsor or Sarnia, and with 130 or more miles to travel from Hamilton by horse and wagon, his venture was doomed to failure. He began selling his lands in 1855 to Mr. Williams and his associates. The Sarnia Observer, January 27th, 1859, says that: "after Tripp formed the International Mining and Manufacturing Company and undertook to refine the oil and render it free from a pungent and offensive odor a dispute arose among the shareholders in 1855, and no progress was made — at least one of the shareholders Mr. Williams bought out the interests of his fellow shareholder..." He states that several wells have been dug and that "works are in the course of erection for treating the oily earth after a fashion somewhat similar to that in which the coal is treated..." The editor had already told of the progress made after Williams took over from Tripp in 1855. In his issue of August 26, 1858, he tells of "an abundant supply of mineral oil which the owners of the land were taking steps for making available for the purpose of the light etc. by erecting works thereon for purifying said oil and making it fit for use." As yet no works for manufacturing the oil into a merchantable commodity has been erected on the premise; what has been obtained has been barreled and sent to Hamilton to be prepared there..." This is undeniable evidence that Williams was producing crude oil in 1858 and sending it to Hamilton to be refined. In 1858, he must travel 30 miles over swampy roads and ferry the Sydenham River to ship his oil over the Great Western Railway from Wardsville to Hamilton. We still have evidence that this operation began in 1857.

Sterry Hunt, Chemist to the Geol-

ogical Survey, who had been familiar with this new venture since 1850, stated in his paper in the Canadian Naturalist Volume VI, August 1861, what he had learned from a visit to the field in December 1860 that "About 1853 the attention of speculators was turned to the deposits of bitumen in Enniskillen just described, but it was not till 1857 that Mr. J. M. Williams of Hamilton with some associates undertook the distillation of this tarry bitumen, when they found that by sinking wells in the clay beneath, it was possible to obtain greater quantities of the material in the liquid state." Charles Robb, a mining engineer from Montreal, read a paper before the Canadian Institute, February 2nd, 1861, and confirms Hunt's statements in every detail. He confirms statement of the editor of the Sarnia Observer that "ultimately the whole adventure devolved on Mr. Williams to whom alone is due the merit of developing this branch of industry in Canada..." Robb says that: "Williams has produced 200,000 gallons," and Hunt says "300,000 to 400,000 gallons." If we take a middle figure it is about 10,000 barrels to the end of 1860, most of which would have been shipped. Sir Wm. Logan in his report of Geological Survey of Canada 1863 enquired of the Agent of the Great Western Railway at Wyoming and found that 5,529 barrels of oil had been shipped through that station prior to July 1st 1861. This leaves a substantial margin that was shipped through the Great Western Railway at Wardsville before the Sarnia Branch of the Great Western Railway was built.

From the above figures it isn't at all unusual that Mr. Williams should have shipped oil to the refineries in the United States. Mr. Paul H. Giddings quoting the Derrick Hand Book says that "in 1858 Colonel Ferris purchased 1,183 barrels of crude oil" and that "two wells in Tarentum furnished 1005 barrels and the rest came from Canada." This would leave 177 barrels of Canadian crude oil. Mr. Allan Nevins furnishes additional information in this book.

Life of John D. Rockefeller, Volume I, PP. 155: He says that "Colonel Ferris was buying crude oil from every source that he could find and when he heard that one J. M. Williams had opened an oil field in Ontario, with pick and shovel, he hurried off to see him, bought his whole supply..." We know that he only bought the surplus that Williams could produce as he was at the same time operating his refinery in Hamilton and selling kerosene as far west as Sarnia.

In his issue of December 30, 1858, the editor of the Sarnia Observer says that "the proprietor of the land at Oil Springs (Mr. Williams) has now erected a suitable building thereon and is now manufacturing by distillation a beautiful burning oil." The price was $1.50 per gallon. In September 23rd 1859 issue, the editor quotes the retail rate by Mr. Clark the agent as $1.25 per gallon, but states that the same oil is being sold in London at $1.00 per gallon and says that "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."

From the above accredited evidence there can be no question that J. M. Williams had established a petroleum industry as early as 1858 and most probably in 1857. He had been financially interested in the venture with Chas. N. Tripp earlier than 1855 and must have been familiar with Tripp's process. He must have worked out every step through production, transmission, refining, and selling a high grade illuminating oil against the competition of the many manufactured "burning fluids" and "coal oils" on the market. Without question he was the first man to do tnis. He was awarded in recognition of this two medals at the International Exhibition held in London, England, in 1862. One was for being the first to produce crude oil and the other for his refined oils.

As in the case of the International Exhibition in Paris 1855 this exhibition was open to all nations and should establish Williams priority without any question.

Mr. Williams operated with a few friends without incorporation during these years. In 1860 he found it more convenient to protect his venture by letters patent. He incorporated the Canadian Oil Company on November 10th 1860. This company operated in Hamilton until his death in 1890 when it passed into the hands of Mr. Williams' son.

(Compliments of the Advertiser-Topic, Lambton County's Leading Weekly Newspaper)

Chapter I: Bothwell

The Harkness Files
Volume XIV
Unpublished Manuscripts

- THIS PAGE CREATED BY OGSR LIBRARY -

Harkness Original Apr 1961
Corrected Nov 14 1961
Feb 10 1964

BOTHWELL
1860 - 1870

CONTENTS

OIL SEEPAGES	1
EARLY WELLS	2
JOHN LICK	7
BOTHWELL FROM THE KENT ATLAS	9
BOOM AND BUST	14
THE FIELD ABANDONED	22
OPERATORS AND FAMOUS WELLS	19
THE FIELD ABANDONED	22 - 24
REFINERIES	26
PRODUCTION	27
GEOLOGY AND STRUCTURE	28
ENTERTAINMENT	31

BOTHWELL

1860-1870

In the previous chapter on the first decade of the Oil Industry in Canada 1850 - 1860, Bothwell was merely introduced into the industry. Wells were being drilled from the "Oil Springs on the Thames", the land mark of 50 years previous, to Cashmere.

The Thames River flows through a valley that is narrow in the lower reaches and broad and shallow in the upper reaches. At Bothwell the river bed is in a trench with the high banks removed from 100 feet to 100 yards from the river. Before the railway was built the river was navigated by the small sail boats that were in use on the great lakes. The head of navigation was at Cashmere two miles upstream from Bothwell.

OIL SEEPAGES

Cashmere is worthy of notice as it was at one time a busy road terminus where the Longwoods road ended and navigation began. The new railway built in 1854 to Windsor had closed navigation permanently and there was nothing left but Gardner's Mill which provided the settlement with lumber. Long after Cashmere had vanished, Gardner's Mill could be identified by the great square timber sills in the river bed.

Oil and gas seeped from the banks and bed of the stream from Gardner's Mills downstream for three miles or more. Gas and oil was found at shallow depth in every well drilled or dug. Each well drilled or abandoned simply added to the enthusiasm of the prospector.

EARLY WELLS

Pioneer drilling at Bothwell differed greatly from that at Oil Springs and Petrolia. The railway station was only a couple of miles from the first operations and the country was sandy. Road building here therefore no problem. Engines and boilers could be had at Chatham and the service of a heavy blacksmith was also available there. A small amount of pipe could be brought from American mills for so far as is known, no Canadian mills were turning out any pipe suitable for use in oil wells in 1860. Foundries and machine shops advertised pumps for oil wells and refinery equipment in the newspapers of every large town west of Toronto in 1862 and possibly earlier.

The Chatham Planet, May 4th, 1865 carries an article comparing Bothwell with Oil Springs that reads in part, "The Bothwell Oil Region possesses many advantages over that of Enniskillen. Oil Springs to Wyoming is 13 miles over a very bad road. Bothwell to the railway station is from 2 to 3 miles. Freight to Wyoming is one cent per gallon, while to Bothwell it is 1/2 cent per gallon. For the same reason lumber, machinery, pipe, etc is much cheaper (at Bothwell). At Enniskillen it is seldom as much as 80 feet to rock while at Bothwell it is from 106 to 180 feet. The first operators in 1861 to 1863 tried curbing to the rock, but quicksand and water prevented this. Later they used an auger and bored a 10 inch hole to 12 or 15 feet where they insert heavy stove pipe of the same diameter; they then reduce the bore and work down ed with lengths of smaller diameter until the rock was reached. The hole would then be about 5-1/2 inches (in diameter). Wood piping was sometimes used. The surface was bored

General McDonald of Madison, Wisconsin, Colonel Cross, Captain Lester, Captain Wiggins and Captain Young. Geo. Gatling altho not an army officer was a brother of the famous Gatling who invented the machine gun called after him and used in the Civil War with devastating effect. Chas. Gunsell started a well in 1861 and shortly went to the war, not to return to Bothwell. Dr. Faulkner of Erie, Pennsylvania was a medical officer in a New York unit which he rejoined in 1861.

The first complete description of the Bothwell field is given by the Globe Special Correspondent who visited it in August 1861. He says: ~~Toronto~~ Daily Globe Aug 24th 1861

(article on THE OIL REGION, its position, resources and capabili ties -

Bothwell, Friday, August 23, 1861)

(see pages 4 and 5 of hand-written manuscript)

Anyone who visits the Bothwell field armed with the several newspaper reports of the 1860's will find himself completely baffled by the lengthy descriptions of wells and locations with no starting point. There is no lack of evidence of old wells along the river bank and in the high land for 75 to 100 yards from the river bank, but they cannot be fixed to the descriptions. For instance in the Globe, August 23rd, 1861, the No. 1 well is not described in a township lot or farm and this makes the ~~description~~ location of the others ~~of no use~~ impossible. But by comparing this with an earlier report from the Sarnia Observer, May 11th, 1861, places two wells (drilling) at Cashmere and Dr. Faulkners well on the Postill farm in Zone Twp. The lot is ..... RR in the Indian Reserve, Shephards well in the river bank at Gardner's Mills and Jordan's well on the Allen farm. The correspondent would leave the impression that the well was on the high land above the river but it cannot be as there is no sign of a well on the brow of the hill on Allens farm. It must be ~~on the~~ Old Company well on lot 22 Indian Reserve river flats where there are many pits. The well was completed at 40 ft. not through the surface. Gunsells well not through the surface, may be represented by a pipe sticking out of the ground about 6 feet high and 30 yards from a pit. It was never completed. John Ricks well is on a 5 acre lot on the Allen farm on the town line, commenced on June 15th, 1861. He dug and drove a pipe to 70 feet with a drilling rig powered by a 10 H.P. engine. He has the only drilling rig in Bothwell at the time. Duncan & Clark are drilling on the south side of the river, hold 15 acres in lot 19, Con. I, Orford township; 1/2 mile down stream from one of

the large seepages in the river. They have dug a well to 35 feet. Later they drilled several small producers on this lease.

The Chatham Planet. April 6, 1862 (dated Cashmere, March 30 1862) says that Dick was boring and driving when he hit something solid. He bored another well 30 rods distant. After boring through 4 ft. of sand and 26 ft of clay he pulled his auger and a roar of gas followed.

The Globe of May 11th, 1863 may tell of the second well started at Bothwell but not completed because of the difficulties met with, mostly quicksand. The No.2 well 20 rods from No.1 (The Tripp well of 1857) and a short distance north of the river, begin two years ago last August" which would date it in August 1860. It was dug and drilled to 137 feet, where it was abandoned.

In Mosa Township the wells at Gardner's Mills can still be traced by pits where the dug wells have caved in. There is a very large hole 10 feet in diameter and six feet deep on the bank of the river. The present operator of the farm says that he has filled up and ploughed over three other pits in the vicinity. The location of Licks and Jordons wells on the Allen farm, as well as others, are identifiable by pits still quite easily distinguished and an iron pipe protruding four feet from the ground near a pit full of water. Across the road in Zone township along the river bank on the north side a line of pits extend across lot 21 into lot 19, marking the dug wells in the early 1860's.

John Lick

The well that has caused the most confusion is the third well drilled by Jordon & Lick and known as "Licks well" or the "Old Company well." It is No. 3 of the May 11th, 1863 dispatch and the only location given is "50 rods from No. 1 on much higher ground being on the brow of the hill". The correspondent goes into a half column description of the Allen farm and has left no doubt that the well is on this farm. However, it is not on the Allen farm but just across the road on the Colville farm, lot 21, R.R. Zone; the old Indian Reserve. The owners are, Jordon and Lick 1/2 interest and Joseph Swalwell, Capt. Taylor and Mr. Gardner, the remainder. It was begun on September 1862 and dug to 70 feet deep, eight feet square, then drilled to a total depth of 224 feet. Oil was found at 181 feet beneath 6 ft. of soff white stone (limestone) The well cost $1500 exclusive of the boiler and engine which cost $1600. The well flowed two 500-barrel tanks full and filled the dug well which held 1000 barrels. It is rated as a 150 barrel well. The company is incorporated as the Thames Oil Co.

There are quite a number of pits on lot 21, R.R. on the brow of the hill at the township line and for some distance north. On the Bothwell map of May 5th, 1866, it is marked at least 1/4 mile from the top of the bank of the river and about 100 yards from the road (township line and county line) whereas the well is described being on the brow of the hill and on the "township line". There is a pit now to be seen that answers this description and is also marked on the map. Two wells in Licks ravine shown in the photograph can both be identified, the one on the top of the bank by a well defined pit

a

and the other in the bottom of the ravine, has a pump in it and on occasions, pump oil. The Globe April 26, 1863 says that Licks big well is in Zone a few rods from the river and on the town line. The description of the location in two independent reports, are "on the brow of the hill" could not be mistaken for the location marked on the map of 1866. It was 224 feet deep, 175 feet of surface and 49 feet in the rock, later deepened to 435.

Photo

of

Licks

Ravine

Two Wells

The writer of the history of Bothwell in the Kent Atlas of 1880 says that Lick received $1000 for his first shipment of 1000 bbls of oil. The partners in the Thames Oil Co. met on the town line road near the well and using a large fallen tree on the road for a counter, divided the $1000 among the shareholders as a first dividend.

Licks well came in about April 20th, 1863 just after the Oil Spring "flowing wells" stopped and when oil was at an all time low. The refiners and large distributors sensed a coming shortage and began to buy oil. Lick evidently caught the upswing when he received $1.00 for his oil. His shipments that followed, each brought him a better price until in 1866 the price reached $11.00. Lick and his partners were then wealthy men. In November 1866, Capt. King opened up the King district PAGE 18 FOLLOWS HERE that sent such a flood of oil on the market that both Oil Springs and Bothwell were "drowned in the flood".

THE BOTHWELL STORY ACCORDING TO THE KENT ATLAS

The historian of the Kent Atlas (believed to be Capt John Taylor) tells the story of the excitement that shook Bothwell after Mr. Lick's well was producing its best, about 150 barrels per day.

"The price of oil went up like a rocket closely followed by the price of land. The well referred to called the 'old company's well' continued pumping about 100 barrels per day until about 30,000 barrels had been discharged ..... The 'boom' in oil lands had already reverberated over Canada and the northern states and thence forward each train brought large numbers of speculators to Bothwell, some of whom engaged in boring and some went immediately to work erecting stores, hotels,

The writer of the history of Bothwell in the Kent Atlas of 1880 says that Lick received $1000 for his first shipment of 1000 bbls of oil. The partners in the Thames Oil Co. met on the town line road near the well and using a large fallen tree on the road for a counter, divided the $1000 among the shareholders as a first dividend.

Licks well came in about April 20th, 1863 just after the Oil Spring "flowing wells" stopped and when oil was at an all time low. The refiners and large distributors sensed a coming shortage and began to buy oil. Lick evidently caught the upswing when he received $1.00 for his oil. His shipments that followed, each brought him a better price until in 1866 the price reached $11.00. Lick and his partners were then wealthy men. In November 1866, Capt. King opened up the King district that sent such a flood of oil on the market that both Oil Springs and Bothwell were "drowned in the flood".

PAGE 18 FOLLOWS HERE

THE BOTHWELL STORY ACCORDING TO THE KENT ATLAS

The historian of the Kent Atlas tells the story of the excitement that shook Bothwell after Mr. Lick's well was producing its best, about 150 barrels per day.

"The price of oil went up like a rocket closely followed by the price of land. The well referred to called the 'old company's well' continued pumping about 100 barrels per day until about 30,000 barrels had been discharged ..... The 'boom' in oil lands had already reverberated over Canada and the northern states and thence forward each train brought large numbers of speculators to Bothwell, some of whom engaged in boring and some went immediately to work erecting stores, hotels,

boarding houses, etc. A second well was sunk some distance west of the first, on the Chambers farm, just south of the town, by a man named McEwan; this being quickly followed by a well on the Gordon farm opened by Wm. McMillan and called the Victoria well, which yielded 100 bbls. per day. Mr. McMillan was among the most important and extensive of the early operators here, but he soon sold out his interests to Mr. Pease of New York (New York City Oil Co.) a gentleman who formed the advance guard of a legion of American operators who now began to flock to Bothwell with practically limitless wealth, which they lavishly, and in some cases, injudiciously expended in the attempt to 'strike ile' both literally and figuratively".

"That commodity in its crude state had by 1864 risen to ten dollars per barrel. The market rose to this degree of buoyancy by the American War, and the temperature of Bothwell's commercial system rose from fever to boiling point. Speculation and inconsiderate expenditure of money ran rampant. The glowing prospects of the town inflated prices beyond reason..... Companies were organized in almost every city of Canada and the north, to carry on the petroleum business in Bothwell, the speculators El Dorado; wealthy corporations sent representatives to superintend the purchase, boring or operation of wells, whose business qualifications displayed themselves in riotious living among the attractive hotels and less reputable institutions which the excitement had called into existance, while their companies business progressed as best they might. Wells were sunk without regard to ppocedure or

prospects, there being a full compliment of 'sharks' ready to sink them in any spot selected, at such prices as the speculators would consent to pay; and having this secured profitable contracts for boring at so much per foot, it is not surprising that in many instances they kept boring until the petroleum veins were passed and veins of water pierced, the water from which drowned out the oil and destroyed the utility and prospects of such wells. Notwithstanding these disastrous circumstances, however, the oil producing business flourished; a forest of derricks flanked the London Road from the Mosa town line two miles to the west, while the territory between the road and the river was studded with similar evidences of enterprise and industry."

"In 1865 the Hon. George Brown sold out his interest in the land hereabout to a company of Scotch speculators, incorporated under the name of 'Bothwell Land and Petroleum Company' but better known as the 'Scotch Company' who operated more extensively than successfully in oil from that time until the decline of the enterprise....."

"In the meantime many fortunes had been lost and won in the petroleum trade at this point; several men whom the outbreak of the excitement found in poverty had become immensely wealthy, while an exactly opposite condition of affairs was experienced by others. A number of "oil kings" had arisen among whom were John Lick, the original discoverer.... B.T. Wells and a Mr. Reed of Hamilton.

The Lick Ravine and the Pepper Farm were transformed into vast pumping grounds ..... with the outbreak of the Fenian Raid, however, in the summer of 1866 fears of war between our country and the United States materially curtailed the speculative spirit of the American element -- and even induced the removal of Americans in large numbers. This proved the turning point in the history of the enterprise ..... now came the decline..... accelerated by the fall in the price of crude oil from twelve to two dollars per barrel."

"The anxiety of operators gave way to panic succeeded by a stampede from the territory - - - The operators 'stood not upon the order of their going but went at once' leaving in most instances their entire plant and machinery just as it had been used. The rush of travel and crowds of transient residents (the Great Western Railway was at one time running six trains per day to and from London) ..... induced the building of numerous immense hotels .... through the entire area of operations. The most extensive and elegant was the 'Green Mountain House' on lot 19 on the River Front between which and the railway depot a line of omnibuses ran at short intervals during day and night. These hotels were likewise deserted and, with few exceptions, were either burned or wrecked soon after."

"As the development of the oil interests had benefitted, so the collapse crushed the commercial status of the town. During the height of the speculation either side of the main street from the railway grounds

to Oak Street, had been built up with business blocks some of which were three stories high and of brick; including hotels, banks, billiard halls, gaming houses, and the numerous other institutions usually found in a town possessing a population of six or seven thousand, the larger number of whom were transients as was then the case with Bothwell. A magnificent public hall, called Gatling Hall, after the owner, a brother of the inventor of the famous Gatling Gun, graced George St. West, frontin g the railway, while just west of it stood an immense frame hotel built by John Lick and which had been opened but a very short time when the crash came that left Bothwell a commercial ruin".

"In 1867 (February 10th) after many of the attractions had deserted the town, a disastrous fire swept away the major portion of the finest buildings, devestating George and Main Streets for considerable distances and including Gatling Hall in its course. The hotel built by Lick was abandoned upon the bursting of the oil bubble and has not since been occupied."

Continuing the account from the Atlas in a condensed form, - "the growth of Bothwell from a most commonplace and unattractive village without even a church, was so precipitous following the oil boom that without ever having been incorporated into a village, and because it became too cumbersome for administration by the township, a special Act of Parliament was passed in 1866 incorporating it as a town taking effect in 1867. The first council was Capt. John Taylor, mayor,

John C. Collier, Reeve. Capt. Taylor had been secretary to Hon. Geo. Brown and conducted his affairs in his absence. He was Postmaster and Clerk of the Division Court.

Boom and Bust

In 1864-65 the Kent directory gives the population as 300. The Atlas says six or seven thousand in 1866. Bothwell indeed had a boom.

The statement by the historian ~~who gives the history of the Bothwell boom~~ in the Atlas, that drillers who had favourable contracts drilled past the oil horizon to their contract depth, is confirmed by Mr. Archibald Blue, Director of the Bureau of Mines Ontario in his Report for the year 1896. He quotes a drilling contract dated January 14th, 1866 in which the well owner agreed to ~~furnishes~~ the contractor the engine, fuel, light water, lubricating oil and the surface casing, and pay the contractor $2.75 per foot to complete a five inch hole "to 700 feet or such lesser depth should oil be found". "These terms were so favourable, old timers of Bothwell now affirm, that in many cases the contractor cased off the oil when a good strike was made in order that he might increase his earnings by sinking to the contract depth, regardless of the interests of the party of the first part (the owner). And so it came to pass that the oil field became in time flooded with salt water (from below the oil) which had to be pumped out at a heavy cost after each Sunday's rest....."

Of prospecting in the early days Mr. Blue says "There was no science to direct the mind of the oil king or the well driller, the practice commonly followed was to let a contract at a certain rate

per foot under which borings were carried down until oil was struck, or were stopped for want of funds or were abandoned in despair....."

The various writers make a point of the American investors leaving in 1862 to join in the Civil War, and of their return in 1865-66 only to leave again in the same year to escape the country before war should break out between Canada and the United States, because of the Fenian Raids from American soil. Their departure was so shortly afterward followed by the drop in the price of crude from $8.00 in 1862 to 75 cents in 1863 and from $10.00 to less than one dollar in 1866-1867 that both events combined to bring about the closing of the field. Probably 70 per cent of the wells were owned by Americans and 25 per cent by the Scotch Co and Dr Pope. The remaining wells changed hands at such short intervals that their ownership cannot be traced penetrating a heavy water sand below the oil.

An interesting sidelight on the operations of the '60's is given in this report (Archibald Blue, Ontario Bureau Mines 1896, p.18). In the statement of a Mr. Newell of Bradford, Pennsylvania, who was the manager of the largest well at Bothwell at that time. The following is his story: "I was a member of the Pepper Well Oil Company organized to operate the Pepper well south of Bothwell, and I came here as manager in 1864. The sum paid for the property, which included thirty acres (easterly 30 acres, lot 19, R.R., Zone township) with one well down, was $20,000. At the time I took charge it was not producing oil in paying quantities. Pumping was continued about ten days, during which the oil came in spurts, but steadily increasing

in flow. The output was kept up at 100 barrels per day until the company leased four portions of its lot, and when wells were put down upon them our supply fell off to 40 barrels per day. We operated the well until some time after the Fenian invasion of 1866, but that disturbance caused a large number of American owners to desert their wells and leave the country, and as the pumping ceased the salt water steadily rose and drowned out most of the wells in the locality. Ours then ceased suddenly to produce. There was nothing to indicate that the supply in the rock was exhausted, but simply it was shut off by the rising waters. I left the country some time in 1866, but soon after the company dissolved. I returned to Bradford, and with the experience I had gained in Bothwell was able to go into the business successfully there. The Pepper well was afterwards sold at sheriff's sale and I bought it for my wife, in whose name it now is. It was always allowed by the refiners that the quality of the Pepper well oil was superior to that of all other wells in the field, and it sold at 50 cents per barrel more. The usual selling price was $6 per barrel, but we sold as high as $7. I was third owner of the Lancy well at Petrolia, which was reported to yield 4,000 barrels per day, but I never got a dollar of it. The large production at Petrolia caused a drop in crude to 50 cents per barrel, and this along with the Fenian trouble led to the desertion of Bothwell. I never saw such a lively time as at Bothwell during the palmy days of the oil business, except at Petrolia."

PHOTO OF PEPPER WELL 1866

Some of the American officer operators who left in 1861, returned in 1865 with other retired officers and became the most active operators in the field. [illegible] "The Globe", June 5th, 1865, quoting a dispatch from the Bothwell correspondent of the New York World says: "The largest well in Canada is here; it produces 400 barrels per week. About 50 wells are going down this spring, largely owned by Officers of the Union Army, Labor $1.50 per day. Wood $1.25 per cord. A well costs $3,000." It is quite obvious that when the Fenian invasion threatened this country in 1866 that these and other Americans returned to the U.S.A. to avoid any international incident that might occur.

The map of the Bothwell field of 1866, already mentioned, shows 203 producing wells in the field of which 31 wells were being pumped. It is easier to understand Mr. Newell's statement with this information.

REPRODUCTION OF 1866 MAP OF BOTHWELL FIELD Here

The man who profited most from Lick's well was Hon. Geo. Brown. He sold his land(less the town lots inBothwell) for $270,000. The purchasers were the Bothwell Land & Petroleum Co. better known as the "Scotch Co." began operations on a grand scale, with a resident General Manager, Secretary, Treasurer and Manager of farms, [illegible] oil wells and lands. The company was well financed and the largest operator in the field. They brought miners from Scotland and used no steam or other power than manual power until the price of oil dropped and forced them to use steam power.

THIS SHOULD GO IN ON PAGE 3

Lick continued his operations by himself and with his old partner Jordon and others. He made a location in Big Hollow creek (now known as Lick's ravine) and brought in a 200-barrel well in August 1864. He also drilled another well near his big well (known as the Old Company well) and in the next year a third well. In August 1864 the Chatham Planet says that he has drilled his fourth well. In 1865-66 he drilled one or more wells near his well in Lick's Ravine. It is impossible to fix the location of any of these wells drilled by Lick excepting the Old Company well and the two wells in Licks ravine, he appears to have outdone others in bringing in big wells. On two occasions he sold a one half interest in a well just brought in, one another for for $20,000 and $27,000 dollars. He sold his first big well to Benson-Turner Co., Chicago, for $70,000 greenbacks. It has just been related that Lick built the largest hotel in Bothwell that was finished at the same time that the oil market crashed in 1867, and never welcomed a guest. Mr. Victor Lauriston of the Chatham Planet and well known author is a native of Bothwell, completes the story of Lick, he says, "Lick's wealth had vanished but he could not quit the game. Years later he drilled for oil near Thamesville without success.....On a wintery day he died in his lonely lodgings at Bothwell. Old Dr. Pope who had practiced medicine (and operated oil wells and Oil Springs) in Bothwell, in the days before the boom, and had seen its hectic excitement rise and fall, passed the hat and collected enough money for a plain coffin. John Lick greatest and most spectacular of Canada's early 'oil kings' was buried in an unmarked grave in the Potters' field in Bothwell cemetery".

OPERATORS IX

A list of operators in the Bothwell field as they appear in the newspapers appears below, also some owners of oil lands that appear on the land register in 1860-65.

1863 Wilcox and Stone, proprietors of the Wilcox Mills in lot 30 Gore of Mosa, on the Orland Allen Farm

The Scotch Co., Mr. McEwen, Mgr. succeeded by Mr. McMillan, largest operators in the field.

Thayer (of Boston) - The International Petroleum Co. of Detroit
25 acres Swalwood farm lot 15, R.R. Zone.
25 acres lot 20 Gore of Mosa.

Taylor and Hall

Colville, owner of Colville farm, lot 21 R.R. Zone and a number of wells in other locations.

(ed)

Lick (Thames Oil Co.) ownedwells alone and with Jordon.

Chambers, of Ingersoll, lot 15 R.R. Zone, of Ingersoll, Zone Oil Works. Sold to Scotch Co. Chambers has 2 wells on his farm and has bought the St. An drews farm. He has sold to the Scotch Co.

E.B. Adams and one Fitch appear on the register as holders of oil leases.

1864 T.B. Wells and Reid of Hamilton.

Dr. Pope and Brother (Kent Oil Co.) also Pope and Knight 8 or 10 well.

Squire Gardner (of Gardners Mills, Cashmere) well owner, 28-29 Front Con. Mosa twp.

Mr. Benjamin of Montreal owned some wells but sold them.

Canadian News Dec. 22/64 Jan 7 "In 1864 there were 29 wells drilled and 7,714 barrels of oil shipped from Bothwell"

Andrew Torbell

1865 John Raines (Geneva and Lima Oil Co. of New York) bought Wilcox & Stone 20 ac. lot 30, Gore of Mosa 31 ac. lot 21 R.R. 20 & 8 with the Reed well. and Bone Mosa.

Pease (New York City Oil Co.) bought some producing wells on the McMullen, and one on the Pepper farm.

McDonald & Co. (International Co. of Wisconsin)

Wellington Newton Co., Hamilton, have wells on the Colville farm.

Prince and Bone, Windsor and New York Co. have the Hummingbird and other wells.

Chas. Newberry, Hamilton Oil Co.

with McLure, W. Niles, Lister with one well, and White are well owners

Benson and Turner of Chicago, probably own the "Chicago" well on the Fleming farm, lot 27 Con.I, Mosa where they had a good show at 350 feet.

Jordon Lawrence Co. of New York

Petroleum Assoc. of New York (Pease) 2,200 acres.

These are the only company and individual names known, some of the individuals named may have operated companies.

PHOTO OF VICTORIA WELL 1866

FAMOUS WELLS AT BOTHWELL

	Lot	Con.	Township	Farm	Bbls. per day	Depth	
Lick	21	R.R.	Zone	Colville	200		(Old Co. well)
Lick Ravine	20	R.R.	Zone	Atwell	100	224	
Victoria	13	R.R.	Zone	McRoberts	100	465	
Colville	21	R.R.	Zone	Jas. Colville	200		
Pepper	19	R.R.	Zone	Pepper	300	deeped from 367 to 420	Clay 120 Shale 160 Lime 140 Total 420 Oil at 210' in rock
Chambers	15	R.R.	Zone		100	385+	
Wilcox	30	Zone	Mosa	Allen	400	500	Surface 175 Rock 325
Empire		Clay 120, Shale 160 Lime 140				420	Surf. 120 Shale 160 Line 140
Michigan Well	30	RIN	Mosa	Tipperary			
Dr. Pope's	13	R R	Zone	Atwell	No.1 300 No.2. 100		near the Victoria well.
Badger Well	21	RR.	Zone	Colville ravine	233		70 rods from Licks well Came in late in 1865
Lister well					125		
Cumberland	Flats of Pepper farm near river					257	(Jan. 1866)
Thames	21. R.R.	Zone		Colville Farm		618	Sulphur water

This last well, the deepest in the field in 1866 along with many others deeper than 350 ft (where most oil was found) drilled into salt and sulphur water and helped flood the field.

Drilling was carried on along both banks of the Thames River from the east edge of Camden township, Kent, to the Great Bend of the Thames at the east end of Aldborough Township in Elgin County. Newspapers reported from 200 to 300 wells being drilledin 1865 - 1866. Shows of oil were got as far east as lot 6, Con.I of Aldborough Twp. and lot 26 on the river front of Mosa Township. Altho Dr. Sterry Hunt had visited the field in Sept. 1866 and explained to the operators the nature of an anticlinal fold and by taking elevations of the wells, how to locate wells toward the crest of the anticline, the operators preferred to criticize rather than follow advice; had they done so they might have found the western extension of the Bothwell field, which was very much larger than the two small pools that they found in 1862-66. This field was left to Mr. Frank Carman to discover in 1895 in exactly the way that Hunt advocated in 1866.

THE FIELD ABANDONED

An intensive and complete search of all the information on the Bothwell field that can be found, leaves one convinced that the oil men of the '60's were very much in need of a good oil scout service. There is nothing to show that any of the operators made any record of the depth to the oil or water horizon. They seemed to follow the river's course in locating their wells, although all the big wells that produced any oil were some considerable distance to the north of the river. The exception was the Gatling well on lot 21, Con. XV of Orford Township. This well flowed for a few hours and some 300 barrels went to waste. It very quickly settled to be small pumper. All other wells were very small wells or were abandoned, having been drilled

into the underlying water horizon. At least fifteen wells were drilled to the salt water horizon and 10 of these to the sulphur water horizon in the Detroit River formation another 200 feet deeper. Only in 15 out of a total of 68 wells that are recorded as producers, is the depth to the oil pay given. The reports of initial production in very many cases are quite ridiculously high. Wells that did not make 100 bbls. per day initial were most often deepened, only to pass into the salt water horizon below. A larger engine boiler and pump would then be installed and after pumping for several days, the salt water level would be lowered and oil would appear, making the prospects very bright. But in a week or two the well would not be making any more oil than before it was deepened and very probably less. Lick seems to have been one who analysed the conditions of his wells and profited, altho he deepened a well that he drilled beside his first producer (The Old Company well on lots 21, R.R. Zone) and had to abandon it. By the end of the year 1865 all wells deep and shallow were pumping large volumes of water. In each dispatch "Lick's" well is rarely missed. The production is given from 20 bbls. to 100 bbls. per day but the reporter never takes the trouble to state to which one of Lick's five or six wells he refered. Similar reports on the Pepper, Victoria and other wells may be found.

For these same reasons any attempt to arrive at production figures meets defeat. "Lick's" well (i.e. Jordon & Lick well, the Thames Oil Co. well or the Old Company well which is the same well) was completed in May 1863, a 200 bbl. well, and flowed two 500 bbl tanks full and then the dug well 8' x 8' x 70', said to be 1000 barrels (but about 800 present

day barrels). The next report says that Lick sold 1000 barrels and that the well was doing 1000 bbls. per month. The well was reported in May 1864 as producing steadily at this rate, that there was 1500 bbls. of oil on hand and that in February 1864 it had produced 6000 bbls. In January 1864 there were five wells pumping steadily every day and in February a dozen more averaged 15 to 20 bbls. per day each. In March '64, Lick's Old Co. well was rated as 15 to 20 barrels per day. On June 8th, 1864 the report says that at its best Lick's well shipped 300 barrels in six days. This would surely support the 1000 bbls. per month figure. A later report says Old Co. wells production is 4000 bbls. in Aug. 11, 1865, it says that "Lick's" well produced 7000 bbls. to date (which well?) and with a heavier engine will pump 100 bbls. per day. From this point forward the Lick wells are hopelessly confused.

In spite of the pessimistic statements, the field was still active. A report of January 17th, 1867 says two Toronto companies had put eight 15 to 20 H.P. engines to pumping. The refinery with a capacity of 100 bbls. per week was in operation in 1870 and 71.

The Toronto Leader reviews the year 1866 under date of Nov. 15th, 1866:

"The oil business is at a standstill. Bothwell has not stood the test. The production is not in proportion to the money spent. People have been terribly victimized. Bothwell has been advertised beyond any other place; we are made to believe it is the centre of the oil industry. Oil Springs is not quite so bad, although operations are nearly suspended. Petrolia is the only place active though the price has dropped from $10.00 to $3.00 per barrel. The price must go to $6.00 to make operations pay. The Fenian Raid 1st June and the suspension of the Habeous Corpus Act made Americans feel very insecure. The bitter experiences of the Civil War and the increased price of gold has kept their (American) money at home."

Although all the wells in Bothwell did not cease pumping, the place as an oil field did close down. The refinery provided an outlet for anyone who had a well located high enough on the structure to pump oil with a minimum of water. Actually a few wells continued to pump oil and the field was reported active to some extent in 1875.

Thus ends the first phase of the Bothwell Oil Field. The second phase was in 1895 when the western extension of the field was discovered. It lay at least half a mile west of the old field that has been the subject

REFINERIES

The Bothwell oil field had the most favourable location than either Oil Springs or Petrolia, being one and one half miles from the Railway Station, and with good roads in any month of the year, . The oil could be delivered to the refineries at London, Hamilton or Detroit at lower cost than from Petrolia. Even with this favourable situation, a further economy could be effected by refining the oil in the field. Kerosene had a ready market with lubricating oil second. This accounted for 60 to 75% of the crude. Tar and coke was in the late 1860's at least, burned under the stills; only a small fraction was wasted. By this means from 25% or more, of the freight rate was saved.

The opportunity to build a refinery was seized very early in the history of the field. The Globe, May 11th, 1863 says "We understand that Mr. Geo. Brown has leased an acre of ground in the Bothwell field to a person named Kittelwell, at one time an engine driver on the Great Western Railway, who is going to erect thereon at once, an oil refinery for the purpose of refining the oil that is produced at the wells ..... He expects to have it in operation in 20 days. An American Company also has it in view to build a refinery at Chatham".

Evidently Mr. Kittelwell did not make a success of his venture for the Canadian News, Dec. 22nd, 1864, says "The Bothwell refinery after having been idle for upwards of a year is now in operation by Mr. Brake who for two years was employed by Duffield Bros. of London.

second. This accounted for 60 to 75% of the crude. Tar and coke was in the late 1860's at least, burned under the stills; only a small fraction was wasted. By this means from 25% or more, of the freight rate was saved.

The opportunity to build a refinery was seized very early in the history of the field. The Globe, May 11th, 1863 says "We understand that Mr. Geo. Brown has leased an acre of ground in the Bothwell field to a person named Kittelwell, at one time an engine driver on the Great Western Railway, who is going to erect thereon at once, an oil refinery for the purpose of refining the oil that is produced at the wells ..... He expects to have it in operation in 20 days. An American Company also has it in view to build a refinery at Chatham".

Evidently Mr. Kittelwell did not make a success of his venture for the Canadian News, Dec. 22nd, 1864, says "The Bothwell refinery after having been idle for upwards of a year is now in operation by Mr. Brake who for two years was employed by Duffield Bros. of London.

The refinery has two stills of 5 barrels each and will turn out from 25 to 30 barrels per week."

The Essex and Kent directory of 1870 - 71 says that Messrs. Prince and McCullock established the Zone Oil Works in Bothwell in 1867. The capacity was 600 barrels per week refining illuminating oil. In 1870 it had 20 employees and a 15 HP engine supplied the power for pumping the Oil within the refinery. The list of operators at this date is given and Mr. E.S. Chase, John L. Lick and Prince and McCullock are found therein. This is a further proof that all the wells did not close down.

PRODUCTION

As regards the production of the field, a dispatch dated Dec. 22nd, 1864 says that 133 carloads were shipped. We have only 1862 figures on a carload, at that time a carload was 58 barrels (individual barrels). This would make a total of 7,714 barrels but it was probably twice this. Canadian News says that "The year 1866 saw the peak of production and the shut down of the field. January production was double December and February was double January. March was on the way to exceed February. A dispatch from Petrolia in February 1867 says that the Bothwell and Petrolia production for the year ending Sept. 1st, 1866 was 77,000 barrels." Globe, January 8th, 1866 put the "potential (Bothwell) monthly production at 5,000 barrels". This must be December 1865. The Canada Year Book, 1868 says "In 1865 - 66 the district at Oil Springs was abandoned in favour of Bothwell where about 200 wells were put down and some 40,000 barrels of oil obtained...." The field has been shut down since the fall of 1866. In January 24, 1867 the oil on hand was 6,500 barrels, and the price $1.50 to $2.00." Even an Einstein would shrink from translating these figures into annual production.

In the From the few records available, the following is the best estimate that can be made of the production of the Bothwell Field.

Year	Wells Pumping	Price	Annual Production Barrels	
1863	5	$2.00-$3.00	6000	barrels produced in February from 5 wells
1864	Jan. 23	$3.50-$4.00	7714	" shipped in December 1863
1865		$6.00	10000	" April 65 - 7000 bbls. in last year
				Dec. 5000 " produced
1866	Mar. 31	Jan. $11.	60000	" January 10,000, Feb. 20,000
		Dec. $3.		March 20,000
1867		$1.50 - $2.00	7500	" 6500 bbls. on hand, later sold

With the end of the Civil War in 1865, American Oil Fields came back into production. Their prices were from $1.00 to $2.00 higher than Canadian prices. The duty on Canadian oil was raised but with a drawback when it was manufactured. American operators in Bothwell sold their oil through

February. A dispatch from Petrolia in February 1867 says that the Bothwell and Petrolia production for the year ending Sept. 1st, 1866 was 77,000 barrels." Globe, January 8th, 1866 put the "potential (Bothwell) monthly production at 5,000 barrels". This must be December 1865. The Canada Year Book, 1868 says "In 1865 - 66 the district at Oil Springs was abandoned in favour of Bothwell where about 200 wells were put down and some 40,000 barrels of oil obtained...." The field has been shut down since the fall of 1866. In January 24, 1867 the oil on hand was 6,500 barrels, and the price $1.50 to $2.00." Even an Einstein would shrink from translating these figures into annual production.

Is the From the few records available, the following is the best estimate that can be made of the production of the Bothwell Field:

Year	Wells Pumping	Price	Annual Production Barrels	
1863	5	$2.00-$3.00	6000	barrels produced in February from 5 wells
1864	Jan. 20	$3.50-$4.00	7714	" shipped in December 1863.
1865		$6.00	10000	" April 65 - 7000 bbls. in last year
			Dec. 5000	" produced
1866	Mar. 31	Jan. $11.	60000	" January 10,000, Feb. 20,000
		Dec. $3.		March 20,000
1867		$1.50 - $2.00	7500	" 6500 bbls. on hand, later sold

With the end of the Civil War in 1865, American Oil Fields came back into production. Their prices were from $1.00 to $2.00 higher than Canadian prices. The duty on Canadian oil was raised but with a drawback when it was manufactured. American operators in Bothwell sold their oil through their own connections in the U.S.A. Detroit had a large refinery, and Bothwell found a ready sale there, altho no shipments are published.

In 1933 after the old field had been shut down since 1867, Mr. Lather who was born in the field, revived the best of the old wells and pumped off the water that had drowned the field for 66 years. Under his skillful operation the wells were returned to production and have been in operation since that date., They began producing 20,000 barrels per year but diminished annually after 1935, which is sufficient evidence to substantiate the flush

GEOLOGY and STRUCTURE

The shallow oil fields that are the subject of this book are found at the base of the Middle Devonian system in a limestone formation that is very porous. It was sometimes said that oil occurs in crevices in this lime stone and that the drill dropped several inches when the oil was reached and the oil or gas flowed high in the air in great volume. One might visualize these crevices as cavities but they occur too often to be actual cavities. They are not continuous, that is the well drilled next to one of these gushers may be a small well. There are two principal things that control the volume of a gas or oil well - first, porosity of the rock (lime or sand) and second, its thickness. These crevice wells appear to have a thin oil rock or horizon and must therefore be very porous. This abnormal porosity might be found in a great bed of fossil casts or corals. The flowing well drilled in Oil Springs by Hugh Shaw in 1862 appears to fit these conditions but the oil discovered at Petrolia was in a normally porous limestone.

Where a fragment of sandstone is examined under a microscope it will be found to be made up of separate grains of sand that are held together by cementing material that entered the sandstone after the bed of sand was formed. This material is usual lime or silica. There may be ten or twenty percent of open spaces (porosity) in the sandstone. Sometimes the cementing material completely fills the spaces between the sand grains and there is no porosity in the sandstone. Limestones are made up of various materials, from ground up shells that leave

many shapes and sizes of pores in the rock to lime that is precipitated from the sea water and settles to the bottom of the ocean as a mud and solidifies in thick and dense beds that can often be seen in quarries. Another form of porous limestone that is very common is in the reefs that are built by tiny animals that secrete lime or silica to form shells. These live in countless numbers and build up reefs hundreds of feet above the ocean bottom piling layer on layer of their shells on the dead and empty cases of those below them. These reefs are the most porous of any limestone. There are several other causes of porosity in limestone and the most common is a chemical change that takes place whereby limestone becomes dolomite by a substitution of magnesium carbonate for a portion of the original calcium carbonate. When the magnesium carbonate content reaches 45 percent, there is a shrinkage in bulk up to eleven percent leaving minute cavaties throughout the dolomite. Many Ontario Oil and Gas fields occur in dolomite.

A few words on the reason that oil and gas are found in certain areas and not in others may be appropriate at this point. Oil and gas are lighter than water and will always be found above a water body. Sedimentary rocks are laid down mainly under the oceans but some lakes, particularly glacial lakes, have sediments on their beds. Other sediments are of terrestorial origin, such as sand dunes, etc. These rocks when elevated above the ocean bed are found to be folded and fractured into a multitude of shapes. The upfolds are called anticlines and the down folds synclines. Fractures are faults. There are many other types of folds that need not be discussed here. The reef above

mentioned may be found on a flat lying bed and protruding upward into or through an overlying bed of shale or limestone. A dome is the shape of an inverted bowl and have the same origin as anticlines.

The Marine rocks are, or were, saturated with the water they contained when the sediments were laid down. Subsequent folding heat and pressure nearly always cause this water to move to an area of lower pressure, and these moving waters carry along the oil and gas that the rocks may contain. When the moving water passes through or over an anticline, dome or fracture(fault) in the rocks, the oil and gas is trapped at the highest point in the dome, anticline, or fault and these become oil or gas fields.

The Oil Springs field is on a typical dome. The Petrolia field and the Bothwell oil field are each along an anticline, The Bothwell anticline lies along a regional fault. The gas and oil fields in Moore, Sombra and Sarnia townships are found in reefs that are up to 400 feet in height. The Dover Oil Field in Kent County is along a fault. The gas fields in Norfolk, Haldimand and Welland Counties differ from these in that they are in sandstone beds that lie evenly one above the other and altho there are dozens of anticlines, they are gentle folds, and the gas is found in both anticlines and synclines, provided that the sandstone is porous. The edges of the fields are limited by very dense and tightly cemented sandstone. These fields cover approximately 500 square miles.

Entertainment

Whatever lack of entertainment there was in Oil Springs probably resulted from that dreadful, impossible, bottomless mud road from Wyoming railway station to Oil Springs. On the contrary, Bothwell was on the main line of the Great Western Railway and in a well drained sandy area, which made luxuries readily available to those who could afford them. So in entertainment Bothwell fared much better than Oil Springs or Petrolia.

The Chatham Planet (June 15, 1865) tells of a very merry "Petroleum Hop". It had not been the first as the correspondent (who came from London) had learned of the good times and made a special visit. The following is a series of extracts:

"At Griffiths Hotel (The Royal Hotel) the new dining room had been handsomely decorated by Mr. Allen (on whose farm near Cashmere lot 30, R.R. Mosa township, oil springs were first discovered). At the head of the room was a motto "Welcome to Bothwell", done in white cedar brought from Niagara Falls. On either side was the Union Jack and the Stars and Stripes. Along the sides of the room were several oil paintings and water colours, also some models of engines and pumps. Alternating with these were flags and evergreens. But when Mrs. Griffith with her assistants, Mrs. Allen and Mrs. Boon completed the picture with substantial delicacies, flowers, and other adornments, the whole combined to make a general display which I can honestly say I never saw surpassed in Hamilton or Toronto. The Ball Room was distant about 200 yards (from the dining room in the hotel) and this space was laid down with smooth

planking on each side of which was planted evergreen trees". (The ballroom was in Mr. Lukes new machine shop).

"Capt. Young and Mr. Jeffrey did wonders in producing such a grand effect on the Ball Room in such a short time at their command. At the head of the room above "God Save the Queen" and below " Liberty and Union". At the centre a crown with letters V.R.; and an eagle with U S. Also a Beaver and a Maple Leaf. Over the entrance door were the words "First Petroleum Hop"; all being done most appropriately in cedar sprigs. The joists were covered in red, white and blue cotton. The whole interior of the roof and sides were set off with evergreen and flags which gave sort of cool appearance to the room. The music was supplied by Smart's London Quadrille Band, and it is little praise to say that they gave complete satisfaction. When the company had assembled at 10 o'clock, the sight was very pleasing. The plain costumes of the general company was well set off by the blue uniforms of the United States Officers, the bright scarlet of the Canadian Volunteers and gayer dressed of the ladies who numbered about 40 and came from far and near. Col. Cross and Mr. Jordon most gallantly undertook to see that their comfort was attended to, and it was so".

"It was well into morning when supper was announced and I will merely say that Mrs. Griffith's spread was the praise of all and was done justice to. Dancing was afterward resumed and was kept up until 6 A.M. and broad daylight".

BOTHWELL

Reference has already been made in the INTRODUCTION to Governor Simcoe's remarks, in 1793, and to Lt. Col. Burwell's record in 1821, of the oil and gas seepages in the Thames river at the Moravian village near the county line dividing Elgin and Kent, ~~counties.~~ From 1821 a period of thirty six years elapsed before any attempt was made to recover oil save by an occasional ~~Indian~~ peddler of cures and charms.

A description of the operations in 1861 appears in "The Daily Globe", Toronto, August 27th, 1861, but the correspondent missed the story of the first well drilled and we are indebted to the Editor of the "Chatham Planet," who visited the field in May, 1863, for this record. His story is reprinted in "The ~~Daily~~ Globe", May 4th, 1863, from which the following is extracted:

"Well No. 1 is located on the flat on the immediate bank of the Thames River and was commenced by Mr. Tripp, a Canadian, sent by Mr. Williams of London.(1) ~~(J.M. Williams lived in London for some time after 1840).~~ Tripp dug this well to a depth of some 27 feet without meeting with any special indication of oil, but one night when Tripp was about leaving off work, (sic) he fancied, upon striking his pick into the soil, that he heard a hollow sound,

(1) Note: Tripp, i.e., The International Mining and Manufacturing Company, ~~held land in Mosa and Orford townships in the year 1852~~. This may not have been his first work at Bothwell, as Bothwell was more accessible than Oil Springs. The Great Western Railway from Niagara Falls to Windsor was completed in 1854, whereas the branch line of this Railway to Sarnia was not completed through Wyoming until 1858.

yet he did not give the matter much thought just at that time, and in a few minutes afterwards quitted his work for the day. To his surprise the next morning when going to the well to resume digging, he found it full of oil and water. Afterwards an attempt was made to drive an iron pipe down in this well, but when the pipe had been driven a considerable distance it broke, and the well was abandoned. This well was commenced some six years ago (1857). At present the water in the cribbing is covered with oil, giving every indication of oil below the surface."

Experienced operators in the Bothwell field, or in fact in any field, will be aware that "driving a pipe" entails drilling. Reference to the chapter on Drilling will show that the practice of drilling was so fully established in these years, that no special reference or description was necessary.

Apparently Williams and Tripp were discouraged with the results of their experience at Bothwell, as they transferred their operations to Oil Springs, where they were successful in establishing themselves in the oil industry.

The special correspondent of "The Globe", already mentioned,(1) who four years later (1861) visited the Bothwell field, was conducted over the drilling operations by "Mr. Keating who, in connection with Messrs. Duncan and Clark of Toronto (oil refiners), is prosecuting a vigorous search for oil in the neighbourhood."

At the time of his visit Mr. J.M. Lick, who had lately come from the Pennsylvania oil fields, was drilling a well on a 5-acre plot adjoining the county line between Mosa and Zone townships. He had begun work 2½ months previously in a shallow dug well, and had driven a 7 inch cast iron pipe 70 feet into the

(1) Toronto Globe

ground, and was then drilling in a hard "conglomerate". He found at 37 feet a heavy flow of gas under high pressure, which blew for several hours, after which water came in and flowed for a few hours before the gas exhausted itself and the flow stopped. Lick had brought a 10 H.P. steam engine from Chatham and had a very "simply constructed" drilling rig. He was using the oil from the wells in the vicinity for lubricating his engine. His 70 feet of pipe cost him $200. and he had then spent $400. excluding a $50. bonus for 5 acres of land and a 25 percent royalty to the landowner, on all oil produced. This correspondent names four others drilling along the Thames; their operations spread a mile or more along the river front. All operators but one ~~are~~ were Americans recently come from the Pennsylvania oil fields, and this exception ~~is~~ was Messrs. Duncan and Clark of Yonge Street, Toronto, who ~~have~~ had purchased 15 acres of "very extensive river frontage".

The owners of oil lands appeared to be remarkably well informed of ~~their~~ its value. At this early ~~date~~ period in the oil industry, in fact just two years after the discovery of oil in Pennsylvania by Drake, they drove very stiff bargains, bargains that would return them enormous profits. This reporter gives an excellent description of the oil and gas seepages at this locality and tells of the Indians collecting it and selling it as a remedy for cholera, which was then a scourge throughout western Ontario.

The "Daily Globe" April 26th, 1865, says that oil had scarcely been found at Bothwell in 1861 when disaster overtook the operators, ~~due~~ owing to the low prices of oil which followed the period of the flowing wells in Oil Springs in January, 1862. These prices were below the cost of pumping at Bothwell, hence it was abandoned by all but a very few.

Dispatches and letters of correspondence published in "The Globe" show that Lick and others continued work at Bothwell during 1861 and 1862, but the price of oil having dropped to $1.00 per barrel and even less, destroyed all financial backing for oil development schemes. Lick had many partners, of whom the principal one was Jordon; he also canvassed the countryside to raise funds by selling shares in his venture. In September, 1862, Lick and Jordon began their third well in lot 20, River Range, about 200 yards from the river in the ravine that now perpetuates Lick's name. Three accounts (Chatham Planet, Oil Springs Chronicle and London Prototype) bear witness that this well, was the outstanding well drilled by Lick at this date (May 1st, 1863), ~~which~~, one paper says it pumped 150 barrels per day and another, 70 barrels per day. The London writer estimates its production at 180 to 200 barrels per day and gives the log of the well, the depth of which two say is 224 feet and one 229 feet.

Formation	Thickness ft.	Total
Sand	5	5
Clay	55	60
Cemented gravel	8	68
Loose gravel	2	70
Show of gas under hard clay	25	95
Hard clay and gravel	49	144
Very hard cemented gravel	12	156
Hard dry sand	19	175
Soft white stone	6	181
(Show of oil at 181 feet)		
Limestone	10	191
Hard light stone	4	195
Hard dark stone	4½	199½
Soapstone	20	219½
Hard black stone	2	221½
?	2½	224

Oil at 224 feet.

The editor of the Chatham Planet says that this well flowed a total of about 1,500 barrels before pumping was begun. He says it was dug to 70 feet, 8 feet square, and that this excavation which held 1000 barrels was filled with oil. ~~holding 1,000 barrels~~. It cost Lick $2,000 in cash, plus his and his partners' labour. On April 26, 1865, it is reported as pumping 50 barrels a day.

Lick's well created a great rush to Bothwell, and in 1863 to 1865 prices of land soared to great heights, and some large operators, mainly Americans, invested large sums; of the Americans, the Bothwell Oil Company and Pope and Knight were the largest. The Bothwell Land and Petroleum Company (Scotch Company) who purchased the lands of the Honourable George Brown conducted operations on probably a larger scale than the Bothwell Oil Company. This company brought over Cornish and Scotch miners for their work, and at first did most of the operations by hand labour, but as the price of oil decreased ~~at first, but gradually~~ were forced to use steam power.

About May 12th, 1865, Lick again brought in the largest well in the field, which pumped, on the evidence of the Bothwell correspondent of the "Globe" and others, 200 barrels per day. There were at the time many wells pumping from 20 ~~barrels~~ to 100 barrels per day. This date heralded a boom at Bothwell village, increasing the population from 400 in 1865 to 3000 in the summer of 1866 ~~6,000 from 400 the previous year~~.

The present-day driller with a background of 60 years of experience, ~~improvement~~, would not attempt to begin a well in the Bothwell oil field without the very best of equipment and pipe, to penetrate 100 to 200 feet of surface composed of clay, sand,

gravel, boulder clay, quicksand, and hardpan. Many times have drillers encountered quicksand and sometimes boulders that were either impossible or too costly to drive through, and have abandoned the location for a new one. Shaw commenced drilling at Oil Springs on top of the rock in a dug well, but Lick had to force his drill, followed by "casing", through this sand, gravel, clay, and quicksand. The modern driller using steel pipe and a weight of over 1,000 pounds with which to drive, may work for days driving pipe through the quicksands under the soil in the Bothwell field, but Lick's equipment (see Chapter on Drilling page), would weigh about 300 pounds, and he appears to have used 7 inch casing. In any event he had many more obstacles to overcome than had Shaw, Williams, and others in Oil Springs but he persevered -- and won.

Mr. Victor Lauriston, a native of Bothwell, writing in the London Free Press, November 14th, 1936, says that the boom in Bothwell died with the end of the American Civil War and when ~~that~~ the price of oil dropped from $12, ~~per barrel~~ to $2, per barrel. Lick had invested his money in the erection of the biggest and best hotel in Bothwell. One disasterous fire and several smaller fires completed the ruin of the town, and "Lick's hotel stood, tenanted only by owls and bats, a mournful monument to the man whose courage and enterprise had paved the way to the great boom."

"Lick's wealth had vanished, but he could not quit the game. Years later he drilled for oil near Thamesville without success ------- One wintry day he died in his lonely lodgings at Bothwell. Old Dr. Pope, who had practiced in Bothwell in the days before the boom, and had seen its hectic excitement rise and fall, passed the hat and collected enough money for a plain

coffin. John Lick, greatest and most spectacular of Canada's early "oil kings" was buried in an unmarked grave in potter's field in Bothwell Cemetery."

Early reference to Bothwell operations is made by Mr. J.H. Fairbank,(1) who says: "I was never interested in Bothwell; at that place operations were carried out from 1860 to 1865. The surface oil was known for many years and was gathered in the early days as medicine. There is oil in the Bothwell district in different places but in small quantities still, but drilling has not shown that it is in paying quantities -------- I do not think there is any chance of the industry being revived there at the present price. They stopped producing when oil was worth $3.00 or $4.00 per barrel." (Mr. Fairbank with Mr. F.J. Carman became the largest operators in Bothwell after 1896). In the same report, on page 161, Mr. H. Kittridge says that he came to Bothwell in 1865 and drilled there for a few months then went into the contracting business apparently until 1866, when he moved to Petrolia.

(1) Rept. of Royal Comm. on Mineral Res. Ont., 1890, p. 160.

Dr. Sterry Hunt(2) in his report, Geological Survey of Canada, 1866, pages 245 and 247, gives the logs of several wells and the depth to the oil but no indication of the production each no details regarding the oil horizon.

In the report of the Bureau of Mines for the year 1896, Mr. Archibald Blue, the Director, says on page 18; "In the early years of the '60's the region of Bothwell, in the County of Kent, was famous as an oil field, and scores of wells there were large producers, but in 1866 nearly all these wells were closed down and the field was abandoned for the more promising fields

of Oil Springs and Petrolia." In the same report, page 22, Mr. Martin Woodward, one of the early operators, is quoted as saying: "When the Fenian raid took place in June, 1866, there was a rush of Americans across the border and before quiet and confidence were restored the boom in Petrolia caused a break in the price, and crude fell from $10.00 to 50 cents and even 25 cents per barrel." In this interesting report a drilling contract, dated January 14th, 1866, is quoted in which the owner is to furnish engine, machines, fuel, water, oil, light, and surface casing, and pay the contractor $2.75 per foot to complete a 5-inch hole to 700 feet or to such lesser depth should oil be found. "These terms were so favorable, old-timers of Bothwell now affirm, that in many cases the contractor cased off the oil when a good strike was made in order that he might increase his earnings by sinking to the contract depth, regardless of the interests of the 'party of the second part' (owner) and so it came to pass that the oil field became in time flooded with salt water, which had to be pumped out at heavy cost after each Sunday's rest, and at a greater cost, if for any cause a well happened to be closed down for a longer time."

Confirmation of this and an interesting sidelight on the operations of the '60's is given in this report in the statement of a Mr. Newell of Bradford, Pennsylvania, who was the manager of the largest well at Bothwell at that time. The following is his statement: "I was a member of the Pepper Well Oil Company organized to operate the Pepper well south of Bothwell, and I camehere as manager in 1864. The sum paid for the property, which included thirty acres (easterly 30 acres, lot 19, R.R., Zone township) with one well down, was $20,000.

At the time I took charge it was not producing oil in paying quantities. Pumping was continued about ten days, during which the oil came in spurts, but steadily increasing in flow. The output was kept up at 100 barrels per day until the company leased four portions of its lot, and when wells were put down upon them our supply fell off to 40 barrels per day. We operated the well until some time after the Fenian invasion of 1866, but that disturbance caused a large number of American owners to desert their wells and leave the country, and as the pumping ceased the salt water steadily rose and drowned out most of the wells in the locality. Ours then ceased suddenly to produce. There was nothing to indicate that the supply in the rock was exhausted, but simply it was shut off by the rising waters. I left the country some time in 1866, and soon after the company dissolved. I returned to Bradford, and with the experience I had gained in Bothwell was able to go into the business successfully there. The Pepper well was afterwards sold at sheriff's sale and I bought it for my wife, in whose name it now is. It was always allowed by the refiners that the quality of the Pepper well oil was superior to that of all other wells in the field, and it sold at 50 cents per barrel more. The usual selling price was $6/ per barrel, but we sold as high as $7. I was third owner of the Lancy well at Petrolia, which was reported to yield 4,000 barrels per day, but I never got a dollar of it. The large production at Petrolia caused a drop in crude to 50 cents per barrel, and this along with the Fenian trouble led to the desertion of Bothwell. I never saw such a lively

time as at Bothwell during the palmy days of the oil business, except at Petrolia."

Many of the American operators in 1860 and 1861 were officers in the Union Army (Globe, August 27th, 1861) who were called to the colours in 1861 for duty in the American Civil War. These, or other Union Officers, returned to Bothwell after the Civil War. "The Globe", June 5th, 1865, quoting a dispatch from the Bothwell correspondent of the New York World says: "The largest well in Canada is here; it produces 400 barrels per week. About 50 wells are going down this spring, largely owned by Officers of the Union Army. Labor $1.50 per day. Wood $1.25 per cord. A well costs $3,000." It is quite obvious that when the Fenian invasion threatened this country in 1866 that these and other Americans returned to the U.S.A. to avoid any international incident that might occur.

Continuing from Ontario Bureau of Mines report of 1896 Mr. Blue states that there were 35 producing wells at the end of 1896. The majority of these were on the north side of the river (Thames) in Zone, and two or three in Mosa; but a considerable number were on the south side of the river in Orford Township. Wells were drilled in Aldborough Township, but none were producers. Most of this development must have been in the old field discovered by Lick in 1861, ~~that~~ which had been flooded out 30 years previously. The new development in the Bothwell field was in lots 6 and 7, concessions VII and VIII, to the west of the pool that Lick discovered and separated from it by a non-productive area. The story is continued by Mr. Blue in his report for 1896, page 19: "Carman and Fairbank are one of the

leading firms employed in operating the field. Frank J. Carman of New York State has been in the oil business for eight years in Pennsylvania, Ohio and Wyoming, chiefly as a refiner. He came to Bothwell early in 1896, and spent three or four months collecting data of the field and studying the prospects. Mr. Woodward of Petrolea had been engaged the previous year looking over the ground also, and the discovery of oil near the lake shore in Dunwich township suggested the idea that the course of the oil-bearing arch was nearly east and west. Mr. Woodward, with some Toronto associates, bored a well on lot 2, in the first and lot 1 in the second concession of Aldborough, near the river Thames, but got nothing. The record proved however that the wells were sunk upon low points of the arch, which suggested to Mr, Carman that drillings should be made further west along the line of the arch. Accordingly he commenced to bore on the Goodyear farm, lot 7, in the eighth concession of Zone. The drift had a thickness of 180 feet, composed of 20 feet sand containing water, 30 feet impervious blue clay, 30 feet gravel, sand and clay forming a hardpan, and 100 feet gravel, sand and hardpan. Below the drift the drill passed through 33 feet of what is believed to be Hamilton shale, and then for 187 feet through lime supposed to belong to the Corniferous formation. A small flow of oil was found at 373 to 378 feet, and a strong flow of salt water at 399 feet in a loose granular limestone. The best producing band is five feet of the lower section of the 15 feet ending with 378 feet." ~~Samples of the drillings from this well, furnished by Mr. Carman from the base of the~~

shale, have been examined by Dr. Coleman who reports on them as follows:"

213-219 ft., bluish gray calcareous shale.
219-225 ft., bluish gray limestone.
225-383 ft., pale bluish or brownish gray to white limestone. (oil from 373 to 378 ft.).
383-388 ft., brown dolomite or dolomitic sandy limestone. (oil horizon).
393-399 ft., brown sandstone. (water horizon).

Of prospecting in the early days of Bothwell, Mr. Blue says: "There was no science to direct the mind of the oil king or the well driller, the practice commonly followed was to let a contract at a certain rate per foot under which borings were carried down until oil was struck, or were stopped for want of funds, or were abandoned in despair. Now, however, the aim is to ascertain the relation of the oil bearing band of rock to sea-level, and to be guided thereby in sinking new wells -- shutting down at the first appearance of salt water." Here follows a series of levels on many wells in the area with the dips that outline the anticline running through the Bothwell field in an east and west direction, concluding with the remarks: "The western end of the field was not yet prospected at the end of the year; but from lot 7 in the seventh concession of Zone to as far east as the iron bridge on the Thames (the corners of Mosa, Zone, Aldborough, and Orford Townships) a length of four miles by a breadth of half a mile, its limits have been pretty carefully ascertained." There were twelve companies or individuals who owned 35 producing wells in this field at the end of 1896.

In the next year, 1897, he says: "The Bothwell field has not realized expectations entertained of it at the close of 1896, and a number of wells have already been abandoned by operators ----- The Walker Oil and Gas Company drilled 32 wells during the year all of which are reported as producing wells."

In 1898 he says: "Bothwell is getting its producing limits as an oil field defined, and during the year its yield was little more than 6,000 barrels monthly." He also ~~refers~~ says to the Thamesville field, which is an extension of the Bothwell field to the West. "In the township of Zone near Thamesville the same experience was realized ~~(as in Brooke township where the supply did not prove to be permanent and most of the wells have been abandoned ---)~~ several wells yielded liberally when first drilled but the flow did not last." This is, of course typical of "top show" or "mud vein" oil, i.e., oil produced from the top of the Delaware limestone as in Oil Springs in the '60's, and in Brooke Township in 1927.

The records show the peak production of this new development in the Bothwell field to be in 1898 and 1899, which compares with Mr. Blue's statement that in 1898 the limits of the field are fully defined. No doubt some of this production came from the two pools in the eastern end, which had been opened up in the '60's, and a little from Thamesville.

The years following 1898 witnessed a gradual decline in production, ~~that~~ which is normal in every field where the oil reservoir is similar to Bothwell. The annual production is

given in the table on page . As will be seen it declined until the year 1931, when the production began to show a remarkable annual increase, which is being maintained at the present time. There is no doubt, ~~but~~ that the financial disaster of 1929 had its effect on the oil industry of Bothwell as well as on all other business in the world, and that the low prices in 1931 and 1932 were caused by the enormous over-production of oil in the U.S.A., where 98½ percent. of crude oil refined in Ontario is obtained. Those operating at a loss, were forced to retrench at ~~the expense~~ and suffer a decline in ~~of~~ the output of their wells, ~~and~~ The very serious decline in the production of crude oil for the years 1930 to 1932 is no doubt due to these reasons; but the increase in production began before there was any great advance in the price of oil. This old part of the field was over a mile from the electric power lines; the few wells in operation were heavy water wells and, pumped by gasoline engines, gave only a small profit. The turning point came in 1933 when Mr. Arthur Lather purchased the Arthur Mobey lease, lot 22, concession XV, Orford township, where a good oil well had been drilled in 1929 but abandoned because of the great quantity of water to be pumped. Mr. Lather put in a large pump and, after months of trouble, finally had the well pumping 10 to 12 barrels of oil per day. He then drilled another well and equipped both with electric power and had two very good oil wells in operation.

When others saw the success of Mr. Lather's venture there was a rush to put these old oil wells of the '60's in

operation. The old field had been flooded with water for seventy years and it was necessary to pump off this accumulation and continue pumping at a rate greater than the inflow of water. The old gas or gasoline engines were ~~not dependable for such an operation, and as lengthy shut-downs seriously impeded the dewatering process~~ replaced by, electric power ~~was installed~~ throughout the field. The first reclamation work took place in Orford township. In the intervening years since 1866 most of the old well sites had been obliterated by farming operations, and it became necessary to drill new wells. Some of these wells began pumping 75 barrels of oil per day and, on settled production, produced from 3 to 10 barrels per day. The old wells in the portion of Aldborough adjacent to Orford township were cleaned out and some new wells drilled but it did not prove as profitable as the remainder of the field. The river lots in the old Indian Reserve in Zone township where the first drilling was done in the '60's were the last to be reconditioned, mainly because of the great number of old wells that had been abandoned without being plugged. The largest producers were in this area - the Pepper, Victoria, Old Company, Empire, Lucy, and Lick wells. It was a problem for the producer to determine whether to clean out an old hole or to drill a new well. It would in all probability cost less to drill a new well than to fish out corroded casing, that ~~broke~~ would break under the strain of pulling, old wood and iron pump rods, bailers, pumps, and every kind of equipment used seventy years ago, with which these wells were filled. If the old wells were ignored and new wells drilled, the old ones might prove

a great source of water encroachment. In general the operators first tried cleaning out old wells before drilling new ones. All the famous producers of the '60's, where the actual site ~~is~~ was definitely known or ~~when it~~ could ~~can~~ be reached, ~~are being~~ wells opened up. A pig pen now occupies the site of the Victoria well, and the Pepper well has been ploughed over, but its site is known very closely. Three of Lick's wells in the famous Lick Ravine were cleaned out and put into operation in 1938 and 1939; two of them ~~are~~ producing 20 barrels per day, but the third ~~is~~ was not very profitable. The table on page tells the remainder of the story of the success of the operations since Mr. Lather began reconditioning in 1933. ~~The work still continues.~~

This is not a case of regeneration of the oil that was pumped out of the field, it is simply a case of recovering the oil that remained in the field after it was flooded and abandoned in 1866, as has been shown at the beginning of this chapter.

The map of Bothwell published in May, 1866, shows wells (presumed to be producing) as follows:-

Township	Lot	Con.	No.
Aldborough	1	I	5
Orford	16, 17, 18, 19	XVI	9
"	19, 21 to 26	XV	39
"	24, 25, 26	XIV	9
Mosa	26 to 30	I S.	10
"	29 and 30	I N.	7
Zone	13 to 21	S.R.R.	106
"	1 to 18	N.R.R.	19
Total			203

In May, 1866, there were 31 wells being pumped out of this total of 203 wells in the field. Some time towards the latter part of 1866 the field shut down completely as previously related.

Below is given a table of the production of this portion of the Bothwell field from 1928 until 1938, inclusive. It will be noted that besides the wells drilled since 1866 there are 57 wells, the locations of which are now unknown.

TABLE OF PRODUCTION OF BOTHWELL FIELD ABANDONED IN 1866

Year	Wells in Operation	Wells not Operated	Total Wells	Production bbls.
1928	79	23	92	1,082
1929	98	34	132	959
1930	87	39	126	1,934
1931	70	51	121	2,172
1932	91	25	116	3,643
1933	79	37	116	8,137
1934	76	44	120	17,425
1935	78	43	121	19,777
1936	90	46	136	19,859
1937	97	46	143	25,275
1938	100	46	146	23,432
1939				123,695
1940				
1941				
1942				
1943				
1944				
1945				

From the above table it can be deduced, giving 1,000 barrels per year as the average production prior to reconditioning, that by the ingenuity of the present operators in Bothwell 112,000 barrels has been recovered in eleven years over and above average production.

Chapter II: Oil Springs I

The Harkness Files
Volume XIV
Unpublished Manuscripts

- THIS PAGE CREATED BY OGSR LIBRARY -

first draft corrected Nov. 1966

PETROLIA

THE FIRST WELLS

The authority for the drilling of the first commercial well in Petrolia is Chas. Robb, already mentioned. In his paper on the Enniskillen Oilwells that was written after he visited Oil Springs in December 1860, he says, "In other parts of the township as at Kelly's wells, 10 miles north of Mr. Williams, (i.e. Oil Springs) the conditions and mode of occurrence of the oil are quite different than at Oil Springs. Here it occurs in a bed of gravel and boulders at a depth of about 47 feet from the surface, associated with such an amount of water as to render the wells exceedingly difficult in working, although the quantity of oil here is evidently very great. Whether these variations in the physical structure of the region has any connection with the origin of the deposits, it is in the present state of our knowledge of the subject, impossible with any degree of confidence to determine. Recently oil has been obtained by drilling in the rock and in such cases it is said to be of a superior quality to that derived from the clay or superficial deposits".

Mr. R.T. Lowery, editor of the Petrolia Topic, March 1st, 1892 says "The first well in Petrolia was struck on the 30th day of June, 1860 on lot 13, Con.X, a short distance from present residence of

Mr. Jas. Perkins". The late Mr. John Scott who came to the oil fields in 1870 pointed out to the writer the location of this well, south of the Main St. and on the south east side of the crossing of Bear Creek 50 yards from the road and 150 yards from the bridge. The Globe, April 20th, 1865 says that this well is on the south east 50 acres of lot 13, Con.XI.

The oil seepage was on the bed of Bear Creek where the present Main Street of Petrolia crosses and follows along the bed of the creek. This street runs between Concessions X and XI and because of the custom of naming each road a "Concession Road", confusion arises over the numbering of the Concessions. More than one well was dug in the creek bed and on each side of the road before 1860, and in all probability Tripp dug the first well no later than 1855 and no one in 1865 knew for certain where the first well in Petrolia was dug. Then again, Robb says that these wells were giving a large quantity of water. They would therefore, cave in if not operated continuously, and be lost to memory.

The Globe, September 9th, 1861, gives the information about Kelly's Wells but places them on Wm. Barclay's 200 acres, lot 14 Con.X. They are two surface wells - No.1, 41 feet deep, yield 6 bbls. per day and No.2, 47 feet deep, a yield of 10 bbls. This observer tells of a well on Adams 150 acres being parts of lots 13 and 14, Con. XI that was dug at a natural oil spring that suggests Tripp's work. This

well is 50 ft. deep and some hundreds of barrels of oil has been taken from the well. Adams and Kelly are both on the list of oil miners given by the Census taken of 1860.

This issue of the Globe continues with a list of the wells at Petrolia with the miners and lessees of the land on which the wells were located.

"(1) Mr. A.A. Adams of Boston, owns 150 acres, lots 13 and 14, Con.XI., In 1860 he dug a well at a natural spring of oil and found that someone had dug a well some time before "as the digging could be followed by the filled in earth". He seems to have dug three wells. Others who have leased small parcels from Adams and have dug wells are:-

(2) Port Huron Oil Co. 2 wells, 50 ft. to rock. The wells are pumped with a steam pump that is placed between the wells.

(3) J.P. Sanborn & Co. surface well 50 feet to rock. It gave 600 bbls. in the first 30 days but it has settled to 10 barrels per day. The water is removed by a force pump and the oil by a hand pump.

(4) Sanborn. Surface well 53 feet deep. Estimated at 10 barrels. Several feet of oil and water in the well.

(5) Sanborn. Surface 52 feet, a 5 barrel well.

(6) Boyd and Maxwell. Surface 62 feet, rock 200 feet. Makes 20 barrels of very superior oil.

(7) Trueman Cowan &nCo. Surface well 60 ft. Makes 5 barrels per day.

(8) Adams & Co. A surface well as stated above. Some hundreds of barrels of oil have been pumped from this well.

Wells on the Robt. Barclay property 200 acres, lot 14, Con.X.

(9) Kelly & Co. Surface well 40 feet. Yields 6 barrels per day.

(10) Kelly & Co. Surface well 47 feet. Yields 10 barrels per day.

Wells on W.B. Fowler property 200 acres, lot 13, Con.X.

(11) W.B. Fowler & Co. Surface 50 feet, rock 300 feet. There is 70 ft of oil in the well. It is the deepest (oil) well in Canada. It was drilled with a steam engine.

(12) Lancaster and Robb. Surface 50 feet. Oil is seeping in from the rock.

(13) Lancaster & Co. Surface 50 ft. Has a good show of oil. It will be drilled deeper into the rock.

(14) L.L. Collver (Culver?), Simcoe. A surface well 56 ft. deep. Not yet pumped. It is estimated at 5 barrels per day.

The potential production of the 14 wells is 100 barrels per day. Two wells have produced and sold 1000 barrels (in twelve months).

Seven other wells are being dug in Petrolia. //

" Close by the site of the principal wells, the Petrolia Refining Co. has erected a refinery. The company is composed of Bostonians. The capital is $20,000 and the works cost $11,000. The buildings are of wood separated from one another. A 20 H.P. steam engine works the machinery. An elevated tank holding 600 barrels receives the crude oil and six stills of 15 barrels each, capacity 3600 gallons (?) are placed below this tank. The first distillation gives 10 percent benzole and 42-1/2 percent illuminating oil. The balance is lubricating oil and refuse, from which we have seen before that Hugh Shaw has discovered a method of extracting paints and dyes. After distillation the oil is pumped into leaded tanks in which works an agitator. Four steam pipes go around the tank and heat the oil to rid it of the benzole.... From the agitator vat the oil is conveyed into a vat of similar capacity to settle. Lastly, by means of syphons, leaving the sediment behind, it is drawn off into the treating vats where it is washed in water. "

This limited description shows a much superior refinery than that described in Oil Springs by Dr. Marcet in 1863., It is the only refinery in the field stated to be operated by steam power. As in Dr. Marcet's description, there is no mention of acid being used as a neutralizing agent. Probably the most up to date refinery on the continent at this time was situated in Boston. As these men were Bostonians, it is highly probable that they copied the Boston Refinery in operation.

Prof. Tennant in his article Journal Society of Arts Vol.XI, May 1st, 1863, P.416, accompanying the Catalogue of Minerals in Canada at the International Exhibition in London in 1862 seems to have drawn from the above information and adds "The oil from the deeper rock is somewhat lighter and more fluid than that from the superficial wells, which is very dark coloured and somewhat viscid".

In January 15th, 1862, a flowing oil and gas well on the Bligh farm, owned by a Boston firm, was struck at 350 feet. It blew gas, oil, and water high in the air and then caught fire. It was out of control for days until the gas blew down and a month later it was flowing 10 barrels of oil, 100 barrels of water and "the gas could be heard whistling at 1/4 of a mile". The Globe, Feb. 4th, 1862, tells of two other flowing wells. T. Coman well, 370 ft. deep, flowing 2 bbls. per day and nearby the Wheelwright well, 355 feet deep where a big gas pocket blew out and the well caved.

Atthis time Petrolia went through much the same experience as at Oil Springs, land values pyramided. Hon. John Sanfield McDonald experience is recorded. He bought East 1/2 of lot 13, Con.XI (100 acres) for $700 and sold to Kelly for $1200. Kelly incorporated it into a company which very shortly afterward leased one acre for $900 and 1/2 royalty, Similar deals kept the prices of wells and leases skyrocketing for one year, ~~until~~ the Oil Springs wells stopped flowing, ~~then~~ the bottom dropped out of the speculative market. All Petrolia wells but two were pumpers and could not operate profitably in opposition

to the flowing wells of Oil Springs. As a consequence, the Petrolia field was practically closed down until the price of oil recovered in February, 1863.

For some reason there is no newspaper reports of 1864 operations. The next report is in 1865 when Theodore Rand tells of a visit to Petrolia on June 16th, 1863. (Thos. D. Rand, Franklin Institute, VOl. L. 3rd series, No. 1, July 1865). "At Petrolia six miles north (of Oil Springs) is the only well in the region now flowing. It flows 6 or 7 bbls. per day and has for 3 or 4 years quite steadily." He says that inexperience is the cause of much of the loss of production in the field. "The machinery is in almost all cases very defective and it is probable that the present engines properly geared and with proper pumps would greatly increase the flow".

The Globe became interested again on January, 1865. The Petrolia field had been very slowly recovering with the gradual increase in the price of oil as the shortage developed in 1863 and later. New wells were drilled along the bed of Bear Creek to the mouth of Durham Creek through Cons. IX, X and XI and along Durham Creek across lots 12, 13 and 14. On April 20th, 1865 the oil field was reported to be about one and one quarter miles square. Ten wells were drilled in the rock and 6 surface wells were pumping. The Crescent Oil Co. that had paid $250,000 for lot 13, Con. X had a well 907 feet deep pumping 8 barrels with a 7 horsepower engine. The manager was very upset over his poor

equipment. He had to set his pump at 450 feet as his engine wouldn't lift from a greater depth. He evidently didn't know then that the main oil horizon was at 450 feet and he might have done even better if he had raised his pump. Mr. Fairbank had began his operations in Petrolia in 1865 with his profits from Oil Springs. He bought the west half of lot 13, Con.XI for $40 an acre and with Vaughan & Whipple the west half of lot 14 on Con.XI; also along with Whipple all of lot 15, Con.XI. The first two properties were in the big producing area and the last one produced oil to a lesser degree. There were a few surface wells on the property. He began drilling at once and had 4 producing wells and two drilling, in early 1866 of the report. Andrew Elliott owned all of lot 12, Con.XI. The Crescent Oil Co. owned all of lot 13, Con.XI excepting 4 acres of Geo. Thayer's of Boston. The Hartford Oil Co. (also in the Oil Springs field) paid $25,000 (paper) for a 3/4 interest on 35 acres in the South East 1/4 of lot 14, Con.XI and Geo. L. Fair Co. of Boston bought 50 acres on S.E. 1/4 of lot 13, Con.XI. T.D. Leyard of Toronto owned lot 14, Con.X. which proved later to be of considerable value. Campbell & Co. owned 800 acres in Con. XIII and were drilling 4 wells. Lang of Wyoming was drilling a well on lot 25, Con.I of Plympton Township.

The paper mentions the Boston Oil Co.'s refinery as a most complete refinery with a capacity of 300 barrels per week.

Sales of wells are made on a basis of $1000 per barrel of daily production, which has to this day been used as a basis of valuation among "traders".

These companies kept up a drilling program and brought in moderate wells throughout the summer. Parsons Bros. (oil refiners in Toronto) and Thos. Lilly of Toronto brought in a well on 15 acres SW 1/4 of lot 14, Con. XI that flowed 50 bbls. per day, one of the first large flowing wells.

The correspondent says that he drove over the Oil Springs - Sarnia plank road on Nov. 23rd, 1865. This road had been built at a cost of $40,000 of which Sarnia had paid the major portion. The road missed Petrolia by some three miles. However, they still had the Wyoming plank road although it was in a bad state of repair, - Oil Springs, Petrolia and Enniskillen not being able to agree on the responsibility for repair.

In March 1866 the London Free Press gives a list of producing wells in the Petrolia field with the daily production:

North Side Con. XI			South Side Con. IX and X		
Matty and Ward	33	barrels	Crescent Oil Co. No. 4	10	bbls.
Hartford Star	6	"	do Eureka Well	5	"
Waterloo Co.	10	"	do Spooner Well	31	"
Hillsdale (Jackson Co)	60	"	do No. 5	10	"
do do	6	"	do deep well		
			Lot 13, X	8	"
			No. 7	3	"
			Chamberlain	15	"
			Daily production Total	197	barrels

It should be explained that the initial flow of wells was a very rough approximation as the largest tank for measuring the initial flow was rarely over 100 barrels and the flow into this tank was timed. The results were so inaccurrate that the Globe refused to accept the initial flows unless certified by a committee of producers as had been done in Oil Springs. The Editor of the Petrolia Advertiser reported new wells as "good producers", "medium or fair", and "a good show". Sometimes he would go as far as saying "the well will make a producer".

Petrolia in 1865 was a small cluster of log and frame buildings at the crossroads of the junction of the Wyoming plank road (now Kings Highway No. 21) and the road between Concessions X and XI. The population is given as 500 with little hotel accomodation or services of any kind. The fact that the settlement remained at the crossroads while the oil wells were nearly one mile to the west, must be on account of the indescribable muddy roads of Lambton County.

The Globe correspondent describes the settlement in the issue of April 20th, 1865. "I yesterday visited Petrolia, the village lying between Oil Springs and Wyoming about seven and one half miles to the north of the former, on the plank road. Petrolia was always a better looking place than Oil Springs, cleaner and possessing some of the elements of the picturesque. The woods in the immediate neighbourhood are less tangled. There is but little swamp and the land is rolling. A good many acres round about are under cultivation, comfortable looking farm houses

stock the landscape, and being nearer the Great Western Railway than Oil Springs, it has always possessed greater facilities for transportation to Wyoming. Petrolia suffered like its rival from the effects of the flowing wells, and the low price of oil (that followed). Most of the wells have been abandoned for two years and the refinery shut off. The people have now awakened and all is activity ....."

By the end of the year 1866, drilling had extended the field until it was one mile wide and three miles long, mostly along Bear Creek, but a certain number of "wildcat" wells had come in. The London Free Press, March (?) 1866 gives a list of wells with their production. The Old Slack or Lancey well gave a huge flow that couldn't be measured but "estimated at 2000 bbls." It was on the north side of Durham Creek near the west line of lot 14 in the IX Concession. Slack had drilled it to 216 feet (50 feet of surface) with some oil on top of the rock. Lancey Newell and Mitchell took it over and about April 10th, 1866 deepened it to 262 feet where it went wild, flowing gas, oil and water. It was expected to settle to 800 barrels but a pump test some time later set it at 240 bbls. per day. Colonel Shoemaker drilled a well on lot 10, Con.XII that came in on April 28th and caught fire. He drilled another well on lot 9, Con. XI a mile to the west of all other wells, that was a flowing well. Central Co. (Elwood, Col. Parsons & Redding) well on lot 13, Con.XI came in for 125 bbls. at 393 feet in early September.

The well that caused even more excitment than the Shaw well in Oil Springs was the well brought in by Capt. B. King, Manager of the North Eastern Oil Co. It was located on lot 11, Concession XI. It was called the King Well or the "Big Well" and came in on November 23rd, 1866.

Log of the King Well Lot 11, Con. XI. Enniskillen Twp.

Drillers Terms			Geological Terms
Clay	Surface	93	Erie Clay
Top Rock	Lime	52	Ipperwash Limestone
Upper	Soap	110	Petrolia shale
Middle	Lime	14	Widder Beds
Lower	Soap	35	Olentangy shale
Big	Lime	79	Delaware or Dundee lime
		383	

Oil at 383.

It is said to have been located by a Mr. Kelsey of Buffalo, a celebrated "oil smeller". It flowed over the 48 foot derrick and again no tankage capable of holding this flow was available. It could not be shut in and as a consequence some 2000 barrels of oil was wasted. When brought under control it flowed 265 barrels per day for 41 days. Not enough tankage could be provided to receive the oil and Capt. King sold the oil as it flowed for $1.00 per barrel. From Nov. 23rd, 1866 to January 3rd, 1867, it produced 10,850 barrels - 2,200 bbls. sold, 2,000 bbls. wasted and 6,650 barrels tanked. This set the price of oil at $1.00 per barrel.

The value of land went as wild as the wells and drilling rigs blossomed like daisies. The Petrolia Valuator and Reporter of April 27th,'67 listed 16 wells over 100 bbls. per day drilled in 1866 and says that for one good well there are half a dozen small wells. These are - Lancey, Hall, Ingersoll, Thomas, Sewell, Saginars, Hurontario, Greenfield, Badger, Crescent, Central or Elwood, Hillsdale #1, Ball, Watkins, St. Catharines and King. No locations are given and altho more details are given, they are now of little value. The Hillsdale well had produced 15,000 barrels and the Hurontario 10,000 barrels. It will strike the reader as rather extraordinary that no notice of these large wells had reached the newspapers prior to this listing.

Two events in the life of Petrolia happened late in 1866. First the Railway branch line from Wyoming was completed and opened on Dec. 6th,'66 when the first train ran to Petrolia. After months of unsuccessful negotiating with the Great Western Railway, the line was begun on Aug. 25th as a private enterprise. The G.W.R. having in mind the failure of the Oil Springs flowing wells in 1863, were shy of spending money on a railway that might not be used more than a year. The Oil Springs Chronicle agreed in this. The oil men of experience realized the difference between the two fields and proceeded to finance the construction at their own risk. Mr. J.H. Fairbank sparked the Company and was the Secretary Treasurer. (Records of Provincial Secretary Ontario). Before the construction was completed the G.W.R. Co. bought over the private interests and took it over. Mr. Rispin was

station agent at Petrolia, Alex. McDongall the contractor and Mr. Reid the engineer.

The second event was the incorporation of the village on Dec. 21st, '66. The reeve was Colin Montcrieff and councillors Hunt, P. Bradley, Chamberlain, J.H. Bolt and H. Smiley.

The Canadian News, a weekly publication summarizing the newspapers opinion, says that the "Oil wells of Canada are capable of producing 500,000 bbls. annually. The Canadian demand is now 150,000 bbls. annually".

Two fires in 1867 had a beneficial effect on the industry, altho to some producers it brought disaster. The first was on John D. Noble's well on the north east corner of the west quarter of lot 12 in Con.XI. This is the first mention of the Noble Bros. in Petrolia. Mr. Noble has already been mentioned in 1867 as a ship owner in Kingston, and a refiner in Oil Springs whose ship returned from Wallaceburg, covered with oil that had floated down to Wallaceburg from the oil fields up stream. Mr. Noble's well was estimated at 1,000 barrels of oil. It had a great flow of gas as well as oil and it caught fire immediately. Six men in the drilling rig were more or less burned. Rod McKenzie, who was lame, fell four times getting away and was severely burned. There was no casing in the well and it presented a problem to the firefighters. Moreover, wooden tanks with 40,000 bbls. of oil were only 40 rods distant; which placed the whole field in grave danger. The Petrolia Topic Aug. 3rd, 1867, tells the story. Mr. J.H. Fairbank, first fire chief of the newly organized

company, headed a party which "sapped" toward the well behind a fire screen, but the heat was so intense that they were driven off. That night a new gang headed by Mr. Taylor advanced the sap to 20 feet from the well. A length of pipe with an elbow on the end was placed over the column of oil and gas. This partially diverted the stream of oil and reduced the heat of the fire, so that at 3 a.m. the party pushed a wagon load of manure to the well and dumped it on the burning well head. A second load extinguished the fire completely. The unprinted part of the story is that after the Fairbank party was driven off, the fire brigade retired to the bar of one of the hotels and laid plans. Following a lengthy discussion and having taken on considerable liquid courage, the "board of strategy" adopted the manure treatment. The wagon was towed, from a safe distance to the well, then a selected group facing the intense heat rushed in and overturned the loaded wagon on the well head. It had been burning for about a week.

A second fire broke out only three days after the first fire had been extinguished that was more than the local fire brigade and its board of strategy could compete with. The night pumper at Lane's well very carelessly brought his lantern too near an open tank and the gas ignited. It happened on Saturday night, Aug. 2nd, 1867. In a few hours several "tank farms" covering 20 acres, with 40,000 bbls. of oil stored in wooden tanks, was in flames. As wellas this, 12 operating wells,(one flowing and burning) engines, boilers, pumps, drilling rigs, and a general assortment of oil field equipment was enveloped. The fire spread with incredible speed from tank to tank until it was an inferno that no human could approach.

An eye witness sent a dispatch to the London Free Press that tells the story; in fact, he paints a picture if he does not overly embellish it. He climbed to the top of a derrick that was well removed from the path of the fire, and seated there, related events as an on the scene broadcaster would at the present time. The following is an attempt to do some justice to the correspondent and keep the description within reasonable limits. He tells of the scene, lighted by a stupendous eruption of flame (mounting hundreds of feet in the air) of colours from orange shaded through deep red and purple into a pall of oily smoke blacker than the night. Of workmen frantically attempting to fix a pipe to a full tank of oil, in order to drain the oil from the full tank (dangerously near the inferno) to a more remote tank. Unfortunately, their best efforts only resulted in spreading the fire to a new area. The great heat melted steel tanks and these with the wooden tanks burst sending the blazing oil along a drainage ditch into a tributary of Black Creek. The crest of this rushing wave of burning oil gave the creek the appearance of a fiery dragon winding through the valley. His description of the bursting of many steam boilers housed in drilling rigs and pump houses is filled with real action and drama. The explosions sent fragments of smoke stacks, derricks and flaming debris in all directions. At the peak of his most enthusiastic description, a red hot piece of boiler was hurled much too near our correspondent for his comfort and he forthwith interrupted his broadcast, retiring from this great spectacle to a place of safety.

The fire equipment of Petrolia and all surrounding municipalities was totally inadequate to deal with such a great holocust; they put their greater efforts into restricting the flames and let the fire "burn itself out".

The loss in oil and equipment was 10 oil well derricks and drilling rigs, and 12 wells, along with 40,000 barrels of oil. The total was estimated at $100,000. Those who have most of the loss were North Eastern Oil Co. (King Wells) Lincoln Oil Co., John D.Noble, Goderich & Marshall, J.C. Rykert (St.Catharines), Edwin Lane and E.H. Thompson, whose well was burning as it flowed. The fire came to the back of Smith's blacksmith shop.

Mr. Noble told the Royal Comm'n, already mentioned, of his experience after the fire at his well. "I sold (oil) as quickly as I could but I had to erect a number of large tanks on the ground to store the oil until I could sell, so that my land got pretty well covered with large wooden tanks. A fire broke out on the adjoining property, extended to mine and burned all my tanks and some 7,500 barrels of oil."

The average wooden tank such as Mr. Noble had on his tank farm was 12 ft. in diameter and 7 feet deep. There were larger tanks at Wyoming.

There was scarcely a tank left in the field and an order for 1000 bbls. of oil could not be filled. A shortage of oil developed that was felt as far afield as Montreal.

At about this same time there was a very disastrous fire in the railway yards in Montreal when 12,000 barrels of refined oil caught fire in the night and completely consumed all the railway warehouses, and endangered a train of tank cars. Troops were called out and railway cars were moved by hand. Barrels of oil burst with the heat and burning kerosene ran down a creek toward the city. Firemen and troops by extraordinary effort kept the fire from spreading into the city. It was so serious at one point that fear gripped the whole city.

In 1868 there was another small fire in the field to Mr. John Noble's wells some wooden tanks holding oil were burned but the Petrolia Fire Brigade now well trained in dealing with oil fires kept the fire from spreading and under control.

These fires and the artificial shortage of oil that brought an increase in price which gave those who had suffered losses new courage to set about re-equipping their wells to produce oil. It was obvious that the first requirement was fireproof storage or at least safer storage. Earth storage or underground tanks was resorted to as safest. These had been in use for some years in Oil Springs and proven satisfactory. W.E. Sanborn had an earth tank for his oil in August 1861 (vide Globe) and Fairbank used underground tanks. There is in his diary a contract to build an underground tank. It reads -

"Memorandum of agreement made this eleventh day of December 1863 by and between J.H. Fairbank and Wm. Swan both of Oil Springs, Ont. as follows: namely, for the consideration herein named, said Swan agrees to construct for said Fairbank a ground oil tank, curbed and thoroughly puddled after the manner of oil wells, and of a shape and size as follows: a round tank the first or puddled curb to be ten feet from inside to inside of sides of curbing said curb to be of sufficient strength to stand the most approved puddling. Said puddling to be no less than eight inches thick, the second curb to be eight inches smaller than the first, the depth to be 30 feet or more as Fairbank wishes. It is understood that this tank is to be constructed as to keep out water and hold oil and to be prosecuted with the utmost practical speed to completion thereof, and in all respects in a workmanlike manner; particular attention being paid to the puddling. All materials to be furnished by said Swan. The location of the tank to be where the said Fairbank has commenced an excavation for tank purposes on his oil lot, and he is to be allowed $4.00 for said commencement and said Swan is to receive in cash $3.50., three dollars and 50/100 per foot for the puddled curbing and $3.00, three dollars, for the other curbing to be paid as follows, for the puddle as soon as completed and the balance on completion of the job.

Signed J.H. Fairbank
William Swan"

The tank held 500 bbls. more or less.

His one acre lot was on the north side of lot 17 Con II.

The above is essentially a description of the underground tanks that were dug, curbed and puddled in Petrolia in 1867.

The oil producers formed a committee that was evidently advisory only. They advised that only underground tankage be used for storage. A few wood tanks that could be readily moved from well to well were necessary to hold the "flush" production of new wells until they could be connected to the larger tankage. These couldn't be done away with. There were two large iron tanks owned by the Iron Tanking Co. of Boston that gave service for many years, but most of the iron tanks were converted to railway tank cars in the years following.

In Petrolia the underground tanks were 30 feet in diameter and as much as 60 feet deep. (In Oil Springs the depth of surface controlled the depth of the tank). The surface was a much as 90 feet deep in Petrolia. The top 15 feet of the Erie Clay was slightly porous while that which lies below is very dense. It and impervious to oil. It was a perfect container. The sides had to have some support, as some learned to their cost in later years when this bottom clay caved in. The excavation was lined with boards laid on their sides and nailed together. A thick puddle was made of this lower clay and well rammed (puddled) behind the boards., The upper 15 ft. of clay was removed and the puddle in the upper 15 feet was made of the bottom clay. Most tanks had light beams laid across the top and the whole covered with plank and 6 inches of clay. The Globe stated that in ~~kx~~ Oct. 1867 the storage capacity of all earth tanks with 2-10,000 and one 5,000 barrel

iron tank was 212,000 barrels and only half full"! The Canada Year Book for 1869 said that underground storage had at that time reached 500,000 barrels. The Atlas of Lambton County is authority for the statement that the old iron tanks (that were suitable) had been mounted on railway flat cars and were now transporting oil by rail. Mr. Wood of London, Chamber of Commerce, is authority for the statement that iron tanks on flat cars were first used for a shipment of oil from Wyoming to London in 1865. The London Iron Works built many tanks for shipping oil on flat cars in the years following 1867, and the Imperial Oil Review of April 1918 says that the first tank car of refined oil was shipped from the refiners to the local warehouse in Toronto in 1878 (from Sarnia or London?)

The Petrolia operators had wasted no time in re-equipping the field and restoring their position in the market. The Petrolia Valuator says that in October 1867 there were 50 wells producing 1200 bbls/day and 46 drilling. In November 30th the wells produced 8000 barrels in that week, half of which was sold and half tanked. "The present aspect is discouraging, the decline in the market at home and abroad when the demand is ordinarily at its height shows an oversupply and producers should shut down". The Globe says that "production is declining 50% per month and development will begin again when prices improve".

There is a review of the year 1867 in the Globe and Canadian News of January 1868. They both say that the field is very much over-drilled by 160 to 170 wells; and concentrated on a small acreage 80 to 100 acres (adjoing the King Well) and cite the experience in Oil Springs on that

small acreage. Storage is full with 170,000 barrels and operators are cutting prices. The trade is very depressed." It remained so all year.

The year had come in with good prices and a plentiful supply. The prices had held until the autumn months when storage was full and production was in excess of demand.

J.H. Fairbank tells of the field at this time in his evidence before the Royal Commission of 1890. "The flowing well period in Petrolia was about 1866 (1867 is more accurate) that was in what is known as the King district, a little west of the present town. We have had wells there as high as 400 bbls. per day. Here the greatest flow was from 400 to 800 bbls. and much was wasted. They flowed a good while, then it became necessary to pump them; some are pumping today..... Flowing wells were generally found where there were crevices (in the rock)".

The Canada Year Book 1870 says that in 1865 - 5000 bbls were pumped; in 1866 up to November, 50,000 bbls. were sold; in 1867 - 130 wells were drilled in the King District, 120,000 bbls. shipped and 200,000 bbls. tanked. In 1865 -66 about 250 wells were drilled in lots 13, 14 and 15, Concessions X and XI, all of which were shut down after the King District came in. In 1869, the Year Book says that production is 800 to 900 bbls per week and in 1870 the improvement in price and trade had brought this up to 5000 bbls per week for the year and at the end of the year to 6000 bbls. per week.

The price of oil was from $8.00 to $10,00 per barrel in January 1862, ~~but with 400 teams hauling 16 to 20 barrels of oil per load, the demand was very soon filled. The small capacity refineries had little storage, probably one car load of 55 barrels, enough to run one of these for one week. A large refinery had double that capacity~~. As a consequence of the limited market the price of oil fluctuated unpredictably. It had dropped to less than one dollar in the Fall of 1862. Fairbank has some prices at Wyoming in his diary. February 1863, $1.50 when the flowing wells stopped, March $1.00, June $1.50 to $2.00, July $2.50, September 1st $5.00, September 17th $6.50, October 9th $4.50, December 15th $3.50, February 1864 $3.50 to $4.00, March $3.00. The rise in price followed the cessation of the flowing wells in Oil Springs and it remained so until the producers had all these wells equipped with pumps. The surface oil remained at a steady price of $2.00 per barrel. The Globe gives quotes in 1864: In May oil was $4.00 and July $5.00; surface oil $4.00; November $4.00 to $5.00, surface $2.25, $3.25. In 1865, May $4.00. In January 1866 (when the King well came in at Petrolia), $10.00; July $5.00; November $2.50; December $1.00 at Petrolia. In 1867 crude was $1.65 at Bothwelland at Petrolia 75 cents to $1.00, July 50 cents, November 70 cents. 1868 January 50 cents. From other sources later prices are August 1869 $1.62, October $2.50, November 1869 - $1.75 which fluctuated only slightly for a year.

At this depressed time, the famous Judge Higgins of Chicago came into the Canadian picture. His idea was to duplicate the action of Mr. John D. Rockefeller in the Standard Oil Co. by buying up all stocks of refined and crude oil, close down the refineries and wait until the market was ready to pay a higher price for oil. He had plenty of financial backing both in the U.S.A. and Canada and his idea was not difficult to sell to the refiners. He paid 18 cents per gallon for refined oil, which was well above the market price, and he bought crude above the market price. He leased 52 refineries in London, Oil Springs, Petrolia and Sarnia until December 1st, 1868 and closed them down. This had the desired effect and refined prices rose steadily.

Whether the outcome of Judge Higgins association was is nowhere stated. The price of oil did improve from 50 cents per barrel in July 1868 to $1.65 in January 1869, but dropped again to 50 cents. It may, therefore, be assumed that he did make some profit . His efforts to include the producers in his association was not a total success. For several reasons they could not and would not enter any combine. First, the small producer was suspicious of the combine and second, they had little experience in business of any kind. Some had no ready money and must depend on oil for cash. Third, some were in the hands of the bankers who would not allow their creditors to enter into a union that might cut off their income for an indefinite time. Fourth, if Judge Higgins could improve the price of oil, those out of the organization could reap a profit and also drill additional wells.

The outcome of Judge Higgins scheme made a deep impression on the producers and a few leaders attempted to follow his lead.

Judge Ebenezer Higgins of Cook County, Chicago, is referred to in the Globe as from Chicago and Kingston, Ontario. He may, therefore, be a returned expatriate, with plenty of money. The Titusville Herald says he has four or five million dollars. This may be heavily discounted for the London Free Press, March 1st, 1870, lists Ebenezer Higgins as refinery manager of the Englehart Refinery in London. In any case, he must have been favourably impressed with the opportunities in the Oil Industry in Ontario after organizing the combine in 1868 for he again associated himself in the refining business in 1869.

The Ontario Carbon Oil Co., Hamilton, was incorporated on July 17th, 1869 with a capital of $50,000. The directors are:

Ebenezer Higgins	Chicago
James Miller Williams	Hamilton
Henry Edward Parsons	Toronto
William Duffield	London
James Cummings	Hamilton

Other officers are: John H. Allyn
Henry E. Chess

The objects of the company are to purchase crude and distilled oil from producers and refiners, and refine it so that it shall be fit for general illuminating and lubricating purposes. To manufacture cans, barrels and packages connected with and necessary for such business.

This refinery under the expert guidance of this group of experienced refiners headed by Mr. Williams who was president a year later, very shortly became the leading refinery in Canada. Most refiners sent their kerosene to the Carbon Oil Co. in Hamilton for its final treatment. They had a refinery in Petrolia and may have had one in London. The newspaper accounts are very garbled and would lead one to believe that either J.L. Englehart bought out or amalgamated with the Ontario Carbon Oil Co. and moved it to London or Petrolia in 1871. The fact that Ebenezer Higgins (of Ontario Carbon Oil Co.) was refinery manager of Englehart's, London refinery would tend to confirm this. Adding Englehart to the men in the Ontario Carbon Oil Co. would put all the leading men in one company.

Williams refinery in Hamilton continued to do custom refining and turned out a high quality product. He appears so infrequently in the press that it is difficult to follow his activities, in the Oil Industry, but with all his many divergent interests, he remained active in the industry until his death in 1890.

The Canadian News, February 20th, 1869, says "an attempt is being made to form an oil well union of all producers on a basis of the value of their property and wells. These individuals would lease their properties to the Union for a period of one or two years. The present demand can be supplied by three or four wells". The demand at the time was 2,500 barrels per week. The scheme involved

the closing down of the remainder of the field and saving the labour and materials necessary to operate some hundred or more wells that were pumped intermittently. The price of oil in the field was then about 50 cents per barrel.

The Associatinn was formed after a long drawn out period of negotiation but again, it did not include all of the producers. In Canadian News August 26th, 1869 it says that the Association had sold 69,813 bbls. about half the total quantity sold. The price reached $2.50 per bbl. in November 1869 but enough distress oil was sold to bring the price down to $1.50 in January 1870. This was not all due to the business administration of the producers Association. The sudden rise found most of the field shut down and tankage far from full. Oil was selling faster than it was being produced, thereby drawing on reserves. Speculators, sensing a profit, bought on a rising market, sending the price to $5.50, but like all unstable markets, the boom fell to pieces as soon as the Association ended and the hundreds of wells in the field, were brought into production. The Canadian News October 20th, 1869 says that every well that would pump 10 barrels was in operation. Mr. J.H. Fairbank in his evidence before the Royal Commission says that the Association lasted about two years.

The London Free Press in its summary of the trade of 1869 and 70 says that when the price of oil at the wells in Canada was 35 cents per barrel, it was $4.00 in the U.S.A. It blames Canadians for not getting their share of the foreign market, that the Americans

have established themselves in markets all over the world and Canadians have no energy or enterprise. Ten years before this, the newspapers were berating the Canadians with money for being "note shavers" who were satisfied with 2 percent while Americans were picking off all the plums in the oil field and making 200 and 300 percent.

The decade 1860 to 1870 saw the industry grow from infancy to manhood. It had pulled itself out of the Lambton mud and passed from the manpowered spring-pole to the steam drilling rig. Pumping was now done by steam power with the exception of an occasional isolated well still pumped by spring-pole. The jerker line system of pumping many wells from one central power was introduced by J.H. Fairbank at some period in the late 1860's. Oil was now stored in large underground tanks that would hold one half year's production of the field, 500,000 barrels. Oil well supplies were now obtainable. Rubber and leather packers were slowly replacing the seed bag packer altho these successfully shut out surface water and were used for many more years.

The Tillsonburg Observer April 26th, 1866 gives a description of one of these patented packers. "A substitute for the seed bag packer has been patented by Noyas and Mallam of Franklin, Pa. It consists of a piece of tubing about two feet long around which a union collar projecting from the pipe 3/4 inches, is fitted. The collar is so turned, on the upper side of the shoulder, that it slants away from the tubing at an angle of 50°. Against the collar a ring of stout sole leather

is fitted and then a mate or corresponding collar, is slipped down upon the leather and tightened by means of a screw so as to press the leather very neatly into the shape and angle of the bottom collar. The leather ring thus placed extends in the same direction as the shoulder of the bottom collar, and a little more than half an inch beyond it all around. Another arrangement exactly the same is fitted to the other end of the short piece of tubing. When in the well the pressure of the water will keep it tightly against the sides of the well so as to exclude all surface material. When it is required to be drawn up, the leather will turn over and will admit of its coming to the surface."

If this patent had merit it is more than can be said of the explanation, which should secure it from being copied without a patent.

Iron rods were expensive and scarce which brought ash poles into use for pumping. These were spliced in 40 foot lengths, the box and pin was holted to the poles with straps. There is no record of the date that poles replaced the manilla cable for drilling but it must have sometime in this decade.

Oil was hauled from the wells to the tank farms or the Railway shipping point by upwards of 200 teams, and the roads in the field soon resembled the Oil Springs - Wyoming road of 1862. Corduroying was resorted to but the traffic was too heavy for these roads as ordinarily constructed. A one inch pipe line is referred to along the Blind Line

(a given road on the line between Concessions XI and XII from lot 10 to 15) but it is not stated who built it or if it was a common carrier. It was some years before a system of pipe lines was introduced to collect oil from the limits of the field and bring it to a shipping point.

DRILLING

There was a transition from cable tools to pole tools. The problem of letting the poles down as the drill deepened the well was solved by placing a ring on the top of the poles and attaching a chain to the ring, the other end of the chain was carried over the end of the walking beam and held in two V shaped iron forks fixed to the top of the walking beam one 18 inches behind the other. The late Mr. Jas. Sanson of Petrolia states "When it was necessary to slip the chain i.e. lower the poles, the driller picked up the slack from behind, and placed the link selected in the back fork. When the walking beam had raised to its highest position (which took most of the weight from the chain) the driller pulled up the chain from the first fork and let it slip the required distance". He states that this method was used on some early cable tool rigs. "When the tools became heavier, it was necessary to wrap the chain around the end of the walking beam to relieve the strain on the chain. This led to the cast iron jacket used with pole tools". So many drillers lost fingers with the chain and forks that a man named Yeager introduced the cog wheel and dog universally used. This cog wheel and dog was taken directly from a watch escapement.

(sketch)

Nitro Glycerine appears in the field in the late 1860's.. No details are given of the method used to explode it. Much space is taken up with the merits and demerits. One party says that it greatly increases the flow of oil, while others say that it brings in salt water. Each could be correct for varying conditions among wells could bring this about.

Nitro Glycerine had been used extensively in rock excavation for some years. Here the drill holes were smaller and the safe method used in loading holes was to fill the hole with water, and then pour the Nitro Glycerine in the hole, the heavier nitro glycerine replacing the water. In the shallow holes at Petrolia, 450 feet and less, this method may have been used. At present the nitro glycerine is very carefully poured into cans from three to four feet long, and an inch to two inches smaller than the diameter of the hole; the can is lowered carefully with a measured wire. Great care is taken to assure that the can reaches bottom. The charge is now exploded with a time bomb set to explode at a predetermined time but earlier days a firing head was made where a plunger, when struck, exploded a detonator. A "go-devil" (short piece of cast angle iron ~~(cast)~~) was dropped into the hole at surface which struck the plunger and exploded the charge. Another method was to detonate a stick of dynamite, attach a ten minute fuse and drop it into the hole. These sometimes lodged above the charge and failed to explode. The electric detonator came into use. Enough measured wire was attached and it (with a stick of dynamite)

was lowered into the hole until it rested on the charge of nitro glycerine. This rarely failed to explode.

Bottom water entered the wells from lower horizons as soon as initial production relieved the gas pressure. This that caused the early wells to flow wild and waste oil. The operators wasted this gas as fast as possible for as they were sure that it "held the oil back". From gas to water was usually one to two years. In 1870 the King district was pumping more water than oil.

In 1868 Petrolia was becoming quite a refining centre and the refiners were mostly well owners. These were James Kerr, J.H. Fairbank, John D. Noble, McMillan, J.P. Minhinick and John McDonald. Other refineries were owned by associations of both consumers, and producers. Some of these owned their own underground tankage. There were, however, a very large number of independent producers who were from time to time joined in Associations. These carried on a war without quarter with the refiners whom they accused of "rigging prices". Mr. Jacob Lewis Englehart came to Petrolia from New York in 186? at the age of...? He seems to have established a branch of the Ontario Carbon Oil Co. in Petrolia after buying out Williams and his associates in Hamilton and moving the plant to London. The producers blamed him for victimizing them and refused to sell any oil to them. He closed down his refinery and stated that he would reduce the price of crude oil. A compromise was eventually arrived at and the price of crude oil was maintained.

The newspapers say that 20 refineries were in operation in 1870 , eleven in Petrolia.

The names of producers mentioned in Petrolia in 1868 and 1870 are:

Harry Prince	Jas. McDougall	R.S. Dunlop
John Polly	P. Taylor	John H. Bennett
Williams	O.W.Chamberlain	H. Smiley
W.H. McGarvey	J.D. Noble	M. Hill
Dr. Miller	John McKenzie	Putnam
Townsend	Galbraith	Elijah Coryell
Frank Smith	J. Longhead	Dr. Ball
Jas. Rolston	Jackson	J.H. Fairbank
L.B. Vaughan	Thompson & Co.	Charlton
Lindsay	J. Johnson	Chandler
Foster	F.A. Fitzgerald	Chas. Ribighine
J.R. Minhinick	Wm. Spencer	Keenlyside
E.D. Kirby	Lamb	Jas.Wm. Lawson
J.H. Vivian	Mr. Penton	Jas. Perkins
Wm. Simmons	Lewis	Joe Ward
Capt. Tracy	Geo. Montcrief	A. Braise
John Brake	McIntyre	Drummond
W.R. Gibson	Stoke and Dawson	Col. Shoemaker
W.E. Reynolds	Cole Kidwell	Carmichael and Buchannon
Jas. Hardacre	Clement and Waller	Jones
Prince and Parsons	Lawyer, B.S.VanTuyl	D. Webster
Mr.Jeffrey and P.M.Kennedy		H. Watroman
Blackburn	Buffington	H. Rosenburg
A. Simpson	John Hyde	W. Oliver
A. Moss	M. Murray	E.D. Kirby
John McMillan	Andrew Elliott	W.H. Lancey

EXPLORATORY DRILLING

The success of the oil drilling at Oil Springs, Bothwell and Petrolia, especially the wells in the King district in Petrolia which flowed hundreds of barrels per day, inflamed the imagination of every one in Canada who enjoyed "taking a chance". Mention has been made of the trusting prospector who set out with a post hole auger and spade to search for oil but the oil fever that broke out in 1862, ~~and~~ but in 1866 the fever could not be soothed with a post hole auger. Companies were formed all over Western Ontario and in Eastern Ontario as well. Oil was to be found at 500 feet, the same as at Petrolia and wells were abandoned at that depth.

The ~~oil~~ irridiant scum on stagnant ponds was ~~still to be~~ believed a certain indication of oil, but sulphur springs were considered equally sure ~~as any other means~~ of locating an oil well. The "oil smeller" with his forked stick came into his own and is mentioned with discoveries ~~in several instances~~. One man claimed that he found the Florence oil pool in the year 1880 but, unfortunately, for him it had already been discovered in 1865 and abandoned.

Sulphur springs drew many prospectors ~~most searchers~~ and ~~many~~ wells were drilled on these showings. The Detroit River limestone or Bass Island limestone carries many sulphur water horizons. In Welland County this information is at the surface and in many areas within 10 miles of Lake Erie it is impossible to find water that is not tainted with sulphur. Two wells were drilled at Drummondville and one near Niagara Falls. A well was drilled on the Steel farm (adjacent to Pt. Colbourne) in 1866 to a

depth of ..... feet where a fair flow of gas was encountered. To this well can be attributed the discovery of the Welland Gas field. The surface gas deposits (in the gravel beds that are in contact with the rock) along the "Ridge" from Blenheim to Highgate in Kent Co., were discovered about this time and many deep wells were dug hoping to find oil at depth. One digger found more gas than he bargained for. The newspaper account says that the gas came in a rush at 50 feet and the digger made his escape by ladder bombarded by stones and gravel until he reached the surface. Not a few diggers were overcome by gas and a few lives were lost through asphyxiation.

An oil seepage was stated to have been found in the vallye of Otter Creek just south of Tillsonburg and a well was drilled in 1861. (It may have been started in 1860). The location is about three quarters of a mile ~~from~~ south of Tillsonburg, about 75 feet north of ~~King~~ No 3 Highway where the road curves sharply and climbs the hill out of the bed of Otter Creek. It is ~~on~~ a very swampy spot and considering the fact that little or no oil was recovered, it is easier to imagine that it was colours of iron oxide seen in the stagnant water than a seepage of petroleum. In any case a little oil was found at 36 feet in the limestone under 40 feet of clay and sand. A Globe dispatch (Aug. 14th, 1861) from the Ingersoll Chronicle says "At 4 o'clock this P.M. (Aug. 6th) at Messrs. Watkins and Inglis (Hamilton) well, water and oil were struck at 70 feet, more than the engine could pump. Estimated at 50 gallons per minute, two thirds oil. The well was dug (and curbed 4' x 5') 30 feet and drilled 37 feet. Duncan McLean is drilling (another well) on the rock and cannot be far from oil. Mr. E.D. Tillson has already two curbs

in the ground ready for commencement, and commencement has been made a little farther down the creek on the property of E. Grey of Bayham Township. Although several wells were drilled along the creek, oil was never found in commercial quantities. A small shallow field also non-commercial was found another two miles farther down Otter Creek just south of the Railway Bridge.

A sulphur spring at Delaware Village where Kings Highway No. 3 crosses the Thames River and on the site of an ancient Indian village, attracted a prospector in 1865. Oil was found at 193 feet and a great flood of sulphur water. Half a dozen wells were drilled, all striking sulphur water, which still flows (as anyone driving through Delaware on No. 3 Highway must be aware of). This first well was called the Enterprise. Others mentioned are the Hinks, Caradoc, Maple Shade, Loomis, Benneville and the Pioneer. The locations given are referred to land marks either so indefinite or so long since gone that these wells cannot now be located. The only known log is the Caradoc which was later deepened to 1947 feet. The log can be found in Ont. Bur. Mines 1890 p. 61.

A seepage of oil was known at Cape Smith on Manitoulin Island for years. In 1866 the Grand Manitoulin Oil Co. was formed and they sunk six wells. A Globe dispatch July 11th, 1866 says "The Grand Manitoulin Oil Co. shipped 60 barrels of oil from the wells at Cape Smith to Parsons Refinery Toronto. Received $8.00 per barrel, which is $3.00 to $4.00 over the present market value". Another and

the last dispatch dated January 24, 1867 says "The Grand Manitoulin Oil Co. has sunk six wells but has only shipped 132 barrels of oil". The oil on Manitoulin Island was found in the Trenton Limestone at .... feet. This limestone outcrops on the north and east side of the island. It has been given half a dozen thorough tests at several points since 1866 without success.

Oil was also struck in individual wells scattered over southwestern Ontario. In 1865 oil was struck on the Peter Marshall farm lot 2 Con.I Moore Twsp. depth not stated.. In 1866 a well at Belle River Station, Essex County, found oil at shallow depth. A small field developed here in later years. The Globe May 10th, 1865 says that drilling began at Adelaide, village in Lambton County." Drilling has been active along the Sydenham River near and at Florence during the past three years, and some good oil shows have been found. Two drilling rigs are getting ready to start work." This is the field that Mr. John Doran, the "oil witch" discovered in 1898. Reported in the Bureau of Mines Annual Rept. 1898, pages 18 and 19.

Wildcat wells in the 1860 are as under:

July 1864. At Chatham, to 1000 feet found a heavy flow of salt and sulphur water at 585 feet.

Apr. 8, 1864. At St. Clair (?) drilling at 970, total depth, unknown.

May 6, 1864. "A well is getting ready to drill at Pt. Stanley where the oil can be seen coming from the rock". There is nothing to confirm this seepage from the rock and no rock is exposed at Pt. Stanley. No doubt another scum of iron oxide.

May 9th, 1864. Drilling in Ballantyne farm two miles from Widder Station, Lambton County.

October 5th, 1864. A well is being drilled on lot 11, Concession VI, Barton Township, now 300 ft. deep. (Two wells were drilled here in 1864-66, one 875 ft. deep and one 1318 ft., both abandoned in 1866)

June 15th, 1866. The Paris Oil Co. say that strong indications of oil were found in a well at 60 ft. (in Paris)

July 16th, 1866. The Norwich Oil Mining Co. Pine Grove well, three miles from the village found a heavy flow of water at 85 feet. Two feet in the rock.

Oct. 4th, 1866. On the Stirling Road ninemiles from Belleville a well is now drilling at 160 feet. (The Archean rocks are exposed not far from Belleville in Hastings County)

In 1866 (no month) At North Agusta near Prescott, oil is seen pouring out of the rock. (This could be a seepage from the Trenton limestone which is exposed in this area, or more likely the usual iron scum).

It was the search for oil in 1866 that was responsible for the salt industry at Goderich. A well was drilled for oil at the mouth of the Maitland River and salt was encountered at..... feet.

The year 1866 was the boom year in the Ontario Oil Industry. The American Civil War had brought about a raise in the price of oil. The fame of the Ontario oil fields had reached around the world. Americans were the most prominent in the Oil Rush. In 1865 there were 16 oil companies incorporated and in 1866 there were 27 and the big majority were purely American companies, Boston, New York, Buffalo, Detroit, Chicago are prominent among the names with and without Ontario affiliation. Seventeen give Enniskillen as the object of their efforts

and eight give Bothwell, followed by Manitoulin Island, Haldimand, Huron, Glengarry, Malahide, Pelham, Sandwich Counties. London City and Springbank, Tillsonburg, Vienna and Milton are each the object of a company's operations. A total of 43 different companies.

The change from cable tool drilling to pole tools was undoubtedly gradual but there has been little evidence to fix the date when pole tools were first used. Some light on the subject may be ahed by a dispatch in the Chatham Planet June 8th, 1865 which was "The Thamesville well being sunk by General McDonnell is situated quite close to Thamesville Station (present CNR) and is now drilling at 260 feet. On Thursday a pocket of gas was struck that blew 200 ft. of rods weighing 600 pounds as far as the length of the chain attached to the walking beam would allow, and blew cuttings high in the air and over the inside of the rig".

The fact that the correspondent calls them "rods" does not disprove anything. He was no doubt unfamiliar with drilling (few were in 1865) and might easily miscall the wooden poles, rods. Iron rods were more expensive than three inch Manilla Rope, and poles were substituted for economy sake. The poles were fastened to the walking beam with a chain. He gives no further details of how the cable or rods were lengthened in drilling.

REFINING

DURING THE PERIOD from 1860to about 1868 there is no record of any change in Refining from that described in the earlier Chapter. An improvement that occurred probably in 1868 is told in Canadian News Nov. 12th. 1868. taken from The London Free Press. " The process is simple. The oil is distilled in the usual way and 75% is taken out of the crude. This is treated with acid and the whole is pumped back into the still and redistilled. About 50 to 60% is taken out and treated again. This double distillation and double treatment by sulphuric acid produces by ordinary attention a white oil free from objectionable odour, with a gravity of 44½ degrees, and a fire test of 120 degrees. or 5 degrees above standard."

Ther is no mention of any treatment with either caustic soda or litharge.

Mr. John Noble in his evidence before the Royal Commission in 1890 tells of the process introduced by about this time, "In 1868 I went into the refining business in Oil Springs and about that time the lead (litharge)treatment was introduced I think by a Mr. Allan..... In the early days of Oil Springs a great deal of attention was paid to chemical analysis. An old Scotchman connected with the Canadian Rock Oil Co. named Pierce, I think, did a great deal of work, but he died and the results of his work were lost. He made some good samples of oil".

Another burden that the refiners had to carry was the tax levied on refined oil. It was shown in the Chapter on Oil Springs that a duty

on imported crude oil and refined oil had been imposed in 1862. There had been so many complaints about the injury to persons and property from fires caused from the low flash point of much of the kerosene placed on the market. The best refiners had equipment that could turn out a safe product but the small refineries had difficulty in making their product safe. A publication 'Hamilton and its Industries' 1884, says that "Williams Safe Oil" manufactured by Canadian Oil Co is a safe product and that no accident has ever been traced to it. The flash point is 120° or 5° above requirement.

The refiners, among themselves or their association, had an inspector who tested all manufactured products before shipment and it had to meet the standards fixed by the refiners. However, nothing less than Government Inspection would satisfy the public who petitioned the Government from time to time. In the session of 1866 a bill of this nature was presented to parliament but was discharged on second reading. Not until 1868 did the petitioners succeed in presenting a bill that was acceptable to all parties.

The Dominion Government passed the Petroleum Inspection Act (31 Victoria Chap. 50) 1868 in which all petroleum offered for sale must be inspected and pass a flash test of 115°F.

All refiners and warehouses must have a license to operate. The fee was $50.00.

All refined petroleum imported or domestic must pass fire test of 115 degrees F. without igniting.

Inppection was performed by officers of the Internal Revenue and Customs. The inspection fee was 20 cents per barrel or 1 cent

per gallon for smaller packages.

A duty on refined petroleum made in Canada was fixed at 5 cents per gallon.

Imported refined petroleum paid a duty of 15 cents per gallon, and imported crude petroleum 6 cents per gallon.

When the price of crude oil was from $4.00 to $5.00 per barrel and refined oil was 50 cents per gallon and up, this tax did not hurt anyone but when the price of refined oil dropped to 10¢ per gallon, the tax was a heavy burden. The refiners claimed that the Govt. inspectors interfered with their experiments in refining and were a detriment to the industry. They had to have a free hand in order to find new and better refining methods.

And so through the 1860's the storm continued. Every fire was blamed on the dangerous kerosene. Coal oil was advertised as safe and although there was no such product on the market, the retailers sold it anyway and to this day the majority of the public have been trained to call all illuminating oil "Coal Oil".

PRODUCTION

In the story of Oil Springs, the difficulty of fixing the annual production is told. The two records of oil shipped given by Logan and Hunt and the Dept. of Excise figure gives a basis of an estimate for 1860, 61 and 62. Beyond this point there is no such figure given. The Globe January 24, 1867 and the Montreal Herald of March 30th, 1867 says that the domestic consumption of kerosene in 1865 is estimated at 75,000 bbls. and in 1866 a conservative figure is 100,000 barrels. As this is kerosene the crude equivalent can be arrived at by applying the ratio of refined to crude. There are several calculations of the number of gallons of kerosene recovered from a barrel of crude oil and they vary with the skill or carelessness of the refiner. In the 1860's this ran from 50 to 60 percent. The calculation then resolves itself into home consumption, plus exports, less imports equals total refined in Ontario. Then by applying the ratio we arrive at the crude produced. To this must be added the waste and an estimation of the quantity evaporated. This when solved and apportioned among the fields on a basis of the wells operating and their flow or rate of pumping, gives as follows:

Year	Oil Springs	Petrolia	Bothwell	Total
1861	20,000	500		20,500
1862	370,000	500	300	270,584
1863	89,000	1,000	500	90,500
1864	99,200	1,000	500	100,700
1865	97,870	5,000	5,000	107,872
1866	51,175	60,000	40,000	151,175
1867	1,000	363,534	1,000	365,534
1868	1,000	249,000		250,000
1869	1,000	395,700		396,700
1870	1,000	449,000		450,000

Chapter III: Oil Springs II

The Harkness Files
Volume XIV
Unpublished Manuscripts

- THIS PAGE CREATED BY OGSR LIBRARY -

April 10/1940 (2)

OIL SPRINGS

Revised and
Not complete several pages
missing

The first written reference to a seepage of oil at Black Creek (Oil Springs) is found in Geological Survey of Canada, 1849-50, page 99, by Sterry Hunt, chemist to the Survey, who, in 1849 was conducting a soil survey of Canada. Earl Cathcart, Governor of Canada, submitted a sample of the "Gum Beds" to Hunt, and later Mr. Joseph Wood, M.P.P. for Kent county, collected and sent Hunt a one hundred pound sample. Hunt reported it suitable "for the construction of pavements, for paying the bottoms of ships and for the manufacture of illuminating gas ------ the specimens in my possession contain from 78 percent to 81 percent combustible and volatile matter."

Alexander Murray, Assistant Provincial Geologist, reported on the deposit in Geological Survey of Canada, 1851-52, pages 90-91. His visit was in the autumn of 1851 and he says of the deposit: "The black shales of the Hamilton group, in the Western Peninsula, are in general probably more bituminous than those of the Utica slate. Several places in their distribution are characterised by bituminous springs, and a visit was made in the early part of the season to a bed of nearly pure bitumen, of which the existence has been noticed in previous Reports, including that of last year, in which the range of the Hamilton group in the Western Peninsula is given. This bed of bitumen, which in some parts has the consistency of mineral caoutchouc, occurs on the sixteenth lot of the second concession of Enniskillen in the county of Kent, but its extent

does not appear to be so great as we were at first led to understand. It does not seem to exceed half an acre, extending five chains in a north-east direction, with a breadth of rather less than half a chain. By different trial holes which have been sunk through the deposit, it would appear to have a thickness of two feet over about twenty feet square, towards the south-west end, from which it gradually thins towards the edge in all directions, varying in some parts along a low ridge which it forms, from a foot to four inches. The bitumen is underlaid by a very white clay, which I was informed had been bored through on one part for thirty feet. The upper portion of the clay was observed to be more or less penetrated with petroleum, and small black globules of the same were seen scattered through the mass for a depth of four or five feet. Bituminous oil was observed to rise to the surface of the water on the Black Creek, a branch of Bear Creek, in two places on the seventeenth lot of the third concession of Enniskillen, and I was informed that it had been observed at other parts further down the stream, but to what amount the material might be daily collected at any of the places, I am quite unable to say; a freshet prevailed in the river at the time of my visit, the current of which swept away the oil as fast as it rose."

In the year 1860 the decennial census was taken in Lambton county by John Smith enumerator. Most fortunately he has left many notes of interest and in particular with regard to the oil excitement. He says of Enniskillen township and the oil district: "A few persons settled in the township as

early as 1835 but for many years it was dreaded by the settlers as a miserable swamp, and made very little progress. In the year 1854 the settlers had increased until there were 54 on the assessment roll, and the township was erected into a municipality under the amended Municipal Act."

"Since that time the increase of the farming population has been steady, and a good deal of improvement both in roads and land clearing, buildings, etc. (also in schools) has been made."

"But the oil mania has brought the greatest influx of population to the township."

"It commenced in April last and has tended greatly to increase the inhabitants, and to put a fictitious value on land; many parcels of land that a few years ago were thought hardly worth the taxes are now being held at high prices."

"The problem to be solved at present is, does this substance abound in the crevices of the rock generally or is it confined to those spots where it showed itself spontaneously. For the purpose of solving this problem, wells are being sunk in various places, and hitherto they have not been successful in any place at a distance from where the oil appeared naturally."

Hunt says[1] that speculators became interested in the deposits of bitumen in Enniskillen township as early as 1853, and Robb[2] says: "In Enniskillen ---- deer horns and pieces of timber bearing the mark of the axe, have been dug up at

(1) T. Sterry Hunt, Can. Nat., Vol. VI, 1861, p. 249. See Appendix "B"

(2) Chas. Robb, op. cit.

considerable depth below the surface in what appears to have been old wells." The excavations on the "Gum Beds" done by Tripp between 1851 and 1855 have already been referred to on page ....., James Miller Williams (1) was the first to produce and refine crude petroleum in Canada on a commercial basis. His first operation was at Bothwell and later at the present village of Oil Springs in the year 1857. Robb, who visited

(1) He is referred to as J.M. Williams by Dr. Robert Bell, and W.M. Williams by Hunt and Robb. Williams was later M.P.P. for Wentworth county, 1867 to 1879, and registrar of that county from 1879 until his death in 1890.

Oil Springs in December, 1860, or January, 1861, after giving a very detailed report of operations in late 1860, states, as does Hunt at the same date, that Williams began producing and refining oil on Black Creek in 1857, using at first the asphaltic material, (clay and surface oil mixed), locally known as "gum beds", but that he soon discovered "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." "The total quantity which has been raised by Mr. Williams is about 200,000 gallons. (Hunt says 300,000 to 400,000 gallons). Mr. Williams has now five wells in more or less successful operation, yielding on an average from 600 to 800 gallons per day; but the amount which the wells are capable of yielding has never been thoroughly tested, as the difficulty attending the transportation from the wells to the railway station -- a distance of about sixteen miles -- has hitherto restricted the yield. At first the oil flowed into

the wells unmixed with water, but latterly, although the supply is undiminished, large quantities of water are associated with it, insomuch as to render it necessary to use steam pumps to drain the wells."

All writers on the history of early oil fields in Western Ontario up until ten years ago, credit Shaw with the drilling of the first oil well in the rock at Oil Springs in February or January, 1862. The origin of this statement appears to be in Alexander Winchell's book "Sketches of Creation", 1870, page 286. Winchell visited Oil Springs early in 1865 and made extensive enquiry into most phases of the industry. He gave a list of the large flowing wells drilled immediately following Shaw's. The writer questioned this date as that of the first well drilled into the rock, and purely on a negative hypothesis placed the date as January, 1861. A search of the Daily Globe, Toronto, has finally settled this question. The Globe on January 23th, 1862, published a news letter from Oil Springs signed "Sigma". "On the 16th of this month a Mr. Shaw, lately of Port Huron, Michigan, a dauguerrean artist and formerly of Kingston, C.W., struck oil, as it is termed, near the road running between the second and third concession in the north part of the east half of lot 18, concession II. The well was sunk about 203 feet below the surface of the earth, measures 4 feet by 5 feet at the top -------- 50 feet through clay, 153 feet in the rock -----. Within 15 minutes of the last drill of the chisel, the oil was overflowing the surface of the earth, the well being entirely filled -------." Here follows a description of the method then in use for "shutting in" an oil

well. "The oil spouted 20 feet above the surface of the earth." "Four 120 barrel tanks were filled and many barrels." "I timed the filling of these barrels and found that in one minute and 45 seconds each barrel was filled." "From the time that the well was brought into partial subjection (which was on Friday evening) up to this time, upwards of 2,000 barrels have been taken away and more than this quantity has been lost ------" "owing to the want of barrels only some 650 barrels are taken from the well each day." Sigma further informs us that Shaw began his well in the previous July with a capital of $50.00 and borrowings up to the limit of his credit for a radius of 20 miles. The next best well is stated to be on the north end of lot 19, concession II. It yields less than 30 barrels a day. "There are few comparatively who have drilled in the rock." "The plank road to Wyoming will be completed immediately." "Not more than one-quarter of the wells are in operation owing to the lack of demand." This definitely fixes the date that Shaw drilled his 2,000 barrel well as January 16th, 1862, but this was not the first oil well drilled in the rock in Ontario.

The Daily Globe had sent a special correspondent to the oil fields of Canada West in August, 1861. His dispatch from Oil Springs (August 29, 1861) was published on September 6th in which he said that about 400 wells had been drilled. He gave the logs and production of 32 oil wells drilled into the rock, ~~one owned by Kelsey and Vaughan on the east half of lot 19, 156 feet in the rock -- he mentioned wells 250 feet deep~~. He listed among the 32 wells one owned by Shaw and Company on lot 18, concession II, surface 50 feet, bored 70 feet in the rock, yielding 15 barrels each 24 hours.

Williams and Company are reported as owner of 800 acres - lots 16 and 18, concession I, and lots 16 and 17, concession II, (part of the Tripp acreage) and as having three wells drilled into the rock, two in the "gum bed" in lot 16, concession II, and one in the "gum bed" lot 18, concession I. Of the first two, one is 150 feet in the rock and the other is 100 feet; it has been in operation two years. (1859-1861). The first yields 50 barrels per day and the second 60 barrels per day. The well on lot 18, concession I is 100 feet in the rock and produces 100 barrels per day for six days in succession. The correspondent states that several other wells are being drilled on Williams' property, and one has now reached 250 feet, in which oil has repeatedly been found but not in sufficient quantities to pay. He tells us at the beginning of his dispatch that the "quantity of oil mentioned as produced is given upon the authority of the lessee or the landowner." This correspondent's logs are very complete and his statements have all the appearance of accuracy. His facts show that Williams drilled the first producing well in the rock some time in 1859. It is this one that has been in operation two years which produces 60 barrels per day from 100 feet in the rock - a total depth of probably 170 feet. Its location was on the small "gum bed" in lot 16, concession II, very minutely described by Murray in G.S.C., 1851-52, pages 90-91.

It is perfectly clear how the error in date arose and how Shaw was given credit which belonged to Williams. Shaw's well

was the first of the "great producing wells" of 2,000 barrels and over, that were listed by Winchell and referred to by many early writers. Shaw had already drilled a well, probably within one hundred feet of his 2,000 barrel well, and it was producing in August, 1861. The practice at Oil Springs and Petrolia at this date was to buy a farm from a settler and divide it into acre lots for drilling. Shaw had a one acre lease, Sub. 10, Rg. B, lot 18, concession II. He later became a partner of Bradley and others in larger operations.

All recent writers refer to Shaw as James or J.W., if any initial is given, and call him an American from Pennsylvania, evidently confusing him with Lick; but the Globe correspondent (September 6th, 1861) calls him Hugh Shaw, as do all contemporary writers, and says he has had considerable experience in California and is about to erect a refinery and has patented a process for refining oil as well as extracting colours therefrom. His home is variously assigned to Kingston and Toronto, but in his obituary notice (Globe, February 14th, 1863) it is given as Cooksville, Ontario. "Hugh Nixon Shaw, died February 11th, 1863, at the age of 51, of asphyxiation in an oil well at Oil Springs, Canada West."

Apparently Hugh Shaw was a "rolling stone" and had travelled a very considerable part of North America. When "down on his luck" he turned photographer taking "tin types" or daguerretypes. He must have been a man of some considerable intelligence, as his patent refinery was extensively used in the '60's. It was probably as good as any of those times. His effort (or perhaps idea) to extract colours or dyes from petroleum tar was well in advance of the times as chemists are still working on this problem.

The honour of drilling the first oil well in America is bestowed, by nearly all American writers, to "Colonel" Drake who completed a producing oil well at Titusville, Pennsylvania, on August 23, 1859. The well is said to have produced oil at the rate of 35 barrels per day from a depth of 69 feet. It is not the desire of the writer to wave the flag of Canada higher than that of any other country - his object is to pay tribute and do honour to the men who gave us the means of travelling in the comfort that we now enjoy. It is a very empty honour for any jingoist of the present generation to say "We were first". When he flashes past the site of any first well "doing 70", he might well reflect on those valiant pioneers who poured forth their energy and sweat, helping their horses haul heavy loads through bush roads over stumps, roots and through mud holes, wrecking their vehicles and their hopes on these obstacles. Neither the name of Tripp or Williams appear on the list of oil miners and oil speculators left us by the enumerator in Enniskillen township in 1860. They had come and gone; Tripp to seek a livelihood in some other vocation, and Williams with his oil refinery to Hamilton where he achieved success and made a fortune.

Dr. A. Gesner, already referred to, points out that the honour of discovering the process of refining oil is divided among independent workers in several countries. The same is true of the discovery of petroleum. The refiners knew that the crude oil that seeped from the rocks of the Caucusus and from the coal measures of England could be refined into the same illuminating oil as they obtained through coking coal. Tripp knew it, Williams knew it, and Gesner, the consulting chemist

to the New York refiners, knew it. There is no doubt that many men were searching on all continents for petroleum seepages. Tripp dug wells at Oil Springs between 1851 and 1855, and Williams began in 1857 where Tripp left off in 1855, digging additional wells. The depth of these dug wells was from 44 feet up to a maximum of 70 feet, and producing up to 30 barrels per day, equal in production and depth to "Colonel" Drake's well. It is quite clear therefore, that the effort to produce oil in Ontario was not inspired by "Colonel" Drake's success in Pennsylvania, for Williams had been producing and refining oil for two years before "Colonel" Drake drilled his first well.

OIL HORIZONS

There are three separate and distinct oil horizons at Oil Springs. First horizon: at the surface in the clay and at various depths down to the top of the rock where it is found in quantity in the beds of sand and gravel. This was operated from 1852 to 1862. Second horizon: tapped by Shaw and others in the Hamilton shales and a few feet in the Delaware (Corniferous) limestone.(1) It was operated from 1861 to 1866, and each spring a few wells are still pumped. Third horizon: the main source of oil at about 100 feet in this limestone, probably the Onondaga, and 400 feet more or less below the top of the rock; it has been pumped continuously from 1861 to the present time.

(1) M.Y. Williams, G.S.C., Summ. Rept., 1918, pt. E, p. 34.

Wells in the Surface Clays

The practice in oil wells dug in the surface was the same as for water wells. They were dug about 4 feet square, which

was a minimum size to accommodate a man digging out the earth and loading it into a bucket; they were lined with logs to prevent the clay from caving. The oil found its way into the wells at various and random levels following cracks and fissures in the clay, but principally at the top of the rock, if a gravel bed was present. These were always found to be completely filled with oil in fair quantities. In December, 1860, Hunt saw "nearly 100 wells" and in August, 1861, the Globe special correspondent listed 57 of the better producers out of a then total of 400 wells, some of which had been drilled into the shale below. Hunt's estimate of production to December, 1860, is 30,000 to 400,000 gallons. (7,500 to 10,000 barrels). He says that the wells are not pumped continuously owing to the shortage of barrels and the "difficulties of communication". On what Hunt described as "difficulties of communication" in December, 1860, the Globe correspondent in August, 1861, exhausted all his descriptive superlatives, after the stage had bumped and floundered through two miles of the 12½ miles of stumps and mud holes, between Wyoming and Oil Springs. These were courageous men who produced oil at Oil Springs in 1860 and 1861; only the huge profits kept the industry alive, for the impassable road so often mentioned, brought the industry to a standstill for many months of the year. (See Chapter on Transportation).

The Daily Globe correspondent, April 14th, 1865, says that when this surface oil was found, a number of workmen with a few hundred dollars came in and sunk wells on ⅛ acre and ¼ acre leases. Some of these wells flowed. (probably for a few days).

Any of these producing wells made their owners prosperous but the larger wells made riches. Machinery was primitive; for digging, a pick, shovel and 100 feet of rope; for pumping, an ordinary water pump operated with a spring pole in many cases. When steam power became necessary for drilling in the rock and more expensive machinery was required, the prospector with a few dollars was outdistanced, and most of the early operators sold out to wealthy Americans, who operated either as individuals, partnerships, or companies. He says that most of the early names have disappeared excepting where one is perpetuated in a well. The Americans, he says, have purchased most of the old oil properties. Other dispatches mention prices paid that was then ample compensation and no doubt the early settler and operator was highly satisfied with his bargain.

Wells in the "Mud Vein"

There is, in the top of the Delaware (Big Lime) limestone, a foot or more immediately under the hard surface, that is exceptionally porous. The drillers say that the bit drops through this distance without meeting any resistance. There are many things that might meet this description, commonly found in limestone where coral reefs abound; but none of them are usually found over such a large area and such a narrow vertical distance. Under such conditions it is out of the question to expect any samples from a percussion drill, and therefore the drillers' description must suffice.

Shaw's well, on January 16th, 1862, was the first well to reach this horizon, and in January or February, 1863, Sanford Fleming[1] says that there were 30 flowing wells drilled into this same horizon, only two of which were then flowing. Shaw's well had flowed for 10 months and produced a total estimated quantity of 55,000 barrels. Fleming published a map on which he showed the area covered by these wells.[2] Alexander Winchell[3] gives a list of 33 flowing wells with a total initial flow of 55,200 barrels. Fleming says that at one time these wells flowed a total of 12,000 barrels per day. The last two that flowed produced 100 barrels per day each and production had then dropped so low that the old surface wells were being reopened, many being pumped by hand. He estimates the total production at the time of his visit at 400 barrels per day. Fleming's most interesting paper shows that this horizon was flooded out by encroaching edge water. He says: "There is one remarkable peculiarity connected with the stoppage of the natural discharge of oil from the wells, which might here be mentioned. The deepest wells invariably have been those which first ceased to flow; and the two shallowest of all the thirty wells are those only which now yield a natural discharge of oil" ------ "The deepest well was the first to fail; in fact this one only discharged 4,000 barrels of oil in all ------- In ceasing to give a discharge of oil, these wells seem to give no previous indications of a coming change. ------ This discharge is suddenly changed, in

[1] Can. Jour., New Series, Vol. VIII, p. 246, map, p. 185.

[2] Can. Jour., New Series, Vol. VIII, p. 246, map, p. 185.

[3] Sketches of Creation, 1870, Appendix note VIII, p. 443.

most instances, from petroleum to salt water, and the water flows in a continuous stream as did the former substance." Porosity in this horizon was not at all continuous. He cites three instances of wells drilled within 100 feet of producing wells and many feet deeper which were dry, and he also cites instances of wells directly connected and each effected the production of the other.

Fleming gives no suggestions of the force behind the flow of oil and water; there was undoubtedly considerable gas but it would seem that in this case, as in most, normal laws prevailed and the flow of gas was exhausted before the oil ceased and the flow turned to water. Dr. Marcet's[1] attention was drawn to the presence of gas only by the fact that it "imparted to light a peculiar oscillation which revealed its presence". A great deal of speculation might be indulged in over this very minor point, but it seems to the writer that these wells flowed from hydrostatic pressure which was imparted to the gas that was present. When the drill tapped this reservoir, gas escaped first, then gas and oil, and then water which would continue to flow until it found a state of equilibrium. This state must have occurred within a relatively short time as Dr. Marcet, in September, 1863, mentions no flowing water wells; his entire reference is to pumping. He attributes the cessation of flow to the exhaustion of gas.

[1] Jour. Soc. Arts, Vol. XII, p. 234.

After these wells ceased to flow, pumps and power of all kinds were requisitioned, but the flood of oil in 1862 had

sent the price of oil to bottom levels, and it was not until the price improved that the operators could afford to put in first class equipment. It will be noted in the chapter entitled Oil Field Practice that a very limited supply of untried equipment was available in these years. There were plenty of very original inventions but the oil fields were festooned with failures.

Dr. Marcet[1] says of this field in September, 1863: "In my ramble through the forest I saw two men engaged in pumping a well by hand; they told me that after pumping a well a whole day about a barrel of oil (40 gallons) rose to the surface during the night, this they ladled out the following morning and then proceeded again to pump out the water ---- I visitedseveral wells where oil and water were pumped out together by means of steam power ----- one well 246 feet from the surface, 196 feet of which are in the rock. I observed two wells close to each other and pumped by one steam engine."

Theodore D. Rand[2] says: "In 1864 several companies

(2) Jour. Franklin Inst., Vol. I, 3rd Series, No. 1, July, 1865.

were organized for petroleum mining in this district. They have gone to work in a thorough manner, with proper derricks and machinery and soon will be in a position to test thoroughly the oil value of this region". He had previously mentioned one well which made 30 or 40 barrels per day by pumping with a spring pole.

"The present yield of the whole region is quite small. This is in great part due, as has been stated, to the abandonment of wells and to unskillful pumping. Many of the wells were sunk

by men of small capital, who, even if they could finish the well were not able to erect proper engines and pumps. The machinery is in almost all cases very defective, and it is probable that the present engines, properly geared and with proper pumps would greatly increase the yield of oil."

A point on which opinions vary ~~enormously~~ widely, is the waste of oil into Black Creek due to the unrestricted discharge from these early flowing wells. The low estimates are by engineers who were on the ground at the time, and the highest estimates are by those who came years afterwards and made their estimates from hearsay evidence. The description on page shows very clearly that most of the initial flow was lost, but in a very few days this flow was materially restricted and the waste curtailed to a small quantity; so no doubt was the case in each of the first large wells. Of the list given by Alexander Winchell (1)

(1) op. cit., p. 443.

only 14 wells had an initial flow over 1,000 barrels, but Winchell in January, 1866, estimates the loss into Bear Creek at 5,000,000 barrels. Rand says: "While the wells were flowing immense quantities of oil flowed down the creek and were lost. Several times it took fire on the creek and blazed above the tops of the tallest trees. Evidence of this is even now to be seen in the track of the creek, marked by a border of trees charred to their very summits, those farther off being charred on the creek side only ---------" Sandford Fleming says: "I was informed, that although only about 150,000 barrels of petroleum have been shipped, a total quantity of 300,000 barrels must have been discharged up to this date from

all the wells, about half the total yield having been allowed to run to waste." In estimating the waste of oil in 1862, one has a choice of Fleming's estimate of 150,000 barrels made in 1863 or Winchell's of 5,000,000 barrels, made in 1865.

The closing of the Oil Springs field about 1866 is by many writers attributed to the departure of American operators when the Fenian raid threatened, but it seems to the writer that the flood of oil from the "King" wells and adjoining territory and the consequent drop in price below the cost of pumping and hauling from Oil Springs was a certain cause. The plank road to Wyoming was in a deplorable condition; the operators were pumping over 90 percent. water and expenses from shut-downs were mounting. Such operations could only be carried on at a loss and the field closed down for 13 or 14 years.

At the present, this "mud vein" or "top show" horizon gives a few barrels each spring. It accumulates some water (mostly fresh) during the autumn and winter which fills up the voids and washes a film of oil off the surface of the rock. One or two operators at Oil Springs have wells so located down the dip of the structure that they can pump off the water and oil by operating these wells in succession from the highest to the lowest on the structure. The mud vein then is left filled with air which the operators, who do not pump this horizon, claims adds to their troubles by accelerating the process of corrosion of their casing.

The Lower Oil Horizon

Every oil field or mine has a certain amount of romance connected with its discovery, and history would be very drab reading if it were not for these stories of the "luck" of those who failed and succeeded. So with the main oil horizon at Oil Springs. Two oil horizons had already been exploited in 1863 and the operators, with visions of the "great flowing wells" of 1862, speculated on a new source of supply. The Pennsylvania operators urged that deeper drilling be done, and finally several operators made a pool and drilled a deep well in lot 18, concession II, in late 1863. (See Fleming's map page). Hunt gives the log in Geological Survey of Canada, 1866 page 246 .

Test well, lot 18, concession II, Enniskillen township, Clay 77 feet, Grey shal, etc., 300 feet, below which only "hard rock was found until near the bottom when soft shales were again met with. In this well small portions of oil were said to have been found by the sand pump at de, ths of 210 feet and 400 feet in the solid rock beneath the shales. The total depth reached was 1,000 feet."

Hunt's information may possibly be incorrect and if so, the 210 feet and 400 feet should measure from the surface and not the top of the "solid rock beneath the shales". In the deep gas well on the same lot by Dr. C.C. Fairbank in 1914, oil was noted at 260 feet and 420 feet from surface. We have only the approximate location of this well and the steep dip in this field may account for the difference.

Another well was drilled on lot 19, concession II, and the log given by Hunt in Geological Survey of Canada, 1866, page 246: Clay 42 feet, shales, etc., 182 feet, where a copious flow of oil was found. The well was deepened to 595 feet in the limestone, a total depth of 861 feet.

Here are two wells drilled through the present deep oil horizon of Oil Springs prior to 1866 and neither of these found any oil of any importance. Why these two wells failed to uncover the deeper oil is one of the mysteries of the industry. Lady Luck had not yet found the man of her choice, and although further exploration work was done in the years immediately following the indifferent results obtained discouraged the operators. Of this work Arthur B. Johnston (1) says:

(1) Arthur B. Johnston, "Recollections of Oil Drilling at Oil Springs Ontario", London, Ont., January, 1923.

"About the year 1868 or 1870, talk was started about the deepr oil that was well known to be there, and which we will call the 400-foot level. Most of the first contracts called for 500 feet or oil. The Lockhart Co. drilled a number of oil wells to this level, but owing to the formation that this oil came in and the water it was loaded with it did not look attractive. Mr. Lockhart tried to operate this vein; whether the trouble was that they went too deep or could not get the upper water shut off, it proved a failure. I believe the first well to produce from the lower level is at the rear of William Woodward's rig, and I think it was called the Shepherd well. It was owned at various times by Grant, Major, Johnston, and Anderson. It was supposed to be Top Show and was kept quiet for years."

Apparently no further work was done until 1881 when

Dr. Robert Bell[1] states, "Some of the old wells were revived by means of torpedoes; new wells were drilled in 1862 and operations were again active in 1863 when some 45,000 barrels of oil were produced ------".

(1) Dr. Robert Bell, Trans. Roy. Soc. Can., Vol. V, 1887, p. III.

The credit for this discovery is given to Mr. W.S. Duggan of Oil Springs by his biographer[2] writing in the Toronto Mail, December 1st, 1888. He says that Mr. Duggan "is credited with having been largely instrumental in the discovery of the oil below the 'flowing vein' in the Oil Springs territory ------- It was through his exertions that the Excelsior Oil Company was organized - a company that in 1861 first developed the resources of the lower vein." Quoting further from the Toronto Mail, - "Oil Springs which had lain dormant for 15 years was resurrected, and yielded liberally from the lower vein. The result was another surplus of raw material, but the steady increase of the demand seems to-day to require all stocks, machinery, skill, and appliances engaged in the business."

(2) Mr. Jas. Kerr of Petrolia is stated to be the writer of this special edition of the Toronto Mail, December 1st, 1888

From this revival in 1861 until the present day, the Oil Springs field has been in continuous operation. Details of production, oil field practice, refining, etc., will be found in the chapters under these headings.

Chapter IV: Canada's Oil Industry (1850 - 1860)

The Harkness Files
Volume XIV
Unpublished Manuscripts

- THIS PAGE CREATED BY OGSR LIBRARY -

revisions in green
Sept 4th 61

CANADA'S OIL INDUSTRY
1850 – 1860

ACKNOWLEDGMENTS

The events in this book took place many years before the birth of the author and are therefore a compilation of published reports taken from many daily and weekly papers Gelogical Reports and Scientific Magazines. Nearly all the reports are by observers and where this is not the case it is so shown. Where the author has drawn any conclusion this is clearly indicated.

This work would never have been concluded without the encouragement and assistance of Dr James J Talman Chief Librarian of Western University who deserves credit for bringing to light many important facts regarding Williams early work. To Dr Kay Lamb and the staff of the Archives of Canada I am especially indebted, and I wish to thank the staff of the Provincial Secretary of Ontario for their help It would be impossible to mention the many librarians and newspaper editors who have by their interest and help over the past thirty years made this work a success. To them the writer tenders his most sincere thanks

CANADIANS IN THE OIL INDUSTRY

The discovery and development of the Petroleum Industry in Canada had no relation to the Mining Industry. There were no prospectors paddling canoes in the rivers, or carrying heavy packs through the woods and stopping at intervals to search an outcrop of rock for "pay dirt". The rock in Lambton County lays from 50 ft. to 100 ft. below the ~~surface of the overlying clay.~~ Erie The discovery of oil in Canada West or Upper Canada as it was variously called, was the result of the experience and study of one geologist, two chemists and a hard headed business man. The geologist was Sir Wm. Logan, the two chemists were Abraham Gesner (indirectly) and Stenny Hunt, chemist to the Geological Survey of Canada. The business man was James Miller Williams of Hamilton.

The purpose of this book is to show the part that each of these men took to bring the industry from ~~the laboratory~~ to a thriving industry. These men earned a right to a place in history and to them be the glory.

This book is a compilation of extracts from newspapers, various Geological Reports and other sources. Any opinions or deductions are clearly indicated A reference to the source of every quotation or a complete quote would make the text too cumbersome. All important items are quotations and the source is given.

Development of Petroleum in Canada

Canadians who made the Oil Industry

PETROLEUM IN CANADA

Introduction

~~The object in the mind of the author, in writing this book, is to place the men who established the oil industry in their rightful place in history.~~ Oil for producing artificial light had been made from animal and vegetable sources since before the days of Solomon's Temple in Jerusalem. The men who discovered that oil could be pressed from the olive, will never be known, although they made one of the great disooveries; neither will it ever be known who discovered that whale oil and many fish oils could be used for illuminating purposes. Whether turpentine was first used for illumination or for preparing paints, is not clear, but it was extensively used in North America as an illuminant in the first half of the XIX century. No one has appeared to champion the discoverer of turpentine although he contributed to a major extent to the benefit of humanity in the first of that century.

All these things were steps toward the universal use of Petroleum as the first toddling steps of the infant lead to the speedy stride of the four minute mile racer. Crude petroleum was well known, but it had never been obtained in commercial quantities. Seepage from the rocks had been known all over the world and from the dawn of man on

earth, but no one had ever attempted to even guess when it could be found in quantity. There is no doubt that early geologists had given thought to the matter but (Sir) Wm. E. Logan understood and wrote of the reason that gas and oil accumulated underground, as early as 1843. Converting the crude petroleum into a refined oil that could be used for illuminating purposes was another major step in the industry. There were chemists working on the problem of producing illuminating oil from crude petroleum and other hydrocarbons, in England, France, Germany, the U.S.A. and Canada. Jas. Young of Glasgow was a pioneer in the British Isles, M. Selligue in France is given credit by Gesner as the first to attempt the removal of the objectionable mercaptans mircaptions from illuminating oil. In the U.S.A. the credit goes to Dr. Silliman as the first in 1855, to distill ~~rectify~~ the illuminating fraction distilled from petroleum; but Abraham Gesner of Halifax, Nova Scotia, successfully produced a liquid from coal which he named "Kerosene" and demonstrated its use, in Charlottetown, P.E.I. as early as 1846. He is without question the originator of illuminating oil on a commercial basis.

The man who brought the petroleum industry from the laboratory and made it commercially successful was James Miller Williams of Hamilton, Ontario. He began his work in 1856 at Oil Springs in a pilot refinery ~~refining~~ which he moved to Hamilton in 1857, and he was selling a refined illuminating oil to the public in 1858. His crude petroleum from Oil Springs carried a large percentage of

sulphur which could not be removed by the ordinary methods of distillation but had to be given a special treatment. This process was the work of Professor Croft of Toronto University. It was developed by him in the interval between 1857 and 1858.

These great Canadians established the Oil Industry on a commercial basis that has now spread from Oil Springs and Hamilton to every square mile of the earth's surface and Canadians can be justly proud of these men. This book is meant to be a means of perpetuating the memory of these men.

NATURAL SPRINGS OF PETROLEUM

The first user of petroleum in written record was Noah. In Genesis VI, 14, Noah was commanded to build an Ark "Make thee an ark of gopher wood; rooms shalt thou have in the ark, and shall pitch it within and without with pitch". In Genesis XI, 3, it is recorded that in building the Tower of Babel "slime had they for mortar". This pitch or slime as it was variously translated, could have had several sources that were all available to Noah and the temple builders. The best known and most plentiful supply would be at Hit near the Euphrates River, to the west of Bagdad, about 100 miles, where there were several "springs" of heavy oil, and gas. At Kirkut ~~in Iran-Irak border miles from the junction of the~~ on the Al'Usaym river 150 miles north of Bagdad. River and the Tigris. This is the site of the present Iraq oil fields and the Biblical "Fiery Furnace". Very large and important seepages of oil and gas were, and still are, found at Baku on the west side of the Caspian Sea. These are the sites of the great Russian Baku oil fields. The Zorostrians who practised fire worship at these two sites, made them famous to the ancient world. Herodotus 450 B.C. (Book V Chap. CXIX) tells us that the petroleum oozing from the rocks of Zante in the Ionian Isles was used for embalming. Tar was observed along the southern shore of the Dead Sea; it was used in ship building and for making bricks. The old Temple and pyramid builders along the Euphrates and Tigris Rivers imprinted the king's seal in their mud bricks and laid them in a bed of tar.

These can still be excavated leaving conclusive evidence that they used "slime or pitch for mortar". Pliny writes of oil from the wells of Agrigentum, the present Girgente in Sicily being used in lamps in the Temple of Jupiter. ~~Kirkut is said to be the site of biblical "Fiery Furnaces~~". Marco Polo tells of the commerce in both light and heavy oils from the Baku seepage, and this is confirmed by the report of Geffrey Dudeat in his fifth voyage into Persia for the English Merchants in 1568". (Richard Hakluyt Voyages Everymans Vol. II p. 132). "There is a great river which runneth through the plain of Javat, which falleth into the Caspian Sea by a town called Bachu, near unto which town is a strange thing to behold. For there issueth out of the ground a marvellous quantitee of oil, which oil they fetch from the utermost bounds of Persia; it serveth all the country to burn in their houses."

"The oils is black and is called Nifte; they used to carry it throughout all the country upon kine and asses of which you would sometimes meet with four or five hundred in a company. There is also by the said town of Bachu another kind of oyle which is white and very precious, and is supposed to be the same that here is called Petroleum. There is also not far from Shamaky a thing like unto tarre, and issueth out of the ground, whereof we have made the proof, that in our ships it serveth well in the stead of tarre."

There are other references to the Baku oil. The following is condensed from the Encyclopedia Britainica XIth edit. by Sir ~~Brerton~~ Boverton Redwood. He states that the distillation of petroleum especially of such as was required for medicinal use, was regularily carried out in the 18th century and earlier. The following is summarized from his remarks - V.I. Ragogin who visited the Caspian district in 1735, found that the crude Caucasian oil required distillation to render it satisfactorily combustible, and that when distilled, it yielded a bright yellow oil resembling a spirit, which readily ignited. In 1823 there was a refinery in operation, and in 1846 the refiner applied for a subsidy, claiming that he had taught the Don Cossacks to "change black naphtha into white". He gave a description of his method and a drawing of his still. Eichler of Baku is stated to be the first to introduce into Russia the use of sulphuric acid followed by that of soda lye, and his process was in universal use until recent years. (~~1911?~~)

Mr. J.T. Henry who published a book on the Baku oil field make no reference to Ragogin or his work.

Another most important seepage of petroleum that cannot be passed over to the "Pitch Lake" in Trinidad, British West Indies. Lord Cochrane tenth Earl Dundonald while an Admiral in the British Navy, got control of this deposit and attempted to introduce pitch to replace copper for covering the bottoms of ships of his Navy. He failed to convince the Admiralty and his scheme fell through. He did, however, sell great quantities for gas making, for burning fluid, and many other purposes

ndonald

in the first half of the XIX century.

There were ~~many~~ seepages of petroleum in Canada West known to the Indians long before the white man came. One seepage in the banks of the Thames River at the original Bothwell field and the others in the present Enniskillen Township, Lambton County. The Enniskillen Township seepage was either not known or else little known, as there is no reference to it by any early writer. The Thames River seepage was known to the Indians who collected it by dropping woolen blankets on the surface of the water and wringing the oil and water into a receptical. It was sold for medical purposes, for treating wounds and as an embrocation for bruises and sprains. Our first Lieut.Governor, Lt.Col. John Graves Simcoe, travelling from Newark (Niagara-on-the-Lake) to Detroit in February 1793 noted, in the daily Journal kept by Major E.B. Littlehales, A.D.C., the presence of petroleum in the River La ~~Toauche~~ Tranche (Thames) and marked it on the map that was made a part of the Journal. He says (Simcoe Papers, Vol.1. page 290 of February 15th, 1793) "In proceeding down the river, the Indians discovered a spring of an oily nature which on examination proved to be a kind of petroleum". Mrs. Simcoe drew more details from her husband and in her diary, say of his journey, "A spring of real petroleum was discovered on the march, but its offensive smell". If Lt.Col. Simcoe left any records, they probably were consumed in the fire following the capture of York (Toronto) 1813.

When Mahlon Burwell sub-divided the township of Zone in 1821 he marked the Oil Spring on his map. This oil spring was a well known land mark in the early 1800's. The dividing line between the of Kent, Elgin and Middlesex ~~District~~ was fixed at the oil spring on the Thames.

All travellers through Canada West who wrote accounts of their journeys never fail to mention this Oil seepage. John Howison Esq. says on page 194 of his Sketches of Upper Canada published in 1821. "At one of the houses where I stopped to feed my horse they showed me a specimen of mineral oil, that is found in considerable quantities upon the surface of the Thames. It flows from an aperture in the bank of the river, and three or four pints can be skimmed from the water daily. It very much resembles PETROLEUM, being of thickconsistance and black colour, and having a strong penetrating odour. The people employ it medicinally; and I was told that its external application proved highly beneficial in cases of cramp, rheumatism and other complaints of similar kind."

Also in Inquiries of an Emigrant being the narrative of an English farmer, 1824 to 1830, records on page 122 that on December 28th, 1826 - at Moraviantown; "A singular spring of oil issues out of the banks of the river near here, on the land belonging to the Indians. It is of the consistency and colour of tar, with a peculiar smell. It is generally supposed to be coal tar (petrolium) arising from a bed of coal said to run across the country. There are sulphur springs also in the neighbor-

hood, and in various parts of the province. The oil is gathered from the surface of the water (by Indians and others) by blankets extended and lightly dropped on the surface, when they absorb the oil. It is sold from two shillings three pence, to four shillings and six pence the quart, and sent to all parts of the province, and even to the states, as a cure for rheumatism, sprains, etc., and is sometimes taken internally in small quantities, for strengthening the tone of the stomach and for other complaints."

Honouring the first distillation of Petroleum apart from its rectification or elimination of the ~~[illegible]~~ ~~and sulphur~~ would carry little distinction. Distillation of alcohol on the authority of the Encyclopaedia Brittanica (11th Ed.) dates at least to 1000 B.C. St Patrick is credited with having introduced whiskey distillation into Ireland, but it doesn't make any reference to the banishment of the snake as coincidental with the introduction of Irish whiskey. In any case the skill was greatly in the removal of the impurities from the fractions distilled.

LAMPS

The progressive steps in producing artificial light from burning olive oil in an open saucer to the modern kerosene lamp covers two thousands years and more. Men had to learn "the hard way" that the best light was obtained only when the lamp would give complete combustion of the fuel used. This meant that lamps must be designed to meet these conditions for each fuel; the smoky flame of the open saucer gave little light. That amazing scientist Leonardo DeVince recognized this and in the XV century introduced a lamp chimney (first of metal) which he placed on a level with the top of the flame. It was used first with the candle and didn't come into general use on oil lamps until the XIX century, when DeVince was forgotten. When whale oil came into use in the XVIII century, it was used in a very crude lamp, simply an enclosed vessle or can with one or two tubes one half-inch long leading out of the top. Each these held a solid round wick extending another one quarter inch. Very often pressure was used to force the oil up the wick. About 1784 Argon, who had been feeding oil to his burner under pressure, discovered that oil would rise through the wick by capillarity. He designed a burner in which he controlled the rate of combustion by putting a valve in the tube that supplied the fuel. His was the first improved design of lamp and later developments were based on his lamp. The fuel used in lamps at this date were vegetable oils, from olive, palm, and various nuts; animal oil; lard oil, whale oil, and oil from various fish. The lamp was not generally used until well into

the XVIII century, because the fuel was not plentiful. The whales filled that requirement so well that by 1850 the whale population was so seriously reduced that another fuel was sought. Alcohol was available but it was too volatile to use in any lamp. Turpentine was less volatile but it must be refined to eliminate the disagreeable odour. Some one discovered that this odour could be removed by "distilling it over quicklime". It was given the name "Camphene", and the Camphene used in lamps was in general 95 percent alcohol and 5 percent camphene. This was expensive and in order to reduce the cost it was mixed with alcohol and other oils, ~~whale and fish oils~~ and sold as "Burning Fluid". It had been introduced about 1830 and was in general use until superseded by kerosene in 1860.

All of these fuels were very dangerous when used in the lamps then offered for sale. The Windsor Herald, July 18th, 1856, says of Camphene lamps "Since 1850 up to the present time, 169 persons have been killed and 279 wounded in the United States by explosions, etc, of lamps containing Camphene or Burning Fluid".

A better design of lamp was required to burn Camphene. The whale oil lamp was at first adopted by lengthening the tubes that held the wick and inclining them outward from one another. This reduced the heat that was transmitted to the bowl. The burner with a flat wick gradually replaced the solid round wicks; beginning about 1850 and glass bowls replaced metal, and the glass chimney greatly improved ventilation.

Most lamps and more particularily those with glass bowls and with or without glass chimneys, were all hand made. They were ornate and very expensive, well beyond the limits of the purse of the settler in Canada West, who probably had never heard of Camphene and knew nothing better than a whale oil lamp, and more likely still, the tallow candle.

In 1850, the use of artificial light had increased to a point where it became a subject among discussion groups, and societies that were interested in advances in science, arts, and mechanics. Such a discussion before the Society of Arts in London in 1864 is published in the Journal of the Society of that year. Dr. Marcet (Dr. Marcet Jour. Soc. Arts VOl. XII P. 236) speaking of the design of lamps brought up a discussion in which one speaker blamed explosions on overheated metal bowls. He strongly advocated glass bowls and more ventilation. In the discussion that followed, a Mr. Madden gave credit to a Mr. Wagerman, a German, for inventing a lamp which Jas. Young (the previously mentioned Scottish refiner) had been given credit. Mr. Tegetmeier referred to the use of Benzine (a lighter fraction than gasoline) for lighting said "For instance, I hold in my hand a specimen of oil used to light HMS Warrior and this will light at ordinary temperatures, and even if a light is brought near it, it will inflame without actual contact ..... the mode in which it is used on board ships is this: atmospheric air is driven through reservoirs of it, and the vapour thus produced is distributed through pipes and burned in ordinary burners, like gas, the absurd title of

Ozone Gas being given to it. It is impossible to overrate the danger of this commodity; gunpowder is safe in comparison with it, because a light must be placed in contact with the gunpowder to cause it to explode, whereas this vapour is so subtle that it will in fact run to the flame".

Dr. Bachhoffer, speaking on the subject, inadvertently gives his obituary of Mansfield one of the leading "coal oil refiners of the 1840's". He said "The vapour used on the Warrior in the manner described was neither more or less Mansfield's patent, who unfortunately lost his life in experimenting in these substances."

Reflecting on the few references given above to the development of the lamp and the illuminating oils used in them, one cannot help being impressed with the perserverance and courage of these early experimenters in the face of failures and fatal explosions that took many of their lives. It also emphasises the importance or necessity of artificial light to the public in general in these years. ~~It is recorded that~~ In 1862 when Sir Wm. Logan went to England to give a paper on Canadian Resources, that he seriously injured his eyesight coloring a number of Geological Maps by candle light on board ship.

ARTIFICIAL LIGHT IN CANADA WEST

The average family in Ontario probably never heard of kerosene until that fraction of crude petroleum was advertised for sale in the newspapers in 1862, when it was in plentiful supply for the first time. It had been advertised and sold in London and Sarnia (and no doubt in Hamilton) in 1858 on a commercial scale but the supply was limited to Williams' small refinery in Hamilton. In 1862 there were refineries in Oil Springs, Petrolia, Sarnia, Wyoming, London, Woodstock and Hamilton and a year later in every large town in Western Ontario. Prior to 1862 very few settlers in Canada West could afford the luxury of artificial light. Tallow candles could be purchased readily and when the settler had cleared enough land to graze some sheep, he made his own candles. The very few "well to do" farmers within reach of the lake ports or the larger towns on the newly built railway, could purchase "burning fluid" at $1.00 per quart. This was manufactured in the U.S.A. and much used there in the 1840's and 1850's. ~~It was a varying mixture of turpentine and alcohol, and was more dangerous than gunpowder.~~ Lamps designed to burn whale oil were quite unsuitable for using "burning fluid", Whale oil was very heavy and required some heat to reduce the visoosity but to burn these mixtures sold under the name of "burning fluid", the bowl of the lamp must be kept cool or an explosion would follow. A new lamp, ventilated, and

cooled, was on the market in early 1850 but it required further modifications to render it safe to burn kerosene for lengthy periods. One of these lamps burning "Rosin Oil" (another name for "burning fluid") very nearly caused the death of James Fearman's 16 year old daughter. The Caledonia Advertiser of February 6th, 1856 tells of Jas. Fearman of Oneida Township Haldimand County having bought a quart bottle of "Rosin Oil" for $1.00 in Hamilton. His daughter was filling the lamp when the lamp and the bottle of Rosin Oil burst into flames which enveloped her. She claimed that she had extinguished the light before attempting to fill the lamp. Her father saved her from fatal burns by submerging her in a nearby horse trough.

It can truthfully be said that few settlers in Canada West knew anything of kerosene and from their experiences with Burning Fluid, they were all afraid of it. The newspapers contributed to their fears by publishing the horror stories of agaonies suffered by those who had fatal accidents with burning fluid. There is no disguising the fact that the kerosene sold in the 1860's and some in later years, was quite as dangerous as burning fluid. Many of those who produced oil from one or two wells in the 1860's had difficulty finding a market for their crude oil. As distilling oil differed little from distilling whiskey, there was no shortage of experienced distillers. These men set up stills of all designs at Oil Springs first, and later at Petrolia and produced a brown or yellow fluid that burned but it was laden with tar and sulphur that gave off a smoke and stench. Some of these men later became expert refiners through trial and error experimentation.

The world of 1850 was ready for an illuminating oil that could be burned with safety, that would give a white light and that was clean and odourless. These were the objections to any oil that had reached the market at this time. There were men in every continent and country who had been searching for such an oil for ten years and more. The ninth Earl Dundonald, along with William Murdock, had produced an illuminating gas obtained from coal distillation, in 1780. The Earl had lighted Culross Abbey with this gas, which gave a white light but the coal gas was highly toxic.

In Nova Scotia a chemist named Abraham Gesner had been conducting experiments independently to produce a satisfactory illuminating oil. He was using a mineral pitch which he called "Albertite" (from Albert County New Brunswick, the location of the deposit). He had by 1846 manufactured an illuminating oil that gave a satisfactory light and in that year he took his small oven and still to Charlottetown in Prince Edward Island where he gave a lecture and demonstrated his method of producing and using this oil for illumination. There was so much interest shown His demonstration was such a success that he repeated it in Halifax later in the same year, with equal success and acclamation. He named this illuminating oil "Kerosene".

Stationed in Halifax in 1848 was the tenth Earl Dundonald, newly re-instated in the British Navy, in command of the fleet in North American waters. The Earl had for years been endeavouring to improve the lights used at sea; he was also familiar with his father's work in producing oils and gas from the distillation of coal and shale. In Gesner he found a co-scientist and the two set to work at improving methods and products.

The Earl owned or controlled the pitch lake in Trinidad and was able to furnish Gesner with a full supply of raw material and fuel for his research. Gesner could not have found a better friend to work with than the Earl. What progress they made and what their business arrangements were are unknown. However, Gesner took out a Patent for his process of refining "Kerosene" in 1854 and backed by New York financiers, formed the American Kerosene & Gaslight Co., and built a refinery at Newton Creek, Long Island. This and a refinery at Boston ~~refinery~~ became the principal refinery of in North America, turning out great quantities of various oils. He used coal, Trinidad Pitch, and any crude petroleum that could be obtained from the salt wells in Pennsylvania and West Virginia.

In 1861 he wrote a book entitled "Coal Petroleum and Other Distilled Oils" in which he described the distillation processes and showed cuts of various types of ovens for coking coal and stills for recovering oil. In this book he mentions the Enniskillen oil and the difficulties met with in purifying it; he tells of the disagreeable odour of most illuminating oil obtained from coal and petroleum. He was undoubtedly familiar with the Enniskillen crude oils, as he visited there in February and March 1861 when he visited his older brother Capt. David Henry Gesner (born 1793) who lived in lot 63 South Talbot Road, Oxford Township, Kent County. He stopped in Hamilton where he was interviewed by "The Spectator and Journal of Commerce" March 11th, 1861. This would have brought him in contact with J.M. Williams who had been operating a refinery there since 1857.

Photo

of

Gesner

Gesner's refinery was the principal refinery in North America for many yers and it made Gesner a wealthy man. He retired to Halifax in 1863 and died in 1864. He can truthfully be called the father of petroleum refining in North America. In the British Isles, James Young of Glasgow, began producing "Parrafin" about the same time as Gesner. Richenback and Selligue on the continent and C.B. Mansfield of Cambridge, were working on the problem at the same time. In the U.S.A. Prof. Silliman, Jr. was the leading chemist in the same work.

→ Report of Prof Benj Silliman here

Awarding the honour to the first refiner of Petroleum is rather an empty award, as the process of distillation had been known for who knows how long by the whiskey manufacturers. In order to make a satisfactory illuminating oil, it was necessary to eliminate the high boiling point fractions and tars, etc, as well as the sulphur compounds. A raw product that was sulphur free or else low in sulphur made the task easier. It was the refiner who had an easily available raw material that was low in sulphur that could claim success. The colour of the illuminating oils in the 1850's and 1860's was described as from lemon coloured to light red. Gesner in his book damns Young's illuminating oil with faint praise. He says "Whatever may be the merits of this mode of obtaining lubricating or 'Parrafine" oil so called, the lamp oils are dark reddish brown in colour and of an unpleasant odour. They also encrust the wick of the lamp in burning ....."

St Patrick introduced distillation of whisky into Ireland and no doubt banished the snakes at the same time.

Actually there was little difference in the methods used by any of them. It would appear that they had difficulty in separating their fractions and that they carried over too much heavy oils in the illumination fraction.

They all treated their oil with sulphuric or hydrochloric acid and neutralized with lye or calcined lime. Gesner had refinements in the design of his still and he had better temperature control from using superheated steam. He produced a water white A kerosene and a straw coloured B and C Kerosene; the last two being used for illuminating purposes. He says of these, "they burn freely in lamps without incrustation of the wick".

The preface of Dr. Gesner's ~~preface~~ book is dated in 1860 and at this time chemists had learned the boiling points and specific gravities of many fractions of crude oils from many sources. They were improving the temperature control of the batch, a most difficult task with only manual control of applied heat. All literature emphasizes the importance of temperature control. They had, in 1860, learned to use superheated steam, the application of acids and alkalis also dewaxing lubricating oil by refrigeration. Gesner says that the progress in refining was gradual, dating from 1750 or earlier, and the labour of so many that it is difficult to discover to whom most credit is due. He felt, however, that because of the work of Mansfield, Young, and himself, "a spirit of enquiry was aroused and experiments multiplied".

It is evident that years before the discovery of Petroleum in commercial quantities, the chemists had made much progress in Refining, many different types of oil products from coal, shale, Albertite, and Trinidad pitch; and that refining crude petroleum presented less difficulty. It could be converted into illuminating oil, lubricating oil, wax, and tar,

at will, Then again the two processes, distillation and refining or rectification, must be recognized. As previously stated distillation had been known for centuries but the removal of tar, sulphur, and other impurities was the real problem. In each decade, claims were made that the sulphur compounds had been removed but the Enniskillen crude petroleum contained 0.80 percent sulphur by weight and this was not easily removed. The Pennsylvania crude oils were sulphur free and very easily refined. Kerosene from this source commanded a premium of five cents per gallon over Canadian Kerosene until well into the XX Century.

The second great Canadian who led the way towards finding a source of crude petroleum in Canada West was Sir William Edmond Logan Kt., LLD, F.R.S. He was born in Montreal in 1798. ~~He attended~~ was educated in Edinburg University, ~~and~~ graduating in 1817.

After graduation he took a position with his uncle in his London counting house. This uncle was interested financially in Welsh coal mines and gave ~~Loan~~ him a position there. At this time a great discussion engaged the geologists in the United States of America and Europe. Whether coal was formed in situ, or whether it was transported. Logan carried out his own investigation, spending ~~most~~ much of this time underground with a candle or lamp, examining the coal seams. He discovered a fern "Stigmaria" that was imbedded in the coal, but was able to follow its stem through the underlying layer of fire clay to its roots in the shales below the seam of coal. Having this monumental discovery in hand, he sought further proof in the Pennsylvania coal fields. Repeating his search in the Pennsylvania and Nova Scotia mines he was successful in tracing this ferm, Stigmaria, from its fronds in the coal to its roots in the underlying shale. He wrote a paper on the Origin of Coal which was read before the Royal Society in England in 1841. Logan was thereafter admitted to ~~membership~~ Fellow ? in that Society. By this time Logan had become fascinated with the study of geology. No better location could be found to study geology than in Wales where it might be said that geology had been born.

When in 1840 Upper and Lower Canada were united to form "Canada", the Government decided that a geologist was needed to learn something of the deposits of gold, silver, copper, iron and other minerals and guide in the search for new mines, they appealed to the Mother country for advice and the answer was promptly given - Logan, your own Canadian man. Logan was appointed Provincial Geologist in 1842. He began his work at the eastern extremity of his area, in Gaspe. One of his earliest discoveries was a gas and oil spring in 1843. (Geo.Surv. Canada 1844, pp.41-42) He showed that these springs or seepages occurred along the crest of an anticline formed by a dyke that penetrated the sedimentary rocks.

At this time immigrants were pouring into Canada and the Government had so little knowledge of the available lands, that Logan was instructed to prepare a soil map. Logan passed this work on to his chemist T. Sterry Hunt who, in 1849, called for samples of soil. Among the samples he received was one from Enniskillen Township sent in by Mr. Jas. Wood, MPP for Kent County (Lambton County was not yet formed and was incorporated in Kent County). This proved to be a seepage of Petroleum. Hunt (~~T. Sterry Hunt~~, Geo. Surv. Canada 1849-1850, p.99) reported it suitable "for the construction of pavement, for paying the bottoms of ships and for the manufacturing of illuminating oil ---the specimen in my possession contains 78 percent to 81 percent combustible and volatile matter". Logan recognized the importance of this deposit and sent his assistant, Alexander Murray, to examine the deposit in the spring of 1851. Murray's report of his findings reads (Alexander Murray Asst. Prov. Geol. Geo. Surv. Canada 1851-52, pp.90-91) "The black shales of the

Hamilton group, in the Western Peninsula, are in general more bituminous than those of the Utica slate. Several places in their distribution are characterized by bituminous springs, and a visit was made in the early part of the season, to a bed nearly purebitumen, of which the existance had been noted in previous reports, including that of last year, in which the range of the Hamilton Group in the Western Peninsula is given. This bed of bitumen, which in some parts has the consistency of mineral caoutchouc, occurs in the sixteenth lot of the second concession of Enniskillen in the county of Kent, but its extent does not seem to exceed half an acre, extending five chains in a north east direction, with a breadth of rather less than half a chain. By different trial holes which have been sunk through the deposit, it would appear to have a thickness of two feet over twenty five feet square towards the south west end, from which it gradually thins towards the edge in all directions, varying in some parts along a low ridge which it forms, from a foot to four inches. The bitumen is underlaid by a very white clay which I was informed had been bored in one part for thirty feet. The upper portion of the clay was observed to be more or less penetrated with petroleum, and small black globules of the same were seen scattered through the mass for a depth of four or five feet. Bituminous oil was observed to rise to the surface of the water on Black Creek, a branch of Bear Creek, in two places on the seventeenth lot of the third concession of Enniskillen, and I was informed that it had been observed at other points farther down the stream, but to what amount the material might be daily collected at any of the places, I am quite unable to say; a freshet prevailed in the river at the time of my visit, the

current of which swept away the oil as fast as it rose."

Another description of the Gum Beds is given by a special correspondent of the Toronto Globe who visited the Oil Field in August 1861 and wrote in the Globe issue Sept. 7th, 1861, he says -

"On Williams property are situated two 'gum beds'. The first is in lot 16 Con.II, three quarters of a mile south of the concession line. About five acres of land are covered with congealed oil, which, at some remote period, appears to have escaped from its subterranean reservoir. For the most part it is covered with grass and weeds but in many places it is entirely exposed. The second gum bed, similar in appearance, is on lot 18, in the first concession, about half a mile south east of that first mentioned."

Logan was knighted in 1856 for his outstanding work and discoveries. His interest in the new product, oil, and the faith he showed in its future value, contributed materially to its development. He visited the new oil field in Oil Springs and collected samples for exhibit at the International Exhibitions in Paris in 1855 and in London 1862.

He retired in 1869 and died in 1875.

It might be worth while pasuing at this point to paint the picture of Enniskillen Township, especially the south west part. The township was surveyed by Eliakim Malcolm in Sept. to Nov. 1832. His diary tells that the travelled roads in the district were only passable when a man walked by each wheel of the wagon and assisted the horses at each mud hole by lifting on the spokes of the wheels. By this means he arrived at the end of the "road" at Geo. Wards (lot 15, Con. 8 Dawn Township). There he divided the load into man packs and proceeded to Enniskillen in a north west direction across Dawn Township. They found all creeks dry and had to camp overnight without water. On the morning of Sept. 11th he sent an Indian downstream for water. He returned with some stagnent water from a Beaver dam. On Sept. 12, 13, 14th, there was no water to be found in the creeks on Con. III, altho it had rained a great deal. On Oct. 19th, an almost continuous rain had fallen for a month, when the ground was so saturated that they had to build up limbs and branches ~~to sleep on~~. On Oct. 23 the creeks were so full of water that they could not cross them. Those that were dry six weeks before had risen seven feet. They ran out of food and had to man pack food many miles as the horses could not cross any of the creeks and the wagons were useless. By cutting new roads avoiding all creeks, they were able to finish the survey on Nov. 29th. Just one township.

The map that shows the local roads and cultivated lands in Canada West, dated 1850, shows no improvement on this road that Malcolm travelled in 1832. A wagon road to Dawn Mills and beyond that point, a winter trail.

Mrs. Anna Jameson who wrote of her travels from Toronto to Windsor in "Winter Studies and Summer Rambles in Canada" 1837, describes the road ~~on the south side of the Thames River~~ along the township line between Howard and Harwich townships from the Talbot Road (Highway No. 3) north to the Thames River. "The road was scarcely passible; there were no longer cheerful farms and clearings, but the dark pine forest and the rank swamp crossed by those terrific corduroy roads (my bones ache at the mere recollection) and deep holes and pools of rotted vegetable matter, mixed with water, black, bottomless sloughs of despond. The very horses paused on the brink of some of these mud-gulfs and trembled as they made the plunge downward. I set my teeth, screwed myself to my seat, and commended myself to heaven -- but I was well nigh dislocated. At length I abandoned the seat altogether, and made an attempt to recline on the straw at the bottom of the cart --- but all in vain. Myself and all my well-contrived edifice was pitched hither and thither..."

Almost as much as been written about the roads that ran from Oil Springs south to Wardsville and (after 1857) north to the railway at Wyoming, as has been written about the oil fields. Each traveller declared that a trip over these roads was an experience never to be forgotten. Actually, the general slope of the surface is one to two feet per mile to the St. Clair River.) As the country was in endless forest of mixed hardwood with a little spruce along the creeks, the water would not run away on surface and the sun could not penetrate the platform of the tree tops to evaporate the water on the ground. Even a foot path became a ditch after a few people had made a

path in the moss and leaf mould. Nature had protected this oil field, as securely as a general could by surrounding it with forts.

In neither Malcolm's diary notes or map is there shown the location of the Gum Beds or seepage in lot 16, Con.II or in the stream on 17, Con.III. The chainmen missed it by three quarters of a mile on the north side of lot 17 but could easily miss this seepage in the stream in the downpour of rain and rising water. The Gum Bed on lot 16 was a mile from the cut line on the road allowance to the east or west, and they could not see the small opening in the woods at the gum bed. There were no settlers in the area at that time.

Mr. John Smith of Sarnia, the enumerator who took the census of 1861, says of Enniskillen Township "A few persons settled in the township as early as 1835 but for many years it was ~~decided~~ avoided by the settlers as a miserable swamp, and made very little progress. In the year 1854 the settlers had increased until there were 54 on the assessment roll and the township was erected into a municipality under the amended Municipal Act.

Since that time the increase of the farming population has been steady, and a good deal of improvement, both in roads and land clearing, building, etc (also in schools) has been made."

For an original description of the conditions of the land at Oil Springs we have a report by Mr P.S. Donnely P.L.S. dated July 2nd 1853 giving a valuation for the sale of lot 16 Con I Enniskillen Twp; a Clergy Reserve lot applied for by C.N. Tripp. July is a dry month and the land would be observed at its best. He says that it is a black ash swamp very wet except in the central part which is dry and timbered with birch, maple and oak. It is neither occupied nor improved and worth four shillings per acre. The Canada Company sold their lands for ten shillings to twelve shillings and sixpence per acre.

Williams began his operations on the adjoining lot to the north and it can be seen at the present day that the lots would be similar

1850 to 1860

With Hunt's report, previously mentioned, on the uses that could be made of the Gum Beds, as this seepage of Petroleum was commonly called, and Murray's investigation and report, published in the Geological Survey Reports, and circulated throughout the world, it could only be expected that someone would very shortly appear to exploit the deposit. Seepage of Oil Springs.

The first on the scene were the brothers Tripp, Charles Nelson and Henry, both Americans from Upper New York State. Chas. Nelson had been working for John Counter, prominent in Kingston, in his stove foundry at Bath where he was foreman. He invented an improved front door for a wood stove and sold it to Counter in 1850. Henry lived in Woodstock, Ontario and was employed by John B. VanVoorhise, a contractor who built part of the Great Western Rly. ~~in that locality in 1854~~. It is not difficult to learn how Henry Tripp entered the picture. Sir Wm. Logan, had a very limited Government grant of money to carry out all the field work that his energetic mind had planned. In order to carry on, he was constantly paying Government Bills out of his own pocket and reducing his staff to part time employees. Murray was one of those who was employed on a part time basis. He owned several parcels of land at Woodstock, most of which is now within the present city limits, and he spent his off work time at Woodstock and in private practice.

It will be noted that Murray reports in 1851, that a shaft had been dug to thirty feet in the Gum Beds, before Murray visited the spot. Hunt's report had been circulated in 1850 and Tripp could have seen it or Murray (Alexander Murray Sessional Paper Oct. 1872 PtVII. P.219) as a part time employee was within his rights to show it to Tripp. In any case, Tripp is the most logical prospector in 1850 or 51, and it is to be expected that he gave ~~also to give~~ Murray the information especially the depth of the shaft. Tripp's application for charter, that was placed in the hands of the Speaker of the House on 26th Oct. 1854, states — "That your petitioners have been for the last three years at great cost and expense exploring various sections of the Province for asphalt, lead, copper, silver, oil and salt springs ....". This would show that they were in active operations since 1851. A charter was granted, dated Dec. 18th, 1854, to The International Mining and Manufacturing Co. with head office in Hamilton. ".... for the purpose of exploring for and working the asphalt, oils, and other minerals on and under the property now owned by them in the townships of Enniskillen, Dawn and Brook in Lambton County and Mosa and Oxford townships in the county of Middlesex...." The officers of his company were Chas. N. Tripp, president, with Hiram Cook, Hamilton, Henry Tripp, John B. VanVoorhise of Woodstock, Jas. L. Folger, St. Vincent, N.Y., Jas. Connor and Wm. Ogilvey of New York, directors. The capital was $1,250. The company was empowered to erect works "for the purpose of making oils naphtha, paints, burning fluids, varnishes and other things of the like ....

Photo of

Incorporation of

International Mining

and

Manufacturing Co.

(with Tripp's signature)

and may erect works at Dresden, London, Hamilton, Toronto, Kingston, Ottawa, Montreal and Quebec ...."

Just what work the company carried out is not definitely known. Knowing the condition of the roads, it is certain that no heavy equipment could be hauled to the site of the Gum Beds on lot 16, Con.II of Enniskillen Twp. excepting when the roads were frozen (in January and February). The Railway from Hamilton to Windsor was not completed until Dec. 1854. There is a report by P.S. Donnely, P.L.S. 2nd July, 1853, on the value of lot 16, Con.I Enniskillen, a Clergy Reserve lot, that says, lot 16 Con.I is a black ash swamp and very wet, except in the centre part which is dry and timbered with birch, maple and oak. It is neither occupied nor improved and worth 4 shillings per acre. This is as low a value as was placed on wild lands in these days. Chas. N. Tripp bought the lot, July 5th, 1853. The topography of lot 16, Con.II approximates that of lot 16 Con.I and the slight elevation where the Gum Beds are located, is not more than one foot higher than the adjoining black ash swamp".

copy on page 30

There is no newspaper reference to Tripp's work in Enniskillen and no eye witness to confirm the meagre report on his activities. The writer of the Historical section of the Atlas of Lambton, in 1880 (believed to be the Smith who was enumerator in 1860 census, says in this Atlas) ~~says~~ "Tripp, a resident of Woodstock in 1850 bought lot 18 Con.I and lot 16 Con.II from the Government and several lots in the district. In 1852

he erected buildings and machinery for the manufacture of asphaltum, which enterprise did not succeed. In his dilemma he enlisted the aid of Mr. Williams, since M.P.D. of Hamilton and now Registrar of Wentworth County...." The writer of the Atlas is not accurate regarding Tripp's business transactions but he does give evidence of Tripp's activities that can be confirmed.

Tripp sent two large samples of Gum Bed for test and a report. A report from Thos. Autisell, M.D. is dated February 19th, 1853 which would show that Tripp had procured it in 1852, probably in January and February and a second sample sent to The Hamilton Gas Co. reported on by Thos. McIlwraith, Feby.7th, 1855. The reports from these two sources appear in the Daily Spectator and Journal of Commerce, Hamilton from Feby.7th, 1855 to Sept.14th, 1855; with no advertisement or other remarks.

Dr. Autisell's report reads as follows -

INTERNATIONAL MINING and MANUFACTURING COMPANY
(CHARTERED BY ACT OF PARLIAMENT 18th DECEMBER, 1854)

NEW YORK, No.90, FRANKLIN ST.
FEBRUARY 19th, 1853

REPORT ON CHEMICAL EXAMINATION ON A SAMPLE OF ASPHALT SENT FORWARDED TO ME BY MR. TRIPP.

Signed: THOS. AUTISELL M.D.

"This asphalt is a semi-soled substance, soft, and plastic in the fingers, blackish color in the interior, fracture tenacions and stringy without lustre -----adheres to paper.

"The outer portion of the mass is mixed with undecomposed woody fibre, and rootlets. From these the interior is quite free, and it was on this matter that experiments were made."

"The specific gravity of the sample is 1.014. It does not yield anything to cold water, but by boiling water a minute portion of volatile liquid is diffused through the water."

"On examination in closed and open crucibles it yielded in 100 parts:-

Volatile matter	80.06
Coke	13.57
Ash	6.37
	100.00

"On distillation at temperatures of boiling water, it yielded a moderate amount of liquid resembling Benzoles. The application of a higher heat drove off additional volatile liquids, and a considerable quantity of paraffine. From the experiments I made, I am inclined to believe that the crude material, if properly worked, would yield nearly 15 percent of naphtha-liquid. This mineral is partly soluble in alcohol, a yellow resin being dissolved out by that fluid. It is completely soluble on naphtha, ether, and oil of turpentine."

"The earthy matters are the only residue in the three latter liquids. It melts at 212°, swelling up and softening from 180° onwards - softened in water, it gives off copious bubbles of air".

"I look on this as a valuable variety of bitumen and applicable to all purposes for which this substance is now in demand. Its softness and fusibility renders it valuable in the manufacture of Japan and other varnishes. It is peculiarly fitted for obtaining from it, by distillation, the naphtha-liquid, (benzole) which are now so extensively used as a solvent for Gutta-Percha, and other gums and resins. For this branch of manufacture, this variety of bitumen appears more adapted than the solid and lustrous asphalt."

"For the fabrication of mastics and cements, it is also well adapted, being capable of intimate mixture with the other materials at a low temperature, it makes a good hydraulic cement."

"This bitumen is admirably adapted for illuminating purposes in either of the two ways. First, by the use of benzole liquids obtained from it by distillation, these might be used when diluted with alcohol or other menstruums, as the burning fluid in this is used or second, as offering an illuminating gas. By reference to the analysis it appears that 80 percent is capable of being converted into combustable gases. These gases would be highly charged with carbon, would yield a brilliant light, and require less purification than the gases derived from coal. In equal weight, this bitumen would yield a greater amount of illuminating gases than the finest

variety of bituminous coal."

"For the man ufacture of gases, this bitumen requires a peculiar variety of furnaces and ret orts."

"The bitumen is adapted for use in all the purposes in which the mineral may be used, but the manufacture of volatile liquids and of illuminating gases appears to be its most appripriate uses."

(Signed) Thomas Antisell, M.D.
Consulting and Analytical Chemist
No. 63 Franklin St., New York.

The report from the Hamilton Gas. Co. is as follows:

Gas Company's Office,
Hamilton, February 7th, 1855.

Chas. Tripp, Esq.,

Dear Sir:

"At your request I beg to send you the result of your experiment with the asphalt you sent us.

"The quantity weighed before using was 1,450 pounds. This was put into 16 retorts, and sealed up in the usual way - in three hours it had given off 4,600 cubic feet of gas, which I put into an empty holder, and used it in the early part of the night. It burns with a very soft pure light, without smell. I should say that so far as illuminating power goes, it is 10 to 15 percent over the ordinary coal gas."

"The amount of residual oil deposited I have no means of ascertaining, as it became mixed with the tar and ammonia water previously in the pipes. From the appearance of the residue in the retorts, I believe the specimen I used was of inferior quality on account of being taken off the surface and containing a considerable quantity of earthy and vegetable matter.

I am, Sir,

Yours most respectfully,

(signed) Thos. McIlwraith,
Manager, Gas Company"

Tripp had therefore confirmed by actual test the opinion of Thos. Antisell, that the asphalt was superior to bituminous coal for manufacturing gas. He had no hope of selling the "Gum Bed" for gas making in competition with bituminous coal, as he could not haul it to the railway (in 1855) excepting on frozen roads for two or three months in the year. He did have a market for asphalt in the ship building industry along the Great Lakes and especially the St. Clair River where the industry thrived.

Tripp certainly produced asphalt for a sample of asphalt manufaatured by The International Mining and Manufacturing Co. of Hamilton was collected by Sir Wm. Logan between October 1854 and May 1855, and exhibited at the Universal Exhibition in Pari s 1855. (Catalogue of the exhibits of Canada at the Universal Exhibition (Paris) 1855, pages 41, 48, 155, 372 an d 395). It received honourable mention. This

exhibition, which covered everything manufactured, drew exhibits from all over the world and Tripp's asphalt must have been of no mean importance to receive "honourable mention". Sir Wm. Logan collected the ~~mineral~~ exhibits between October 1854 and May ~~1855~~. He wrote a sketch of the geology and economic minerals of Canada describing their occurences. He says of the asphalt "That matter furnishes by distillation, among other products, great quantities of naphtha."

We have the statement of the author of the historical section of the Atlas of Lambton that Tripp "erected buildings to manufacture asphaltum --- which venture did not succeed" He must have produced naphtha as well as asphalt, for he must heat his crude material to liquid to precipitate the earthy and vegetable impurities from his refined product. No doubt the light ends were wasted as he must haul his packages to Oil Springs before the railway was built.

Whatever the cause of Tripp's failure, his operations ceased in 1855. The author of the Lambton Atlas says that after his enterprise did not succeed "In his dilemma he enlisted all the aid of Mr. Williams since M.P.P. of Hamilton and now Registrar of Wentworth County".

A search of the Lambton County Registry office in Sarnia shows the properties at Oil Springs owned by Tripp were mostly acquired in 1853. These documents show that Tripp mortgaged most of them very heavily in 1854 and 1855 and that he began disposing of them at a handsome profit in 1855. The purchasers were Williams and his associates; some being Tripp's

directors. Tripp and his stockholders were not one happy family and according to the editors of The London Free Press, the demise of Tripp's company may have been due to internecine strife. The Sarnia Observer January 27th, 1859, copying the editorial of the London Free Press, gives a story of the occurrences of oil seepages in Western Ontario and of the International Mining and Manufacturing Co. He says "A company was thereupon formed under the title of "The International Mining Co." which undertood to work the lands and manufacture the oil rendering it free from a pungent and offensive odour, which it possessed in its natural state. This was in 1855. Owing, however, to some disagreement among the shareholders, no great progress was made except in the way of advertising - which by the way remains still unpaid for - and at last one of the shareholders, a gentleman by the name of Williams, bought out the interests of his fellow shareholders, and now possesses a tract of land which, if it does not flow with milk and honey, possesses qualities from which may be expected a large fortune". The article is full of inaccurracies but his statement of Tripp's sales is born out by the records on the Land Registry in Sarnia. Tripp sold lots 18, Con.I and lots 16 and 17, Con.II (the centre of the oil field) to J.M. Williams, Angus P. McDonald, Geo. Harris and Chas. A. Sadlier of Hamilton, and John B. VanVoorhise of Woodstock, the date February 22nd, 1856. As well as these lots, Tripp owned Lot 17 Con.III, lot 19 and west one half lot 21, Con.II and lots 16, 18 and 19 in Con.I. He also owned two lots, 400 acres, in the heart of the present Petrolia oil field where there was an oil seepage in the bed of Black Creek that flowed through the lots. This will be discussed when the Petrolia field is dealt with.

The suggestion that there may have been some disagreement between Tripp and his stockholders, becomes a reality, when the land transations on record in the Land Register in Sarnia, are examined. In all Tripp's transactions beginning in 1853, the International Mining and Manufacturing Co. never appears. The last transaction is a sale of the north half of lot 19, Con.I in Aug.11th, 1866 which was six years after the death of Chas. N. Tripp whose signature appears on the document with no attempt at forgery. The sale of the three lots to Williams and associates must have been made after Tripp had come to an agreement with his disatisfied stockholders. Tripp did very well on this one deal. He bought 600 acres for £ 687 and sold it to Williams for £ 2,000. He did equally well on his other properties.

Tripp did not buy any lands until 1853 altho he had been investigating the land since 1851. He was probably unable to raise any money until he had Dr. Attisell's report. This delay allowed all this land to be taken up by outsiders from whom Tripp had to buy. His only original purchase was the Clergy Reserve lot 17, in Con.I. previously mentioned

Very little is known of the Tripps before they appear in the oil industry. On February 1855, Tripp declared that he was shortly to be married to Almira Jane Cornish of Sarnia, formerly of Mesa. She was a sister of Frances Evans Cornish of London who was the "uncrowned king" of London and Mayor from 1861 to 1865. Cornish practiced law in London with outstanding success. As legal advisor to Tripp, Tripp should have been in safe hands in his business transactions. Tripp went

to New Orleans on or after 1857 where he died about 1860. Mrs. Tripp is a widow, vide, a document dated Nov. 22nd, 1860. Henry Tripp moved to Schenectady, N.Y. where he died in 1896. He was prominent in that city as one of the early plate photographers and has left a highly prized collection of old photographs now in the archives of that city.

Photo

of

JAMES MILLER WILLIAMS

Our third great Canadian is now to be introduced. Heis James Miller Williams of Hamilton. The story of his life appears in his obituary in the Hamilton Times, 26th November, 1890.

"The news of the death of Mr. J.M. Williams, Registrar of Wentworth and ex MPP for Hamilton, so long identified with the public interests and trade, both of the City and Province, and so universally esteemed in all the relations of life, will be received with general regret throughout the Province. The event which occurred at his residence at "Mapleside" yesterday afternoon at half past two o'clock was not altogether unexpected; his illness having been more than once alluded to in the Times."

"To do justice to the life and service of one who has done so much for our City and Province as Mr. Williams, would require much more time and space than can be afforded by a daily newspaper; but the leading facts in his history can be briefly noted.

"The future Parliamentary Representative of Hamilton and the promoter of so many practical and beneficial enterprises throughout Ontario was born (of Welch parents) in Camden, New Jersey on the 14th of September 1818. With few of the educational advantages possessed by every youth, however, poor at the present day, but with shrewd, clear such as are exhibited by few whatever the extent of their book learning, common sense and practical skill, he crossed the line into Canada in 1840. Settling first in London, (then a mere village) He was married in 1842 to Miss M.C. Jackson of that place, and in the same year started a

carriage manufacturing business there in partnership with Mr. M. Holmes.

" Soon after this he purchased Mr. Holmes' interest and continued it successfully for four or five years on his own account, when he took in Mr. H.G. Cooper as a partner and moved to Hamilton. Several years later, he sold out his interest and entered on his own account in the manufacture of (railway) cars, and established separate factories for these in Hamilton, Niagara and Brantford, and had the honour of manufacturing the first cars that ran on the Great Western Railway of Canada.

"In 1856 he discontinued the car business and became a pioneer manufacturer of refined illuminating oil from petroleum, on the continent. He was not only the first to move in the manufacture of this now universal and priceless, worldwide blessing, but was actually the discoverer of petroleum itself, and received medals from the British Government, both for the discovery of the article and for the best manufactured oils therefrom. His name can now be seen on the geological statistical records at Washington as both the discoverer of petroleum and as the pioneer in its refinement and preparation for illuminating purposes. He was the constructor of the first still of any pretentions at Petrolia (Oil Springs) and made the first extensive shipments of the refined article to foreign countries, exporting large quantities not only to the United States but to South America, Europe and China.

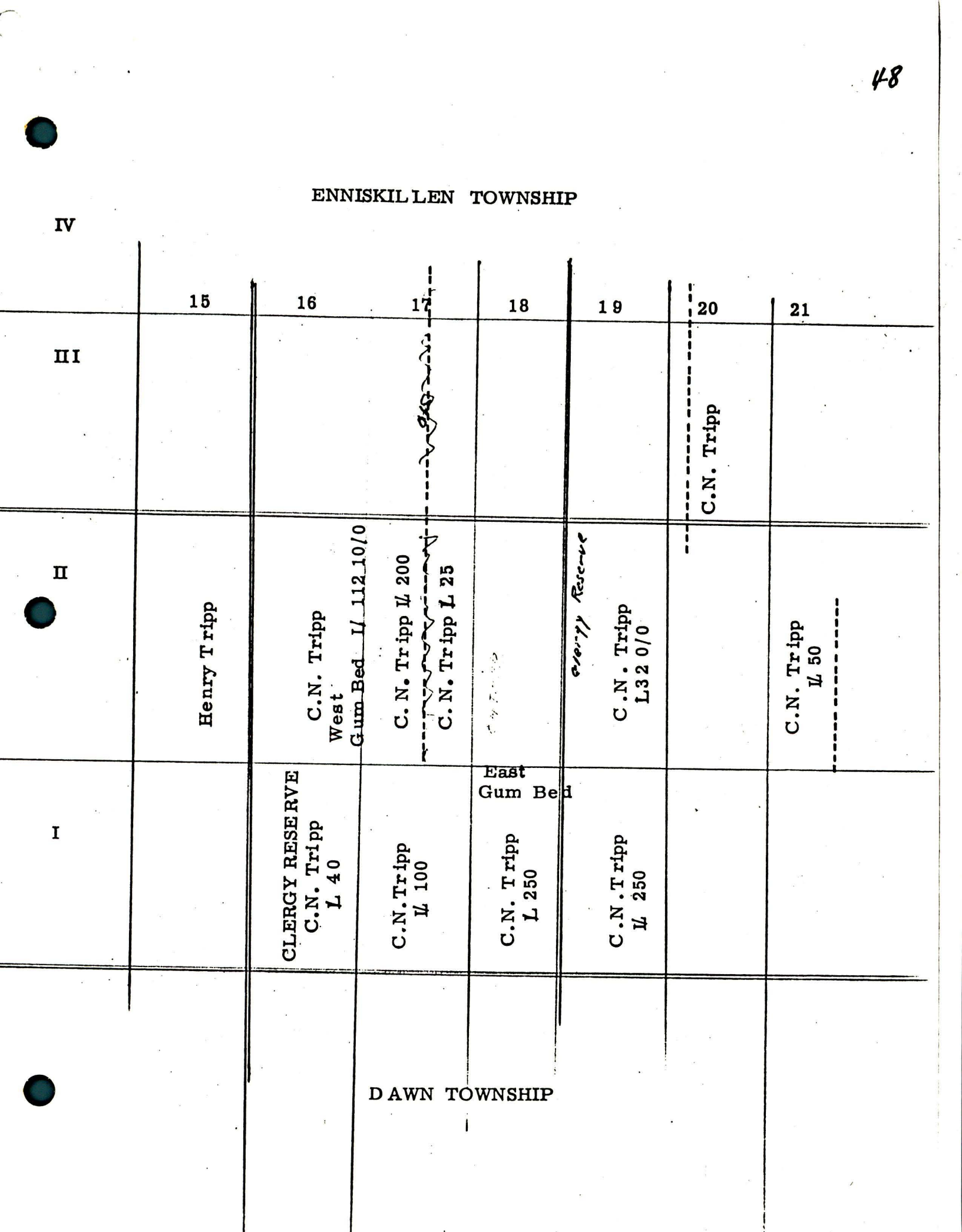
"As this growing enterprise developed, he established the Canadian Oil Co. in Hamilton. He then directed his energies to the manufacture of tinware in Hamilton and was the first to start in this direction in Canada.

"Disengaging himself from most of these enterprises, he became a director of the Provident and Loan Association in Hamilton, the Mutual Life Association of Canada, the Victoria Mutual Fire Association of Hamilton, and served several years as alderman in the city council with great acceptance. In the railway interests and connections of the city, he took the strongest and most constant interest and was one of the liveliest and most energetic promoters of the Hamilton and Lake Erie, Hamilton and North Western, and Wellington Grey and Bruce lines; in the two former, of which he was a director and bulwark during the most critical period of their histories.

"On the consumation of Confederation in 1867, Mr. Williams was chosen the first representative of Hamilton in the Provincial House of Assembly. He was re-elected to that position in 1871 and once more by acclamation in 1875, during all of which time his services as a shrewd sound practical and experienced business man acquainted with all the wants of the people, were of the utmost value to the City and Province.

"He was one of the most trusted and valued friends of our venerated Premier and was never absent from the post of duty.

ENNISKILLEN TOWNSHIP



DAWN TOWNSHIP

James Miller Williams started in the carriage business at the age of 22 years with a partner already experienced in making carriages. He had the advice of his father but who moved from New Jersey to London not him but he had something better, he instinctively knew how to prepare a business deal and how to take the measure of a man. He was never without a highly practical partner in his carriage and railway car making ventures. If their opinions differed he bought them out. In his oil business however there was no one who as much about the business as he did himself. When Tripp had made a failure of processing the Gum Beds he knew what not to do, and he sought the liquid oil beneath the ground that others had used. When he organized his second Refining Company Ontario Carbon Oil Co, his associates were of the most experience and business ability. So also in his ventures in Railway building Insurance and banking.

When he found that he had no supplies of tin containers for kerosene he established the Co and manufactured these and other general tinware. He also manufactured stoves and a general line of cast iron products His greatest interest was in transportation by railway. Like others before him, he felt that if the barrier at Niagara Falls could be bypassed the reduced in cost would give a great impetus to trade; and a great benefit to Hamilton as the lake port. The Hamilton and Lake Erie, the Hamilton and North Western and the Wellington Grey and Bruce lines were to be the main arteries of his Railway System. Into these he put his greatest efforts.

His years of labours as alderman in the Hamilton City Council and a Member of Parliament for Brantford County

were reduced by his increasing deafness and he accepted the post of Registrar of Deeds for Cumberland County as an outlet for his great energy. He was never absent from his office while his health permitted. His grandson Major Dave McLeod (80 (the retired judge of the North West Territories) tells of driving with him to school every morning in his buggy behind a smart team of trotting horses. He was very proud of his two medals from the great exhibition in London in 1862 and they were displayed conspicuously in a case in his library.

"On his retirement from the party to make way for his distinguished successor, Mr. Gibson, he was appointed with the approval of all parties, to the position of Registrar for the County of Wentworth, to the duties of which he devoted himself assiduously till his death.

"He is survived by his wife, three sons, C.J. Williams, J.M. Williams, Jr., H.R. Williams and one daughter, Mrs. Walter Beardmore of Toronto".

Mr. J.M. Gardner in the Hamilton Spectator, September 27th, 1894, fills in a few spots on his life story. His parents came with him to London. His Canadian Oil Co. refinery was on Coal Oil Inlet at the foot of Wentworth Street.

The Registered Deed of the sale of lot 18, Con.I, lots 16 and 17, Concession II of Enniskillen, already mentioned, bears the (registration) date of 22nd February, 1856 and would fix the date that Williams became the proprietor of the oil lands at Oil Springs. He bought the most of Tripp lands in the months following and additional lands from time to time. He was, however, already a shareholder in Tripp's company. Mr. Williams' grandson, Major H.R. Williams, M.C. told the writer that his understanding through the family, was that his grandfather was introduced into the business at an earlier date. He sold a wagon to someone who couldn't pay for it and he had to accept an interest in the

oil venture. All circumstances fit into Tripp's International Mining and Manufacturing Co. and the date, prior to the building of the Great Western Railway in 1854. Tripp had to go by wagon from Hamilton to Wardsville, 110 miles along the Longwoods Road, then to some extent improved, and from Wardsville to Dawn Mills over the road travelled by Malcolm in 1832, still unimproved. From Dawn Mills to the Gum Beds at Oil Springs, 20 miles, over a bush road partially dried out in August and September. Under these conditions, wagons must be extra rugged and expensive. Again the number of mortgages registered by Tripp on every piece of his property would fit in with the story that he couldn't pay for the wagon and by 1855 or earlier he may have realized that the hazards that he faced were beyond his capabilities.

Williams had sold his plant for building Railway coaches, the Hamilton Coach Factory in 1856. The announcement of an auction sale (Personal Communication from Mr. F.L. Britton, Circulation Mgr. Hamilton Spectator) in the Hamilton Spectator is dated April 15th, 1856. His friend, Mr. Gardner in his obituary notice, says that Williams sold the car factory in order to put his whole energies into the oil industry that he had newly acquired. The prices that he paid for the lands in Enniskillen would confirm this.

There is no record of his activities in 1856 but in 1857 he had built a refinery in Hamilton. Mr. Chas. Robb a mining ~~executive~~ engineer of Montreal visited Oil Springs in the winter of 1860-61 and read a paper before the Canadian Institute, February 25th, 1861. (Chas. Robb, Canadian Journal

New Series No. XXXIV, July 1861.) He says of the Gum Beds in Enniskillen "It was not, however, until the year 1857 that the material was turned to profitable account ..... certain gentlemen, the foremost among whom was Mr. J.M. Williams of Hamilton formed themselves into a company and acquired the lands in Enniskillen .... Ultimately the whole adventure developed upon Mr. Williams to whom alone is due the merit of developing this branch of the industry in Canada, as well as pointing out the road to success in the same direction in the United States. The capital that Mr. Williams and his associates have invested is $42,000. At first the distillation was carried on at the wells, but latterly, the percentage of loss in refining being so small (about 30 or 35 percent), it was deemed expedient to remove the works to Hamilton and convey the crude oil thither in barrels. The total quantity which has been raised by Mr. Williams is about 200,000 gallons. Mr. Williams has now, (1860) five wells in more or less successful operations, yielding on an average 600 to 800 gallons per day; but the amount which the wells are capable of yielding has never been thoroughly tested, as the difficulty attending the transportation from the wells to the Railway Station (Wyoming) - a distance of about sixteen miles - has hitherto restricted the yield. At first the oil flowed into the wells unmixed with water, but latterly, although the supply is undiminished, large quantities of water are mixed with it, insomuch as it is necessary to use steam pumps to drain the wells."

1860

1860

T. Sterry Hunt (T. Sterry Hunt, Canadian Naturalist, Vol. VI, 1861), confirms Robb's date of 1857 that Williams had his refinery at Hamilton. Hunt visited Oil Springs in December 1860 and says "It was not until 1857 that J. M. Williams of Hamilton with some associates understood 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...." He says that the wells were pumped at intervals of some days and that the capacity of the wells was unknown.

(To this is to be added the analysis of Gum Beds, surface oil, top show oil (that Shaw discovered) and lower pay oil, now being pumped)

Let us consider for a moment, the position at Oil Springs as Williams found it in 1856. Tripp had dug the Gum Bed and manufactured Asphalt and no doubt experimented in the naphtha recovered. Williams knew from Tripp's work that there was not profit in refining asphalt. He also knew from Dr. Antisell's report, if not from Tripp's experiments, that fifteen percent Naphtha liquid could be recovered by distilling the Gum Bed. Williams' success in many business ventures proves that he always sought advice from the best authorities. Logan, Hunt or Murray would advise him to sink a well for ~~a liquid richer in~~ oil, ~~for his purpose~~. Even if he had had no outside advice, it was as natural for Williams to drill deeper for crude oil below the solid bitumen, as it was for the placer miner in "the creeks" to dig deeper when he found flakes of gold in his "pan".

Robb and Hunt say that Williams removed his refinery from Oil Springs to Hamilton in 1857, and transported the crude oil in barrels, because the loss in refining was so small, in the neighbourhood of 30 to 35 percent, leaving 65 to 70 percent illuminating and lubricating oil recovered. Here we have two quite different oils. Antisell says 85 percent loss in refining and Robb, 30 to 35 percent loss. Antisell referring to the Gum Bed material and Robb, the surface oil from the gravel beds on the top of the rock. In other words, Williams moved his refinery to Hamilton AFTER he sunk a well to the gravel beds at 50 feet and found that he had a very satisfactory crude oil for making Kerosene. Robbs statement that at first the distillation was carried on at the wells" and that he moved to Hamilton in 1857, shows that he must have sunk this well in 1856 as soon as he began his work, His move to Hamilton must have been in January or February 1857 in frozen roads ary of 1857. There is not enough frost in Lambton County to freeze the swamps solid nor enough snow to make sleighing in December. ~~He must have sunk his well in 1856~~. (J.H. Fairbank in his diary 1862 was deploring the mud and wet on Christmas day).

The Editor of the Sarnia Observer (August 26th, 1858) says that Williams is barreling his oil and shipping it to Hamilton "to be prepared there". That Williams expects to build a refinery on the side of the wells "as soon as possible". In the December 30th, 1858 issue he says that Williams "has erected suitable buildings thereon (Oil Springs) and is now manufacturing by distillation" a beautiful burning oil from the raw material that abounds in that region. The price of this oil was $1.50 per gallon.

In 1858 Williams was producing oil, beyond the capacity of his refinery. He sold his surplus oil to the New York refiners. In "Life of John D. Rockefeller" Vol.I, p.155, Allan Nevins says "Col.Ferris was buying crude oil from every source that he could find and when he heard that one J.M. Williams had opened an oil field in Ontario (then Canada West or Upper Canada) with pick and shovel, he hurried off to see him and bought his whole supply". Paul H. Giddings quoting the Derrick Hand Book in his The Birth of the Oil Industry Macmillans p 29. says, "in 1858 Col. Ferris purchased 1,183 barrels of oil" and that "two wells in Tarentum furnished 1,005 barrels, the rest came from Canada". Williams, therefore, sold Col. Ferris 178 barrels. One can conclude that this oil was hauled to Bothwell on the frozen winter roads. Hunt says as much.

In December 1858 (1) ~~(M.A. Blodin.)~~ the railways was completed from London to Sarnia and by hauling his oil north to Wyoming, Williams would save at least 10 miles in distance. However, there was a road of sorts to Wardsville or Newbury but there was no well travelled road to Wyoming. Two men who road horses from Wyoming to Oil Springs in August 1859 say of it (Sarnia Observer, August 5th, 1859 from London Free Press undated) "The road must be very difficult to pass over with a load in the spring and fall but as the County Corporation has taken it in hand its rapid improvement may be looked for. At last we came to nothing but a winding track through the woods which we followed for three or four miles without finding a trace of the Oil Springs, and no one was to be found to whom we could apply for information. At last we discovered a glimmering of light through

(1) M.L.Bladin. Const. of Rlys. in Canada. Univ. Toronto Studies of History & Economics. Vol. V. 1932.

the trees which betokened a clearing and we found that we were within a half a mile of the place. We continued our course, therefore, through the woods, until we cam e to another clearing which proved to be the place that we were in quest of. Surrounded by a dense forest was a clearing of some three or four acres, upon which some log buildings had recently been erected. These buildings we found were the dwellings of the workmen employed, and the place for the preparation ofthe oil for the market." The writer of this letter says that Mr. Williams was not present and he regretted that he "had not the chemical knowledge to enable me to hazard an opinion as to the component parts of the oil, or as to the theory of its production". He gives a very good description of the soil and timber but nothing of the oil or refinery. He says that "a black, pitchy substance appears at the surface of the ground. The substance emits a strong odour and would at once arrest the attention of the observer". He says that "Williams has sunk a well some 30 feet deep in one of these spots (West Gum Bed) from which he obtains by means of a pump a plentiful supply of thick looking substance. This it appears can be got in quantity - it is then subjected to sufficient heat to cause the finer oils to evaporate by which means and a distilling process, it is prepared for the market. The waste in passing through this process is about 20 per cent. When thus prepared it is a clear amber colour, and burns in a lamp with a clear beautiful flame, as we discovered on trying the experiment". He was told of but did not visit the East Gum Bed.

Like all others, he regrets that these "springs" are so far from a railway station and that the roads are so bad. The oil is now shipped from Wyoming and he say "several barrels being carried off on the following morning."

Here was lost to history the one opportunity to record what Williams had accomplished at this important time. The correspondent has obviously made errors. Williams well was 46 feet deep (Toronto Globe September 7th, 1861. Log of well No. 27 and paragraph following well No. 57), and no oil was found in this impervious clay at 30 feet, it came in the gravel beds on top of the rock. The level of the oil would probably be at 30 feet from surface. Some wells filled with oil to the surface and a few overflowed the ground. ~~Again it would be most unlikely that Williams would have his still in a log building; his treatment, tanks and tubs but not his still. This would possibly be covered but not enclosed.~~ He must also have some oil, both crude and refined, stored in barrels. Worst of all, the correspondent gives no description of his treatment of the fractions. If only 20 percent waste, he must have had produced both illuminating and lubricating fractions.

With no roads and such a sparce population one must speculate why he had a refinery at Oil Springs, and also if he would haul acid over such undescribably rough and muddy roads. Robbs estimate of 30 to 35 percent loss in refining is more likely to be correct, than the 20 percent of the correspondent. The cost of hauling and freight would likely be 50

percent or maybe more, of the cost of the refined oil. Williams can be credited as being a most careful business man and if he could save 30 or 35 percent on haulage, he would most likely establish a "topping plant" at Oil Springs and a "rerun and treatment plant" at Hamilton where he had available all necessary equipment.

Robb mentions the difficulties in refining Oil Springs crude and the difference from Pennsylvania crude. He says (p.318)..."most of the oils obtained south of Lake Erie are lighter and bear a less percentage of loss in manufacture; they are much more easily deodorized or rather have comparatively little unpleasant odor, even in the crude state. But the chief drawback to the commercial value of Canadian Oil is its thick and tarry consistance; causing it to foam in an uncontrollable manner; in the ordinary retorts used for rectifying earth and coal oils, and to yield too large a proportion of heavy products. In view of these circumstances, it will obviously be expedient to prepare the material for the market in Canada with apparatus expressly adapted for the purpose".

These remarks would tend to confirm the foregoing suggestion that Williams treated all his oils that he put on the market, in Hamilton.

(PHOTOSTAT OF ADVERTISEMENT IN LONDON FREE PRESS SEPT. 15, 1859)

This advertisement brought an immediate response from the Editor of the Sarnia Observer. In an editorial September 23rd, 1859 he admits the superiority of Williams oil but vehemently objects to the price of $1.25 per gallon that Mr. Clark, the Sarnia agent charges when the price in London is $1.00 per gallon, the only difference being the extra freight charge from Hamilton "where it is manufactured".

Williams' advertisement is eloquent in relating the problems that he had faced and solved before he put his oil on the market. Analysis by the Fuel Testing Laboratory, Dept. of Mines, Ottawa, gives an average of 0.76% sulphur by weight in the Oil Springs crude and 0.87% by weight in Petrolia crude oil at the same depth. This Oil Springs crude is from the "lower pay" at 370 feet. There is no sulphur analysis of this surface oil; however, the sulphur content must be greater as it could scarcely have come from any other source and having lost some light ends the sulphur percentage would no doubt increase.

(THIS WILL BE ALTERED WHEN A NEW ANALYSIS IS MADE IN JULY 1961)

THE LONDON FREE PRESS

Sept. 15th, 1859

THE

CANADA EARTH OIL.

SOMETHING NEW.

SUPPORT HOME MANUFACTURE

A GREAT DEAL has BEEN SAID ABOUT the recently-discovered Earth Oils of Lambton, otherwise known as the Enniskillen Oil. In its pure state it is unfit for use, but, by the action of Chemistry, is rendered beautifully pure, transparent, and free from offensive odour.

Professor Croft, of Toronto, after much labour, has succeeded in deodorising the Oil, and rendering it useful as an article of commerce.

L. C. LEONARD,

Richmond-street

Opposite the Post Office.

Has been appointed by Messrs. WILLIAMS and HAWES the

Sole Agent for London & the West,

for the sale of this new Oil. He is prepared to treat with parties for a supply either wholesale or retail.

This Oil is superior to the Coal Oil in quality and durability; is free from unpleasant smell; and burns with a pure, bright flame. It burns longer, and is at least 40 per cent. more economical than any Coal Oil now in use. *Price One Dollar per Gallon.*

☞ Samples for trial can be obtained gratis of the Subscriber.

LAMPS

For Burning the Enniskillen and Coal Oil always on hand, at wholesale and retail.

NOTE THE ADDRESS:

L. C. LEONARD,

Stove and Tin Warehouse,

RICHMOND-STREET (OPPOSITE THE P. O.).

LONDON, C.W.

STOVES,

THE SUBSCRIBER ALSO SELLS

Cook, Dining-Room, & Box Stoves,

JAPAN & TINWARE,

a great variety, and cheaper than any other House in London.

London, Sept. 15, 1859. D1221-W339-3m

Distillation had not gone through any material change in one hundred years. The acid and alkaline treatment for removing tar, etc, had been used by Young, Gesner, and every one else. Murdock had used freshly slaked lime to remove the sulphur from his gas and oil. The next question is, what process did Prof. Croft of Toronto University use? He had the advantage of knowing what had been done by Gesner and the refiners on the continent, but he had a crude product with a very much higher percentage of sulphur than anyone else. Williams claims that he had succeeded in deodorizing the oil, but it is not easy to give credance to this statement, in the light the difficulties that the refiners of the 60's and 70's met with in producing a "sweet" or odourless oil. Unless the sulphur was entirely eliminated, it would encrust the lamp wick which smoked the chimney and overheated the lamp. However,,Williams was competing only with "Burning Fluid" and he had little difficulty convincing the public that when compared to "Burning Fluid", his kerosene was safe to use in a lamp.

Williams was now, September 15th, 1859, in full operation, producing, refining, packaging, and selling refined kerosene and lubricating oil, on a commercial basis. He must have been selling these oils in Hamilton for a year or more previous to this date, as there would be plenty of market at hand for the limited supply from his early distillation.

His first advertisement in Hamilton appears to be in the Spectator and Journal of Commerce, July 4th, 1860. (The other Hamilton newspapers of these years are not available for scrutiny, he may also have advertised in Sept. 1859).

"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 odor common to all oils. The odor has prejudiced many against them, and has hitherto prevented us from bringing our 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 odor. We offer our oils at the following prices.

Illuminating oil	70 cents per gallon
Machinery oil	60 cents per gallon
Crude oil, 1000-4000-gals.	25 cents per gallon
Crude oil, 4000-100,000 gals.	16 cents per gallon

J.M. Williams & Co."

The time arrived late in 1860 when Williams found it necessary to incorporate under the Joint Stock Companies Act of 1850. He had been operating under the name of Williams and Company. The files of the Secretary of State in Ottawa disclose that on November 4th, 1860, he petitioned for the incorporation of the Canadian Oil Company. The capital stock of the company was $42,000, fully subscribed. His old associates have all disappeared, although their names appear from time to time as land owners in the oil field. His new associates are John Fisher who subscribed $13,000; N.D. Fisher $1,000; Wm. D. Fisher $7,000; Isaac H. Jamison $7,000. Williams subscribed for $14,000. The object of the company was ~~to~~ "Manufacturing, Mining, Chemical and other purposes or for the erection Public Hotels or Baths and Bath Houses or for the opening and using Salt or Mineral Springs or for the carrying on fishing; for the manufacturing and selling oil and oil lamps, and for the erection of any buildings connected therewith." These places of business were in Hamilton and Enniskillen Township.

PHOTO OF CANADIAN OIL CO. INCORPORATION

His oils were retailed in Hamilton, London and Sarnia that we know of and probably Brantford, Dundas and other places. His business must have increased very rapidly as he had to drill more wells. He had one well in ~~July~~ 1856 Robb says that when he visited Oil Springs in December 1860, he had five wells. The Globe correspondent ~~who visited Oil Springs at the end of~~ August 1861, gives the logs of 57 wells out of about 400. He includes three of Williams wells, Nos. 27, 28 and 29. The first two are

at the Gum Bed on Lot 16, Con.II and number 29 is on the east Gum Bed on Lot 18 in Concession I. All three are drilled into the rock, No.27 through clay 46 feet and rock 100 feet. "The well averages the large quantity of 60 barrels per day. A very great deal of oil has been taken from it. It has been in operation two years". This would place the date that this well was drilled in the rock, as August 1859. The same date as Col. Drake's well in Pennsylvania. It is 90 feet deeper and had three times the daily production. His first well in 1856 was dug to the top of the rock at 46 feet where he found oil. The three wells above were drilled with a spring pole, and the other two dug to the rock only.

In Hunt's paper he says on page 248 that "nearly one hundred wells had been sunk when I visited the place in December last (1860) and many more have been drilled since. The rush of prospectors in 1859-1860 must account for this activity.

A list of the men in the oil industry in 1860, as taken by the Census enumerator, is given on page 71 but this list is far from complete as many others were there that are not in this list. These may have had other occupations at this time.

Williams did not buy all of Charles N. Tripp's holdings in 1856 and Tripp disposed of these to many people and in various ways. Henry, ~~his brother~~, ~~indirectly~~ inherited his brother's properties when Charles died in 1860 and Henry executed a quit claim for $500 on 2/3 and a trust bond with Edward Horatio Buck of Sarnia for the other 1/3 interest in 18 lots in Enniskillen Township, among others the east 1/2 of lot 17 Con.III dated 13th June, 1860.

In the list of oil wells in Oil Springs published in the Globe on September 7th, 1861, one Underhill is shown as the owner of the east 1/2 of lot 17 Con. III and there are two wells on this lott, one owned by Underhill and one by Little & Co. Underhill's name does not appear on the Register. The Sarnia Observer, 13th July 1860, telling of the new excitement and the richness of the area says "every new well sunk in the region seems equally and in some cases more productive. Reppecting one of these wells sunk on lot 17, Con. III, fabulous stories are in circulation. It is stated that the well is 30 feet deep (other wells in the lot log 40 and 45 feet) and 6 or 8 feet in diameter and is actuallyfull of oil, which is even running over, and the oil is running down Black Creek at the rate of 300 gallons per hour. A suit is going on at present as to the rights of the property on which the well is situated. A writ of ejectment was issued by Buck vs Underhill but Underhill who is in possessxion persists in keeping it, and, in the meantime, an injunction has been procured from the Court of Chancery to prevent him from carrying on the work until the dispute is settled.

This river of oil continues to flow and hundreds of barrels are lost daily ....."

The Hamilton Spectator, March 4, 1861 says that five of six thousand gallons went to waste.

Property owners at this time subdivided their holdings into lots of ~~five~~ one acre and less, and leased or sold these parcels to prospective

drillers. There were many hundreds of these small parcels on the oil field. The hundred wells mentioned by Hunt were scattered all over the field.

Robb estimates the production of oil from Oil Springs at 400,000 gallons and Robb says that Williams had raised 200,000 gallons which would show that the newcomers in the field in 1860 had many wells and produced as much oil as Williams. The question of disposal is answered by T. Sterry Hunt, p.249, he says "The oil obtained by Mr. Williams is refined in Hamilton while that from the northern part of the township (Petrolia) has hitherto been sent to Boston, though refining works are now being erected at the wells". The many small well owners set up stills and sold their product to any one who had enough courage to use it or who were unaware of the danger involved in attempting to use it.

DRILLING PRACTICE

It has been the general belief that drilling wells with a churn drill i.e. by raising and dropping a heavy chisel bar attached to a "walking beam", originated with the oil industry, and that the "spring pole" or "kicker" was first used in the 1850's. Both these beliefs are far from known facts. The Chinese (who seem to have originated many modern "inventions" in some primitive way) drilled wells for brine used in making salt, a couple of centuries ago, using the same spring pole that Williams used in 1859. Steam powered

"cable tool" drilling rigs were used for drilling water wells in Europe in the early years of the XIX century. Wm. Morris is credited with the invention of our well known "jars" in 1831; which would indicate a high development of the trade at that date. In 1833 a water well 8 inches in diameter was drilled on the outskirts of Paris, France to a depth of 1894 feet (Geo.R. Burnell, Jour.Soc.Arts. London Vol.X, p.156 et seq. Jan.31st, 1862). Many water wells were drilled in England, and on the continent to a depth of 1000 feet and more prior to 1862.

A description of the method of drilling salt wells in China in 1827 is given in the book "Journies through the Chinese Empire by M. Hue Vol.12 pp.300-302. He states that some of these wells are 3000 feet deep and much gas and some oil is recovered. The following is quoted from his book:

"The number of salt wells is very considerable; there are some dozens of them on a tract of country about ten leagues long by four or five broad ..... The mode of procedure is this. If there be a depth of three or four feet of soil on the surface, they plant in this a tube of

hollow wood (conductor) surmounted by a stone, on which an orifice of the desired size, of four or five inches, has been cut. Upon this they bring to work in the tube a rammer of three or four hundred pounds weight, which is notched, and made a little concave above and convex below, a strong man very lightly dressed, then mounts upon a scaffolding and dances all the morning on a kind of lever that raises the rammer about 2 feet and then lets it fall by its own weight. From time to time a few pails of water are thrown into the hole, to soften the material of the rock, and reduce it to pulp. The rammer is suspended to a rattan cord, not thicker than your finger, but as strong as our ropes of catgut."

"This cord is fixed to the lever and a triangular piece of wood is attached to it, by which another man sitting near gives it a half turn, so as to make the rammer fall in another direction. At noon this man mounts on the scaffold, and relieves his comrade until evening; and at night these two are relieved by another pair of workmen".

"When they have bored three inches, they draw up the tube with all the matter it is loaded with, by means of a great cylinder (drum) which serves to roll the cord on ..... Sometimes the large iron ring that suspends the rammer breaks and then five or six months labour are needed before it is possible with the help of other rammers to break up the first and reduce it to a pulp. When the rock is good, the work advances at the rate of two feet in twenty four hours, so that about three years are required to drill a well....."

In this one can read (with some allowance for descriptive terms) a description of a "spring pole drill" as used in China over 100 years before it was introduced into Canada.

American writers on oil historys refuse to give Williams credit for establishing the Petroleum Industry on a commercial basis. They insist that "Col. Edwin L. Drake" has this honour because he drilled a well to 65 feet that gave 10 barrels of oil per day in August 27th, 1859. The location was a few miles from Titusville, Penn. Williams well was dug with a shovel to a depth of 40 feet, (probably in 1855 and certainly in 1856,) four feet by five feet, and the sides supported or revetted from caving with oak logs 4 inches to six inches in diameter. (This can be seen today at Oil Springs) Ontario. Wells drilled later than 1858 when sawn lumber was available at the Railway, were curbed with boards or plank laid tight on their sides. This kept all cavings out of the well. The rough poles did not Actually this Erie clay that overlays the rock in Enniskillen Township needs little if any support. Williams was ~~really~~ he pioneering ~~in the search for oil as he was first, in 1856, to sink a well~~ in 1852. There was a drilling rig at St. Catharines that had finished a water well to 500 feet in 1855, and Williams could have had this drilling rig; but when all that he needed was a shovel to dig and an axe to cut small timber he would never ~~think on~~ give a thought to hauling a heavy engine and boiler, let alone the bull wheels and rig irons to build a drilling rig, over a road which at its best, in winter, was nothing more than a trail through dense woods.

Most of the common tools in use on shallow drilling rigs at present are only slight improvements over the hand made tools used over 100 years ago in drilling water wells. An exhibit of these was seen by the writer in New Orleans in March 1938. It is clear, therefore, that the use of the spring pole drilling equipment at Oil Springs in 1860 was because of the difficulty encountered in transporting heavy equipment through the deep muddy roads, or probably the financial standing of many a newcomer in the field, rather than the lack of knowledge of drilling technique.

Mr. Arthur B. Johnson, born in Oil Springs (a son of the late J. Harvey Johnson who came to Oil Springs as an experienced driller in 1860) says "The belief of many people today is that the first wells were drilled with spring pole and tread board, which is an entirely mistaken one. This method was used by men who rushed frantically to obtain wells and who, because of impossible roads, were unable to bring in the necessary equipment. Many of these wells had to be drilled with steam rigs afterwards, the work having been stopped when the drillers reached the lime rock and became stuck. Some of the spring pole tools were bars of steel sharpened at the ends and with no joints. When the bits had to be dressed, the drillers shouldered them and carried them to the shop. I have seen some of these tools."

When ~~Williams dug his well~~ Williams In 1856, ~~he~~ was alone in the oil industry. No one had faced or solved any of the problems that he met with. He had nothing better than a hand water pump to raise the oil and barrels for storage and transport, that could be obtained no nearer than London and had to be hauled from the railway by horse transport. He had no machine shop, no pipe, no valves and no supply house. Even as late as 1862 Mr. J.H. Fairbank spent a day searching Oil Springs for two 2-inch couplings. Pipe suitable for carrying oil was almost unobtainable, ~~Most~~ the available pipe was made of cast iron with bell joints made and for carrying water. Some wrought iron pipe could be had from Pittsburg; It was mostly steam pipe, threaded ~~pipe was limited to steam pipe~~. Pictures of oil wells taken in 1866 show no piperack and only a small pipe (1 inch?) connecting the well to a flow tank. If Williams had brought in a flowing well he would have had no control of the flow and it would have gone to waste. Any pipe suitable for his use could only be obtained from England. Cordage was obtainable in any size and quantity. Manilla rope was then used on ships and also for drilling.

Railways had no special cars for oil. The barrels were racked on flat cars until the great increase in shipments in 1862, when two round tanks were set on a flat car

No description of Williams still can be found. It is improbable that there was any great departure from those commonly in use. Prof. Croft would have access to any and all information on this subject. We know that it was made in the Gartshore Foundry in Dundas and his treating tanks would also be made there. Gartshore was one of the leading supply

houses for all refinery requirements in later years. They advertised extensively. The Oil Springs Chronicle of April 27th, 1863 - carries a large advertisement for cast and wrought iron stills and treating tanks also advertised as well as and settling tubs. Beckett of Hamilton ~~sold~~ these items and steam engines, boilers, pumps agitators and worms, but the agitator seems to be a new departure. Leonards of London had also been supplying refiners but it is not at all clear that any of these were available before 1860. or 1862

The only equipment in use in the oil field in the 1850's was operated by man power. Certainly all drilling was done with the "spring pole" and the pumps used were either the water well pump made from bored logs called pump logs, or some such pump operated by the spring pole. The level of the oil in these dug and drilled wells was far from uniform. At the present day the water level in Williams well stands at about three feet below the surface, but in the wells to the east and north east the oil flowed in 1860. More than one reference will be found of dug wells that gave neither oil or water, and Robb © has stated that Williams well which gave only oil at first, was in December 1860 making so much water that a steam pump had been installed. This, by the way is the first reference to steam power being used in the oil field.

© Robb Chas.

OIL SPRINGS VILLAGE

The traveller who visited Oil Springs in July 1859 found only a few log buildings housing the labourers and the refinery equipment. In 1860 the news of Williams success in discovering an oil field was spread abroad. Robb says that the influx was mostly from the Pennsylvania oil fields. The only definite knowledge that we have is from the Enumerator for the decennial census of 1860-61 who says -

"Oil speculators, a name I have given to the occupation of a number of well dressed persons who deal in oil claims, hunt up claims, and getting leases, etc". The men who were actually engaged in producing oil (digging wells) he listed as miners.

Oil Speculators

Name	Age	Residence
* Geo. Hart	49	Boston
Wm. Lambert	30	"
Thos. Morris	50	"
* Chas. Boyd	40	Ohio
* Wm. Kelly	55	U.S.A. gentleman

Oil Miners		American Birth
* Henry Cook	26	U.S.A.
* Hiram Cook	20	"
Emasa Fraser	23	"
* J.B. Bradley	22	"
* Warren Bradley	-	"
* Wm. E. Sanborn	22	Pennsylvania
* Chas. Sanborn	17	"
Joseph Hess	37	U.S.A.
Chas. Fisher	23	"
Aaron Edget	45	"
E.F. Songar	35	"

	Austin Jacobs	25	Michigan
*	A.A. Adams	37	Boston
	R.F. Stevens (Bookkeeper)	-	"
	Angus Atler	28	U.S.A.
	John Bancorn	-	"
	Thos. Walker	30	Erie

Those of British Birth

	Robt. Milne	26	Hamilton
*	Wm. Jenks	-	England
	Wm. Lumber	-	"
*	Thos. Franklin	-	"
	Jas. Sherril	-	Ireland
*	Geo. Grey	-	Canada West

* Mentioned as well owners between 1861 and 1863. Among these Geo. Hart, Wm. Kelly, Bradley Brothers, Sanborn Brothers, and Adams became important operators within one to two years.

This list of oil operators plus probably a few others who had begun cultivating the land and operating boarding houses, would constitute the population of the village in 1860. The few settlers and especially their horses, would be in great demand ~~as occasional labourers~~ in the oil field. Trees were everywhere and supplied the demand for construction of log houses when there was no saw mill, to provide lumber. The largest of these houses doubled as grocery stores and provided sleeping accommodation for the travelling public. It would be a little early for a tavern but home made whiskey was sold in those days (without benefit of government tax or inspection) at from ~~50~~ 25 cents per gallon and up, was available and in demand.

There was no saw mill in the neighbourhood until after Elliott's mill had finished cutting the planks for the road from Oil Springs to Wyoming in May 1862. There was so little pine and spruce that building

material had to come from Sarnia or London and be hauled in on frozen roads. The whipsaw, broad axe and adz provided the dressed lumber that must be had to frame doors, windows and floors. Roofs were fashioned from hollow or hollowed logs.

There were no sidewalks, nor drained streets, and the main street was one large mudhole until planked in 1862. Horses had better accommodation than men for there was no hotel before 1860. The workmen boarded with every family in the village and mostly slept on the floor. Horses did better, they at least had a log stable to themselves. As yet no school, church or public building. All food tasted of oil, for the water wells were all covered with a scum of oil. Horses were watered, clothes and bodies washed in Black Creek. Potable water must come from well upstream.

The only recreation available was a card game and a bottle, yet it is commented on in later years that this frontier village had no lawlessness.

WILLIAMS AT BOTHWELL

The editor of the Chatham Planet who visited Bothwell in May of 1863, gives a history of every well in the field. He tells of a well drilled in 1857 by Mr. J.M. Williams. Because an account of the elapsed time, six years, since the first work was done little credit would be given to his story, but he was conducted through the field by Messrs. Jordan and Dick who were the principal operators in the field since 1859 or 1860 and should have a factual knowledge of the wells drilled. His story is -

"No. 1 well, that is the first commenced. This is located on the flats on the immediate bank of the Thames and was commenced by Mr. Tripp, a Canadian, sent by Mr. Williams of London. Tripp dug t he well to a depth of some 27 feet without meeting with any special indications of oil; but one night as Tripp was about leaving off work he fancied, upon striking his pick into the soil, that he heard a hollow sound, yet he did not give the matter much thought at the time, and a few minutes after quitted his work. To his surprise the next morning when going to the well to resume digging, he found it full of oil and water. Afterward an attempt was made to drive an iron pipe down into the well, but when the pipe had been driven a considerable distance, it broke, and the well was abandoned. This well was commenced some six years ago". That would be 1857.

The Chatham Plant of April 27th, 1865 carried the following item "I was informed that some ten years ago a Mr. Williams sunk a well for water (at Bothwell) some 60 feet deep. The gas and water mixed with some black stuff stunk (sic) so badly that he had the well filled up. I had the well cleaned out some few feet and a pole driven down several feet. I found a large show of oil coming up with the gas. Mr. Williams sold this lot a few days after for $6,000." The editor says that Dr. Bonhorst of Chatham was the purchasor.

The date 1857 is exactly right for Williams operations; when Williams had moved his refinery from Oil Springs to Hamilton and was hauling barrels of oil over the almost impassible roads for 25 miles, one would expect that he would have made a further attempt to find a source of oil that would eliminate this haul through the muddy roads. This experience must have convinced him that it was cheaper, to dig a well through the clay to rock at Oil Springs. A search of the land registry of Mosa township Middlesex County fails to discover any lands in the name of Tripp or Williams.

BOTHWELL

It has been related in the first pages of this chapter how in 1793 Lt.Gov. Simcoe was shown the seepage of oil in the banks of the Thames River and how this seepage or oil spring became a land mark. The only white people in the district at that time was the Moravian Mission that stood about one mile down stream and ministered to the Indian settlement in the vicinity. The battle of the Thames in which the famous Indian Tecumseh was killed, took place in 1813, another half mile farther downstream. The township of Zone, on which Bothwell was situated was surveyed by Mahlon Burwell in 1821. He laid out the Indian Reserve on the north bank of the Thames, blanketing the river in Zone Township, from Camden to Mosa Townships.

The writer of the historical section of the Atlas of Kent County says that the settlement of Bothwell did not commence until 1852. "In that year the line of the Great Western Railway having been meanwhile located through here, the Hon. Geo. Brown purchased a tract of about 4000 acres lying to the north of the Indian Reserve, above alluded to, and including the entire site of the present town". He cleared the land, laid out a townsite north of the railway line, established saw mills and a furniture factory. He used the best of the lumber in the furniture factory and sold cordwood to the Great West Railway for fuel in their locomotives.

The earliest institution other than Hon. Geo. Brown's was a tavern. The historian was evidently an abstainer for he says of this "the earliest was the inevitable 'grog shop'; the pioneer concern of that character being one which stood on Elm Street where the Canada Methodist Church now stands. That dispensary of misery was under the proprietorship of one Brown, its dimensions were 18 x 24 feet, and the rush of patronage so great that crowds were unable to obtain admission and were served with the "ardent" out of doors. Upon this elegant retreat was conferred the name "Sebastopool". It was followed by others in rapid succession, until no less than five so called hotels graced the town in 1857". There were three stores in the place in 1858, the first opened in 1856 but there was so little money that Mr. Geo Brown issued I.O.U's as "scrip". This was "legal tender" in the vicinity until "the outbreak of the oil fever" in 1863 when John Lick brought in his big well. This will be related in the next chapter.

Progress in prospecting for oil was held back because most of the oil indications were on the Indian Reserve and it was not until 1858 that the Indians surrendered that portion of their Reserve retiring to the larger portion in Oxford Township on the south side of the River.

Following the oil boom in Pennsylvania when Col. Drake brought in his oil well at Titusville in August 1859, the Americans flocked

into Canada and by the end of 1860 all that portion of Mosa, Zone, and Oxford township fronting on the Thames River was taken up, mostly by Americans from Erie, Pennsylvania. Wells were ~~digging~~ being dug and drill~~ing~~ed ~~from the county line upstream~~ as far as Cashmere in Mosa township two miles upstream from the country line, on the old landmark "The Oil Spring on the Thames". As no results from the wells appear until 1861 and later, this will appear in the next chapter on the Second Decade of the Industry.

PETROLIA

~~At Oil Springs~~, there was a natural seepage of oil into Bear Creek in lot 13 Con XI Enniskillen Township where the town of Petrolia now stands. The Toronto Globe, Sept. 9th, 1861 ways "Messrs. A.A. Adams & Co. of Boston owns 150 acres, part of lots 13 and 14 in Con. XI of Enniskillen. Adams drilled at a natural spring of oil from the earth, near Bear Creek. On digging his well he found that someone had dug some time before, as their digging could be traced by the filled in earth.. At 30 feet he found a deer horn in good preservation. In a third place he found a rib at 35 feet...." Even at this late date it is possible to find the digger of the well that Adams found.

A search in the land register of Lambton County, discloses that the north half of lot 13, Con. IX and all of lot 13 Con.X Enniskillen was sold on December 23rd, 1853 per Thomas Graham of Paris, France to C.N. Tripp for £ 206 5/0 and that on 4th March, 1856, C.N. Tripp and wife sold (all but 20 acres that lay on the concession line dividing Con. IX and X) to Hiram Cook of Hamilton for £ 1500 0/0. As there was no one living anywhere near these lots in 1856 and the place was a wilderness it is most difficult to imagine why this 300 acres would appreciate in value in three years to the extent of £ 1294 0/0 unless Tripp had dug a well on the site of the oil spring and obtained a good result. Tripp later lost the 20 acres that he reserved through an attachment for damages and Hiram Cook was the highest bidder at £ 80 0/0.

L. Sterry Hunt in his visit to Oil Springs in December 1860 (already mentioned) says in his article (p.248) "Large numbers of wells were sunk by Mr. Williams and others in the southern part of Enniskillen along the borders of Black Creek and also about ten miles further north in Bear Creek". This is a definite reference to wells at Petrolia in or before 1860. Again on the same page he says "that (oil) from the wells on Black Creek (Oil Springs) is more liquid and less dense than the oil from Kelly's wells on Bear Creek (later Petrolia)." Petrolia was at first called "Kelly's Wells."

We know from later reference that the infant village began at the cross roads with the Wyoming road, and that the present town dates from 1866 after Capt. King drilled his large wells, within the limits of the present town.

So far as known, this is all the reference to the Petrolia area in 1860 and earlier.

PRODUCTION

An attempt to give any authentic production figures for the years 1857 to 1860 is most discouraging. There are only three authorities, Hunt and Robb in Dec. 1860 and Sir Wm. Logan in Geology of Canada in 1863 who obtained his information from the Great West Railway at Wyoming covering the actual shipments of oil.

Chas. Robb of Montreal who visited Oil Springs in the winter of 1860-61 says that Williams has raised 200,000 gallons (5000 bbls.) has now 5 wells yielding an average 600 to 800 gallons per day. Hunt who also visited Oil Springs in December 1860 says that "large numbers of wells have been sunk by Mr. Williams and others ... Nearly 100 wells had been sunk when I visited the place in December last (1860) and many more have been bored since. Of these but a small proportion furnish available quantities of oil, but the whole amount obtained from the district is perhaps not less than 300,000 to 400,000 gallons".

Converting these gallons to barrels cannot be exact for there were two and more recognized measures of gallons and barrels at this time. The Department of Excise used the wine gallon and 40 gallon barrel until March 15th, 1879 when the gallon was standardized as the Imperial gallon and the barrel held 35 of these gallons. It is safe then to convert gallons to barrels on a basis of forty gallons. Hunt's estimate is, therefore, 7,500 to 10,000 barrels.

The production from Oil Springs up to December 1860 can be taken as 10,000 barrels, according to Hunt and on Robb's authority Williams produced half of this. Some doubt is thrown on this from Logan's figures. He says that up to July 1st, 1861, 5,529 barrels were shipped over the Great West Railway which was completed to Sarnia in December 1858, (M.L. Bladin "Construction of Railways in Canada up to 1885", Toronto University Studies of History and Economics Vol.V, 1932) but we know from the description of the road to Oil Springs, that no oil was hauled over this road in 1859 unless it was in the winter months. It would be safe to say that until at least 1860, all oil was shipped via the Great West main line from Newbury or Bothwell. What that quantity would be is anyone's guess. Williams was advertising both crude oil and refined oil and we know that he sold 178 barrels of oil to Col.Ferris in 1858. The final question is, how much oil would he have refined in Hamilton that he shipped from Newbury or Bothwell? Not very much. Not more than 1,000 barrels.

In 1860 there was a very brisk sale of oil but little or nothing could be hauled excepting in the winter months. The Sarnia Observer says that in 1860 and especially in the spring of 1861 there were meetings in Sarnia and one in Wyoming in March 1861 with the view of organizing a Company or urging the town of Sarnia to construct a plank road to Oil Springs so that the crude oil could be hauled at any time of year. This is

genuine evidence that considerable oil was hauled to Sarnia directly in the winter. Certainly in 1862 oil was hauled to Sarnia and stored, waiting the opening of navigation, to take it to eastern ports. In these years the freight rate by rail was one and one half more than on any other commodity and there was a great effort made to ship oil by water from Sarnia.

From the information available, a reasonable estimate of production would be, 1857 - 300 bbls.; 1858 - 1,500 bbls.; 1859 - 3,200 bbls.; 1860 - 5,000 bbls.; This is made to agree with Hunt's estimate which seems reasonable enough when the shipments from June '61 to '62 (Wyoming via Great Western Railway) were given by Logan as 31,510 and by the Dept. of Excise, 41,527. This latter no doubt includes shipments from Sarnia and is a more accurate total than Logan's.

Who produced this oil? Certainly Williams, the most of it, but we know of other producers (who are no doubt included in the list given by the enumerator for the 1860 census). Kelly and Adams were producing at Petrolia and shipping to the Boston refinery. The other producers in Oil Springs may also have shipped to Boston or possibly New York for the New York refiners at Newton Creek, Long Island, were buying all the petroleum they could get through Col. Ferris. He certainly knew Canadian Oil, as Niven states in his book, already mentioned, Gesner also knew it as he mentions the difficulty in ridding it of sulphur.

How was this crude oil marketed? First of all the surface oil made an excellent lubricating oil in its natural state and was in demand by the railways for use in box car journals (boxes that held lubricants for the wheels) but its principal use was for illuminating purposes. There is no reference to the quantity of illuminating and lubricating oils that Williams refined. He sold both in 1859. Robb says that there was about 30% waste in 1857 when he moved his refinery from Oil Springs to Hamilton. In the 1860's the refiners recovered 60% illuminating oil and this seems to be the greatest percentage recovered. Certainly anything greater than 50% would indicate a very dangerous product. The remaining 20% must have been lubricating oil.

At the end of the year 1860, it can be said that at least the municipalities that were reached by newspapers were alive to the fact that this new illuminating oil was here to stay, and that it was a product made at home. Burning fluid of many kinds were still advertised but the home product was better and in the whole, safer. The public had been told that this oil came from the earth and that it could be seen on the surface of the ground like pitch and that it oozed out of the banks of streams where irridescent colours covered the surface of the waters.

The glacial drift clay, sand gravel and boulders, that covers all south western Ontario holds a high percentage of iron as well as traces of many other minerals. The meteoric water (rain water) takes up some Carbon dioxide from the air, but more from the top soil. The CO_2 and water takes some of

iron into solution and when it finds its way out of the ground into a stream or pond, this dissolved iron oxidizes and leaves a very thin film of iron oxide (or rust) on top of the water. This film refracts the light and gives back the colours of the spectrum (or rainbow colours) in the same manner as light refracted from a film of oil. This film of iron oxide is metallic and if the water is agitated, the film will break up and sink to the bottom. On the contrary, an oil film when agitated, will not break up but will unite reforming the film. The agitation test of a seepage is infallible.

The prospectors of 1860 were not aware of this test and rumours of new oil prospects spread rapidly. The post hole auger preceeded the geologists' pick in the search for oil. Prospectors went in couples, the post hole auger followed by a man with a shovel. This had at least one advantage, it focused attention on natural phenomina and some gas seepages were discovered. The great clay plains at Kent and Lambton counties, covered by the Erie clay is separated from the bed rock, in most of this area, by gravel beds that hold surface gas. This gas was discovered in the post hole auger invasion. The small oil field at Florence may have been discovered with the post hole auger, but a few years later,

There were a number of scientists in Canada who understood the theory of accumulation of oil in pools. Sir. Wm. Logan was no doubt the leader in propounding the anticlinal theory, altho he very generously gives the credit to Hunt who certainly was the first to put it in writing.

Dr. Robt. Bell says (Robert Bell, Trans. Ray Soc. Canada Sec. IV, 1887 The Petroleum Fields of Ontario) "About the beginning of 1860 some gentlemen visited our provincial geologist in Montreal for the purpose of obtaining information in the subject (oil fields). Before entering on a discussion of the matter, Sir Wm. Logan took them to the showcase containing bottles of the dark fluid from both of the above regions (Gaspe and Lambton) and said 'Gentlemen, I have been waiting for you for the last twenty years' and then proceeded to give them the benefit of his knowledge of a matter with which he was even then quite familiar, but which was new to almost everyone in this country."

"The anticlinal theory in connection with the accumulation of gas and petroleum was first mentioned to the writer by the late Sir Wm. Logan in the autumn of 1860. He was then in the habit of comparing the filling of a soda water bottle with gas and water, to the process he believed went on under the impervious strata of an anticline. But the idea seems to have originated with his colleague, Dr. T. Sterry Hunt, who mentioned it in a lecture delivered in Montreal and published in the "Gazette" of that city on March 1st, 1861. According to the hypothesis, gas and oil, following hydrostatic laws, accumulate on the highest points, or the domes, along anticlival folds .." There then follows a long elaboration on details of the anticlinal theory and a discussion on accumulation and four conditions necessary to have a producing oil field.

Hunt's lecture in Montreal March 1861 appears in the Canadian Naturalist Vol. III Aug. 1861 following his visit to the Oil Springs wells, in December 1860. He says "These wells occur along the line of a long anticline which runs nearly east and west through the western peninsula of Canada, and brings to the surface in Enniskillen the shales and limestone of the Hamilton Group..... The oil doubtless rises from the Carniferous limestone..... to a higher portion of the formation, which is the crest of the anticlinal axis, where the petroleum of a considerable area accumulates and slowly finds its way to the surface .... giving rise to the oil springs of the region."

Mr. Chas. Robb, Mining Engineer of Montreal, has already been referred to and quoted with reference to his visit to Oil Springs in 1860, as well as Alexander Murray's report in G.S.C. 1851 already been quoted. Prof. Croft who was Williams' chemist and consultant did not leave anything in writing and his work cannot be traced through Toronto University. Dr. Henry Yule Hind, Professor of Chemistry and Geology in Toronto University does not appear until 1862 in any newspaper report.

Chapter V: Makers of Oil History (1850 - 1880)

The Harkness Files
Volume XIV
Unpublished Manuscripts

- THIS PAGE CREATED BY OGSR LIBRARY -

MAKERS OF OIL HISTORY

1850 To 1880

By

R. B. HARKNESS

Contents

Janes

Jane Miller Williams 31

	Pages	Total
Introduction	2	3
Early Illumination	~~4~~ 15	26 26
Chas N Tripp — Oil Springs	27	50
Bothwell	51	67
Petrolia	68	100
Exploratory Drilling	101	106
Oil Field Practice	107	116
Drilling Practice	117	131
Early Geologists	132	140
Oil Divining	141	147
Storage & Transportation	148	158
Trade	159	169
Refining	170	~~200~~ 199
Legislation	201	~~222~~ 210
Production	~~226~~ 211	~~232~~ 228
Table of Production		
Table of Wells		
Table of Exports & Imports		

Move First Commercial Operation p 15
Take out J M Williams p 22
and put in Rep by Hunt and Alex Murray

Revise Williams first well
see short history

page 44 Insert pages on Oil Springs Village
page 149 Ref. not complete page?
" 203 " " " Chap. ? 38 Victoria. Weights & Measures Act.
" 221 Date of N.B. first refinery
" 2

Introduction

The pages that follow are a record of the achievements of the pioneers of the petroleum industry in Ontario. It is an account of their struggle against natural obstacles and those created by their fellow man, their problems and the solutions, their successes and failures. The development of the mechanics of producing and refining and the tools used in these operations is touched on as is the early methods used in refining petroleum, and the marketing of the products. A tribute has been offered to the early geologists to whom must be given the credit for showing the way to the first prospector.

The period covered is prior to the 20th century.

Acknowledgments

In chronicling events which occurred prior to the birth of any writer, it is obvious that nothing contained therein could be within his own knowledge. So, in the case of this book, the information contained herein has been collected from the writings of those who witnessed these events, and from newspapers and technical papers of that day. These publications are now only to be found in reference libraries and museums, from which they are produced by the amazing skill of experienced librarians. To the librarians and their staffs of the Legislative Library, Toronto, and the Public Archives, Ottawa, I am very much indebted. Great assistance was rendered by many individuals who possessed knowledge of a special nature and who pointed the way to sources of information. It is impossible to mention all of these; some to whom the writer is especially indebted are - Mr.

F. L. Britton of the Hamilton Spectator, who read through several years of the Hamilton Spectator and made many extracts of news items, Mr. W. E. Elliott of the Woodstock Sentinel Review, Mr. A. J. H. Richardson of the Public Archives, Ottawa, Dr. J. J. Talman of Western University, London, who assisted and encouraged the writer in his first efforts, Mr. Frank Moore of Bothwell who loaned photographs of Bothwell in 1866, Mr. C. O. Fairbank, M.P.P. of Petrolia, for maps, and photos, Mr. J. A. McNevin for searching land titles, Mr. E. G. Moorehouse of London for a map of the Bothwell field, Mr. Taylor for the photo of J. M. Williams, and Mr. Harvey Johnston of London who presented the temper screw which his father brought from Pennsylvania, and gave very freely of his own knowledge of the Oil Springs field as related by his father.

Early Illumination

Ancient Uses

Deprive the world of petroleum and "the world stands still". In this age, petroleum moves the world; a nation at war deprived of petroleum goes down to defeat; yet within the memory of a large percentage of people petroleum as a motive power was unknown, and more than a few can remember its introduction for illuminating purposes. Although petroleum has been known to man long before written history, it was not "discovered" until ninety years ago, and was not "put to work" until another forty-five years had elapsed. Seepages of petroleum and gas are found on every continent, and from these seepages has come the development of the great oil fields of the world ~~have had their origin~~.

The earliest record of the use of petroleum is in Genesis VI, 14. Noah was commanded: "Make thee an ark of gopher wood; rooms shall thou make in the ark, and shall pitch it within and without with pitch." In Genesis XI:3, it is recorded, that in the building of the tower of Babel "slime had they for mortar" The "pitch," or "slime", as it is sometimes translated, could have come from Hit on the Euphrates, 100 miles west of Bagdad, where there are several seepages of heavy petroleum; from Kirkuk, an ancient petroleum spring, which led to the development of the present Iraq oil fields; from Baku on the west side of the Caspian Sea, for the past 25 years the largest Russian oil field; from Zante, one of the Ionian Islands; or from the Dead Sea in Palestine. Pitch was also used for making bricks and as mortar in ancient buildings.

Herodotus, 450 B.C. (Book V, Chap CXIX) tells us that the petroleum oozing from the rocks in Zante was used for embalming, and

~~Herodotus~~ Noah's Ark was lost on Mt Ararat; but the old Chaldean temple-tower builders left behind them their towers at Babylon (Babel) and at many sites along the Euphrates and Tigris rivers. Their mud bricks, embedded in pitch and with the kings seal imprinted in them, are to this day excavated in the bases of these old mounds; leaving conclusive evidence that "slime (pitch) had they for mortar".

Diascorides and Pliny speak of rock oil being used in lamps in the temple of Jupiter at Agrigentum, ~~which was collected~~ from the wells in Sicily, represent Girgenti. The followers of Zoroaster (the present Parsees) knew the oil springs at Baku, from which gas also was emitted. They worshipped this flame of gas as their god of fire ~~as they did that at~~ Kirkuk, ~~which~~ is said to be the traditional "fiery furnace". Very large oil springs were known along the Irawaddi River in Burma, and illuminating oil was refined ~~there~~ from them after 1850. In Italy in 1640, oil was used for lighting purposes in Genoa, from the wells of Parma and Modina, ~~and~~ oil bubbled from the bottom of the sea south of Mount Vesuvius. In later years Sir Walter Raleigh discovered and described the great pitch lake of Trinidad, where an oil field developed nearly thirty years ago. As in Ontario, the early oil fields of Venezuela, Colombia, ~~and~~ Peru, ~~in South America, in~~ Mexico, ~~and in~~ California, Pennsylvania, West Virginia, and ~~in~~ Alberta were indicated by, ~~and searched for, through the medium~~ ~~of~~ oil or gas seepages.

Marco Polo tells of the Commerce in both light and heavy oil from Baku, that extended throughout the East.

Oil was recovered from seepages and from salt wells in the mountains of Central China.

Ontario

The petroleum that reached the surface in liquid form was almost universally used by the early settlers in Ontario as an embrocation and for treating cutaneous wounds in animals and perhaps humans. The oil from the seepages in New York state was known as "Seneca Oil" and widely sold for the purposes mentioned.

The first seepage of oil known in Ontario is near the present town of Bothwell on the Thames river. Our first Lieutenant-Governor, Colonel John Graves Simcoe, travelling from Newark (Niagara on the Lake) to Detroit in February, 1793, noted in the Journal kept by Major E.B. Littlehales, A.D.C., the

presence of petroleum on the River La Tranche (Thames) and marked it on the map accompanying ~~Simcoe~~'s journal. He says (1) of February 15th, 1793: "In proceeding down the river the Indians discovered a spring of an oily nature which upon examination proved to be a kind of petroleum". Mrs. Simcoe drew more details from her husband, and, not being afraid of indelicacy in her diary, says of this journey: "A spring of real petroleum was discovered on the march by its offensive smell." The boundary line between the London and Western Divisions of Canada West was made at the oil springs on the Thames river, and this point is referred to in Deputy Surveyor Lt.-Col. Mahlon Burwell's notes. He marked the location of this spring on his original map of Zone township when surveyed in 1821.

(1) Simcoe Papers, Vol. 1, page 290.

"The oil spring on the Thames" attracted the attention of all travellers who wrote about Canada. John Howison Esq. has the following notes on page 194 of his ~~book~~ Sketches of Upper Canada ~~published~~ Esq., 1821; ~~page 194.~~ "At one of the houses where I stopped to feed my horse they showed me a specimen of mineral oil, that is found in considerable quantities upon the surface of the Thames. It flows from an aperture in the bank of the river, and three or four pints can be skimmed from the water daily. It very much resembles PETROLEUM, being of thick consistance and black colour, and having a strong penetrating odour. The people employ it medicinally; and I was told that its external application proved highly beneficial in cases of cramp, rheumatism and other complaints of similar kind."

Inquiries of an Emigrant being the narrative of an English farmer, 1824 to 1830, records on page 122. that on December 28th, 1826, at Moravian Town: "A singular spring of oil issues out of the banks of the river near here, on the land belonging to the Indians. It is of the consistancy and colour of tar, with a peculiar smell. It is generally supposed to be coal tar (petrolium) arising from a bed of coal said to run across the country. There are sulphur springs also in the neighborhood, and in various parts of the province. The oil is gathered from the surface of the water (by Indians and others) by blankets extended and lightly dropped on the surface, when they absorb the oil. It is sold from two shillings, three pence, to four shillings and six pence the quart, and sent to all parts of the province, and even to the states, as a cure for rheumatism, sprains, etc., and is sometimes taken internally, in small quantities for strengthening the tone of the stomach and for other complaints."

The largest oil seepage in Ontario is in Enniskillen township. It was not indicated on the map of that township when surveyed in the autumn of 1832 by Eliakim Malcolm, no doubt ~~due~~ Owing to the fact that it rained incessantly; a situation not conducive to keen observation. The chainmen must have passed within a few feet of the oil seepages and 100 yards from the "gum beds". The majority of the deeds of land from the Crown were dated in 1836. None of the names of these early "settlers" appear among those of the early oil producers. ~~however~~ The Globe

of 1861, however, tells of speculators who purchased farms for a few hundred dollars, having sold them at the time of the oil excitement ror as many thousand dollars.

Insert Footnote here →

Early Illuminants

The limited quantity of tallow and oil available to the settler in these early days was scarcely enough to supply the demand for food. (Colonel Talbot exhausted the supply of pork and flour in Western Ontario to feed the troops at Detroit for a short period in 1812). Grease was required for home manufacture of soap, and the pioneer settler was limited in his choice of illumination to light from the fireplace and the rush light, supplemented by a very occasional tallow candle. After 1840 gas light was available in the large cities, but in the towns of Upper Canada and, until the ~~advent~~ construction of the railways, along the Great Lakes only could whale or other oils be had for use in lamps. A lemon-coloured oil was distilled from the Collingwood bituminous shale and sold for illuminating purposes between the years 1859 and 1862, when it was forced off the market by the cheaper oils made from crude petroleum. The place of manufacture was near the town of Collingwood. (1)

(1) G.S.C., 1863, p. 784, also Catalogue of Minerals Canada, etc., 1862, Geo. Surv. Can., 1862.

In England and the continental cities, gas was available for lighting from the beginning of the 19th century; and during the same period some illuminating oils were made in a crude way from the oils obtained from the coal gas retorts. Dr. A. Gesner (2)

(2) Gesner, Abraham, "A Practical Treatise on Coal Petroleum and other Distilled Oils" Balliere Bros., N.Y., 1861

Footnote

Early Illuminants.

In order to visualize in its propor perspective the primative conditions in Upper Canada prior to the universal use of the Kerosene Lamp in the early 1860's, it should be remembered that the first railway was built west of Toronto in 1853 and that the best roads, Dundas St, the Longwoods Road or the Governor's Road as it was called through different sections, and the Talbot Road were only slightly improved bush roads, corduroyed, and partially drained. In these days, when the settler remote from these highways carried his grain on his back to the mill, the people, even in the larger inland towns, were not likely to have any other illuminant than that which they could provide for themselves

gives credit to Selligue as the first man who attempted to purify these oils. Gesner was the first in North America to produce illuminating oil, and he called his product "Kerosene". In England Young had made improvements in the purification processes then in use and called his product "Paraffine". In a few years' time "coal oil", as it was known in North America, was being manufactured in the larger centres along the Atlantic coast, principally in Boston and New York; the high volatile "Albertite" from Albert County, New Brunswick, being in demand for this purpose. This "coal oil" sold at prices ranging upward from $1.00 per gallon.

In Canada gas lights were first used in Toronto in December, 1841; Hamilton, 1851; and London, 1854. The price for which gas was sold in various cities is given in the Globe of February 23rd, 1850):-

Halifax	18	shillings	per	thousand	cubic	feet.
St. John	17/6	"	"	"	"	"
Quebec	20	"	"	"	"	"
Montreal	12/6	"	"	"	"	"
Toronto	20	"	"	"	"	"
Boston	20	"	"	"	"	"
New York	20 and 35	shillings	per	thousand	cubic	feet.
Philadelphia	15	shillings,	a	municipally	owned	plant.

Before the introduction of gas, and in the outer portion of the province where gas was not available for lighting, the tallow candle was most commonly used prior to 1850. Whale oil lamps were found only in the homes of those who were well to do; whale oil cost $1.50 per gallon at this time. There were several kinds of oil sold for use in lamps. The oil from the sperm whale was the best (least viscous); it was adulterated with several varieties of fish oils in order to reduce the price

and at best these oils had a very penetrating ~~odour of~~ fishy odour. By far the most commonly used illuminant was "burning fluid". This was manufactured by different jobbers and sold under their own trade names, and was a mixture of ~~any or all of the previously mentioned oils~~ alcohol with other less volatile oils mostly fish and Camphene the trade name of turpentine. Most of the whale and fish oils came from the Maritime Provinces, and the "burning fluid" and kerosene from Boston, New York, and Buffalo. The wholesale merchants of these cities in the United States advertised their wares in Canadian newspapers, and it is from these sources that the date of the introduction of kerosene into Ontario has been obtained. The first mention of kerosene known to the writer appears in the London Free Press in December, 1856, and in The Globe in May, 1857. of kerosene "turned night into day" much to the displeasure of this older generation. At the same time kerosene was "the midnight oil" which, after their children's days work was done, offered the children the time in which to advance their learning. It is much more than a coincidence that our great period of progress dates from about the time of the general introduction of kerosene in 1862.

The progressive steps in artificial light, from the open saucer with a floating wick, to the modern kerosene lamp, covers probably three thousand years. Mention is made in the Old Testament of the seven candlesticks; but the instructions and specifications of the olive oil for their replenishment shows that they were oil lamps.① From this beginning in the temple, the use of the lamp spread to the king's palace where it lighted the banquet hall when he made merry with his noble after the hunt. From thence to the castles of the wealthier nobles, replacing the torch or brand. With the establishment of early seats of learning, the lamp was introduced, and, finally, when commerce advanced beyond

① The translators of the Bible may have found difficulty in differentiating between a lamp and a candle, in Greek Latin and Hebrew originals.

78

the stage of barter, to the counting house, banking institutions and larger business houses where the wheels of commerce must be kept moving be it dawn or dusk.

It is beyond the scope of these few paragraphs to do justice to the history of the lamp. A very complete story will be found in "Smithsonian Institute, U.S.A. National Museum Bulletin 141", and from "The Story of the Lamp" by F.W. Robins, Oxford University Press, 1939, from which publications has been obtained much of the information regarding the lamp.

~~set out in the publications mentioned.~~

In general, lamps had to be designed for and adapted to the fuel used; ~~1st,~~ (1) vegetable oil from olives, palm, and ~~oil from~~ various nuts and seeds; ~~2nd,~~ (2) animal oils,-lard oil, whale (sperm) oil, and various fish oils; ~~3rd,~~ (3) mineral oils distilled from coal, shale, and petroleum. With these distilled oils may be included turpentine and camphine, and burning fluid. Turpentine, on account of its disagreeable odour, was little used, but some ingenious person discovered that this odour could be removed by "distilling it over quicklime". This product was called "camphine". It was, of course, very volatile and as dangerous as gasoline. Camphene was introduced about 1830 and was in demand until superseded by kerosene in 1860. It had a limited market, but it served a most important

~~(2) op. cit., Bull. 141, page 68.~~

The Windsor Herald of July 18th 1856 says of Camphene Lamps:—"Since 1850 up to the present time, 169 persons have been killed and 279 wounded in the United States by explosions, etc., of lamps containing camphene or burning fluid."

purpose, because it was necessary to alter the design of lamps used for burning the much less volatile animal and vegetable oils, to use the highly volatile camphene.

"Burning fluid" was compartively cheap ~~and much used before the introduction of Kerosene~~. It was not a standard fuel; the dealers or warehousemen of New York, Boston, Buffalo, etc., were the principle source for the Canadian trade. The Journal of the Board of Arts and Manufacturers of Upper Canada, July, 1863, says "Boston Petroleum Ordinance - at the time of the introduction of coal oil four years agao - burning fluid was composed of 95% alcohol and one part camphene - accidents occurred when filling the lamp while it was lighted". These experiments in manufacturing oils and lamps, paved the way for kerosene lamps. The whale oil lamps were in reality merely closed vessels, mostly metal, with one or more spouts in which a coarse round woven wick was inserted. Very often pressure was used to force the oil up the wick. About 1784, Argand, who had been feeding oil to his burner under pressure, discovered that oil would rise through a wick (capillarity). He designed a burner in which he controlled the rate of combustion, by putting a valve in the tube that supplied oil to the wick. His was the first modern design of lamp and filled a great need when camphene came into use. The whale oil lamp was adapted to burn camphene by lengthening spouts or tubes and inclining them away from one another. Flat wicks were introduced and gradually superseded the two or more round wicks beginning about 1850. The lamp chimney of metal, placed on a level with the top of the flame, and later of glass, had been introduced in the 15th century by Leonardo DeVince. It was used as a shield for the candle flame (hurricane lamp) but did not come into general use on lamps until well into the 19th century. Most lamps, and more particularly those with glass bowls and with

or without chimneys, were all hand made, they were very ornate and very expensive, well beyond the limits of the Ontario settlers' purse who perhaps had never heard of camphene and until the advent of kerosene knew no other lamp than a whale oil lamp. It can readily be seen that a great variety of lamps would be in the hands of early settlers brought out from the British Isles and from the New England states by those who were comparatively well to do.

Some of these early lamps with metal bowls had a metal rod so arranged, that when heated by the flame, the heat was transmitted through the rod to the oil or fat, thereby rendering it less viscous. A heated bowl was of help in burning heavy oils, but it was very dangerous when applied to camphine or kerosene. In the literature of the late '50's and early '60's, mention is often made to explosions and fires. Dr. Marcet,(1) speaking before the

(1) Dr Marcet. Jour. Soc. Arts Vol XII pp 2236.

Society of Arts in London in 1864, mentions the subject of lamps, which brought a discussion in which one speaker blamed the explosions on overheated metal bowls of lamps. He strongly recommended glass bowls and more ventilation. It was about this time that the modern burner was brought toward perfection and became general in use. In the discussion which followed Dr. Marcet's paper, Mr. Madden gives credit to a Mr. Wagenmann, a German, for inventing a lamp for which Mr. Young (the refiner) had been given the credit. There is no doubt that the modern lamp is the combined work of very many men in both Europe and America.

Another method of lighting, adapted from the then well known gas light, used "petroleum spirit" or benzine, the very volatile first liquids from the still which would ignite at atmospheric temperatures. It is referred to by Mr. Tegetmeir in the discussion following Dr. Marcet's paper by Mr. Tegetmeier. "For instance he held in my hand a specimen of the oil used to light H.M.S. Warrior and this would ignite at ordinary temperatures, and even if a light is brought near it, it would enflame without actual contact ---------- The mode in which it is used on board ships was this: Atmospheric air was driven through

reservoirs of it, and the vapour thus produced was distributed through the pipes, and burnt with ordinary burners, like gas; the absurd title of ozone-gas being given to it. It was, he says, impossible to overrate the danger of this commodity; gunpowder was safe in comparison with it, because a light must be placed in contact with gunpowder to cause it to explode, whereas this vapour was so subtle that it would in fact run to the flame." Dr. Bachhoffner, speaking on the subject, inadvertently gives the obituary of Mansfield the refiner of the 1840's; "The vapour used in the Warrior in the manner described was neither more or less than Mansfield's patent, who unfortunately lost his life in experimenting in these substances".

In the Chapter on Refining it will

It can be seen that great efforts were made in these early days to dispose of these "light ends" that were dangerous in ordinary lamps. After the flash test was introduced in 1868 a genuine effort was made to find some safe means of consuming this fluid. Some time in the 1870's the gasoline lamp was perfected and later a gasoline stove which gave the refiner an outlet for all his products. The kerosene lamp in use at the present day has been changed very little from the design of lamp used in 1870

these substances".

In the Chapter on Refining it will

It can be seen that great efforts were made in these early days to dispose of these "light ends" that were dangerous in ordinary lamps. After the flash test was introduced in 1868 a genuine effort was made to find some safe means of consuming this fluid. Some time in the 1870's the gasoline lamp was perfected and later a gasoline stove which gave the refiner an outlet for all his products. The kerosene lamp in use at the present day has been changed very little from the design of lamp used in 1870

First Commercial Operation

The beginning of the petroleum industry in Ontario on a commercial basis was in the formation of the International Mining and Manufacturing Company. It was incorporated by Act of Parliament on December 18th, 1854. The company had been in existence for some years prior to this date as the original petition of incorporation came before the session of 1852. This petition cannot be found, but in the petition ~~for incorporation~~ submitted to the house by the Honourable the Speaker on October 16th, 1854, Mr. Chas. N. Tripp claims that he and his associates have been operating for the past three years. The president of the company was Charles N. Tripp of Woodstock, who with Hiram Cook of Hamilton, John B. Van Voorhice and Henry Tripp of Woodstock, Jas. L. Folger of St. Vincent, N.Y., and Jas. Connor and Wm. Ogilvie of New York City made up the directorate of the company. Its capital was 60,000 pounds, and each director must subscribe for 250 shares with a par value of 1,250 pounds. Its properties were in "Enniskillen, Dawn and Brook township, Lambton county, and in Mosa and Orford townships, Middlesex county."

The powers of the company, as recited in its charter, were, among other things, to explore for asphalt beds and oil and salt springs, and to manufacture these "for the various uses to which they can be converted and made available". They were empowered

to erect works "for the purpose of making oils, napththa, [sic], paints, burning fluids, varnishes and other things of the like on their properties in Enniskillen, and may also erect works at Dresden, London, Hamilton, Toronto, Kingston, Ottawa, Montreal, and Quebec, etc. etc."

This company published daily in "The Daily Spectator and Journal of Commerce" Hamilton, from February 7th, 1855, to September 14th, 1855, a report on a sample of their raw material (Gum Bed) submitted to an outstanding New York chemist for analysis

INTERNATIONAL MINING AND MANUFACTURING COMPANY

(Chartered by Act of Parliament 18 December 1854)

New York, No. 90 Franklin St.,
February 19th, 1853.

" Report upon and chemical examination of a sample of asphalte forwarded to me by Mr. Tripp

(signed) Thos. Antisell, M.D. "

" This asphalte is a semi-solid substance, soft and plastic in the fingers, blackish color in the interior, fracture tenacious and stringy, without lustre ..... adheres to paper."

" The outer portion of the mass was mixed with undecomposed woody fibre, and rootless. From these the interior is quite free, and it was upon the latter that experiments were made. "

" The specific gravity of the sample is 1.014. It does not yield anything to cold water, but by boiling water a minute portion of volatile liquid is diffused through the water. "

"On examination in closed and open crucibles it yielded in 100 parts:

Volatile matter	80 -- 06
Coke	13 -- 57
Ash	6 -- 37
	100 -- 00

"On distillation, at temperatures of boiling water, it yielded a moderate amount of liquid resembling benzoles. The application of a higher heat drove off additional volatile liquids, and a considerable quantity of paraffine. From the experiments I made I am inclined to believe, that the crude material, if properly worked, would yield nearly 15% of naptha-liquid. This mineral is partly soluble in alcohol, a yellow resin being dissolved out by that fluid. It is completely soluble in naptha, (coal oil) ether and oil of turpentine."

"The earthy matters are the only residue in the three latter liquids. It melts at 212° -- swelling up and softening from 180° onwards -- softened in water, it gives off copious bubbles of air."

"I look upon this as a very valuable variety of bitumen, and applicable to all the purposes for which this substance is now in demand. Its softness and fusibility renders it valuable in the manufacture of Japan and other varnishes. It is peculiarly fitted for obtaining from it, by distillation, the naptha-liquids (benzole) which are now so extensively used as a solvent for Gutta-Percha, and other gums and resins. For this branch of manufacture, this variety of bitumen appears more adapted than the solid and lustrus asphalte."

"For the fabrication of mastics and cements, it is also well adapted, being capable of intimate mixture with the other materials at a low temperature, it makes a good hydraulic cement."

"This bitumen is admirably adapted for illuminating purposes in either of the two ways. First, by the use of the benzole liquids obtainable from it by distillation, these might

be used, when diluted with alcohol or other menstrums, as the burning fluid in this city is used or, second, as affording an illuminating gas. By reference to the analysis it appears that 80% is capable or being converted into combustible gasses. These gasses would be highly charged with carbon, would yield a brilliant light, and require less purification than the gasses derived from coal. In equal weight this bitumen would yield a greater amount of illuminating gasses than the finest variety of bituminous coal."

" For the manufacture of gasses, this bitumen requires a peculiar variety of furnaces and retorts."

" This bitumen is adapted for use in all the purposes in which the minerals may be used, but the manufacture of volatile liquids and of illuminating gasses appears to be its more appropriate uses."

(Signed) Thomas Antisell, M.D.

Consulting and Analytical Chemist,
No. 63 Franklin St., New York.

A report on another sample submitted to the Hamilton Gas Co reads;

Gas Company's Office,
Hamilton, February 7, 1855.

Chas. Tripp, Esq.,

Dear Sir:

" At your request I beg to send you the result of our experiment with the asphalt sent us."

" The quantity weighed before using was 1,450 pounds. This was put into 16 retorts, and sealed up in the usual way - in three

hours it had given off 4,600 feet of gas, which I put into an empty holder, and used it in the early part of the night. It burns with a very soft, pure light, and without smell. I should say, that so far as illuminating power goes, it is 10 to 15% over the ordinary coal gas."

"The amount of residual oil deposited I had no means of ascertaining, as it became mixed with the Tar and Ammonia water previously in the pipes. From the appearance of the residue in the retorts, I believe the specimen I used was of inferior quality on account of being taken off the surface and containing a considerable quantity of earthy and vegetable matter."

I am, Sir,

Yours most respectfully,

(Signed) Thos. McIlwraith,
Manager, Gas Company.

In the chapter on Oil Springs it will be seen that Alexander Murray visited the locality and reported on the deposit in 1850. Sterry Hunt had made a report on the seepage published in the previous year and made recommendations. Murray, at this time, had a farm at Woodstock, which he made his home (1) for part of the year when he was not employed on the Geological Survey, and it is not difficult to find the reason that Tripp (also of Woodstock) entered this new industry. At this point

(1) Sessional Paper, Ont., 1892, Pt. VII, p. 219.

At this point.
the writer of the Atlas of Lambton County, 1880, takes up the story: which reads in part "Tripp, a resident of Woodstock, in 1850 bought from the government [?] lots 18, concession I, and lot 16, concession II, Enniskillen, and several other lots in the district. In 1852, he erected buildings and machinery for the manufacture of asphaltum, which enterprise did not succeed. In his dilemma, he enlisted the aid of Mr. Williams, since M.P.P., of Hamilton, and now registrar of Wentworth County."

"Great difference of opinion exists among men who should know, as to who actually discovered oil at Oil Springs. Williams is generally credited with the discovery but it would appear that he only explored the region in 1858 [1856 or 1857 is the correct date] in order to confirm Tripp's findings. After his investigation he formed the Canadian Rock Oil Company [The Canadian Oil Company is correct name] and commenced work. It is stated authoritatively that as early as 1854 or 1855 Tripp sank a well for obtaining water, that at a depth of a few feet it filled with oil which he did not know how to use and it was after he had been convinced by information in respect to the Pennsylvania oil region that he concluded there was a value in oil and sought the aid of Mr. Williams to thoroughly test it."

These statements from the Lambton Atlas, when compared with the original authorities quoted in the chapter on Oil Springs, are quite inaccurate as to date, as is the statement that he purchased land from the government. The author mentions the differences of opinion and no doubt has given dates from hearsay.

The importance of this statement is that Tripp did, as early as 1854 or 1855, actually install machinery and erect buildings for the purpose of manufacturing at least some of the products set out in the charter of his company. The statement that his water well filled with oil, which he was at a loss to utilize, is scarcely in accordance with information in the hands of Tripp from Hunt, Thomas Antisell, McIlraith, of the Hamilton Gas Company, and Alexander Murray, who speaks of "petroleum springs" and says that the "gum beds" are limited in extent and that softer material was found at depth. "The deposit had been bored through for 30 feet."

It is not known how extensive were his "buildings and machinery for the manufacture of asphaltum", but he did produce asphalt. The evidence is in the report "Canada at the Universal Exhibition (Paris) 1855". In this report, on pages 41, 48, 155, 372 and 395, it is stated that the International Company of Hamilton exhibited asphalt manufactured by that Company, and for which exhibit they received honourable mention. The asphalt came from Enniskillen Township. The text of the report indicates that the exhibits from Canada, which were very extensive, were collected between October 1854 and May 1855. The report was written by Mr. J. C. Taché, M. P. Secretary to the Committee of the House of Commons. Sir Wm. Logan was responsible for the collection of minerals. In this most important exhibition where the exhibits came from "the ends of the earth", this display of asphalt could have been of no mean importance to have received honourable mention.

Sir Wm. Logan gives in this report, a sketch of the Geology and Economic Minerals of Canada. His description of the "Gum Beds" of Enniskillen is taken from Murray's report of 1849-50. He adds thereto "this matter furnishes by distillation, among other products a great quantity of naphtha".

When the many fragmentary references to Tripp's activities scattered through various publication are assembled, it appears

that Tripp began his operation at least on a semi-commercial scale, but to what extent he sought to carry out the aims set forth in his charter, it is difficult to determine. At that date most main roads were being "planked" and Tripp may have had the temerity to offer the road builders a supply of asphalt; again ship building along the Great Lakes was at its height and he may have offered to supply asphalt for waterproofing materials for this and many other purposes. Asphalt seems to have been his main product.

In producing asphalt from the Enniskillen Gum Beds, Tripp could not help producing naphtha, as he must heat the raw product, to separate it from the clay matrix, ~~when he had exhausted the limited surface deposit and began using the softer material and finally the heavy oil at depth, he must~~ and distill off the lighter fractions in order to produce asphalt. Tripp originated the first phase of the oil industry in Canada by producing asphalt. His successor, Williams, began the second phase of the industry by producing kerosene. The third and present phase dates from the World War I when more gasoline was produced than kerosene. The next phase will not be known until some master of research discovers a cheaper fuel for motive power, when the petroleum chemist and engineer must, and will, adjust the industry to the demand for petroleum products.

It seems most probable that the expense of hauling machinery through the Lambton swamps (1) to Oil Springs and the "asphaltum" (gum beds) recovered, in the opposite direction, exhausted the resources of Tripp's company. His four years work had brought no profit and apparently ~~had~~ destroyed the confidence of his shareholders; his appeal to the public in May, 1855, apparently failed, and he was forced to place his venture in the hands of J. M. Williams, who reaped the reward of his experiment. It will be seen on page , that he conducted the field work for Williams in 1857. Tripp sought the best advice available and failed, principally because his operations began

(1) See Appendix "A"

before railway transportation, before there was a knowledge of crude petroleum and before the art of refining was well known. In 1850 Dr. Gestner's discovery of kerosene was still in the laboratory stage (see chapter on refining). If Tripp failed to produce a satisfactory illuminating oil he very shortly converted his loss in oil into a profit in real estate, for he sold his lands at a substantial profit. A search of the Registry Office in Sarnia a relative living in Woodstock believes that he went to British Columbia. A search of the sales of lands registered in the County Registry Office at Sarnia, shows that Tripp ~~must have been in financial difficulties beginning about 1855 when mortgages became due,~~ turned against his lands, ~~and in the years following when~~ and Associates were made. Associates of J. M. Williams made purchases from Tripp beginning in 1856. Williams' purchases begin in 18[illegible]. The last recorded sale of his lands is on August 1st., 1866 when all of lot 17 Con. I and the north half of lot 19 Con. I (300 acres) was sold to Chas. W. Lount for $7,000.00. Tripp died in New Orleans in 1866.

JAMES MILLER WILLIAMS

James Miller Williams, the first successful producer and refiner, had, according to his biographer, only an elementary education; he was, however, a genuis at business and industrial organization and especially in choosing able partners. He had a most successful career in many lines of endeavour. At the time that ~~Tripp~~ Williams entered the petroleum industry (figuratively "with his bare hands", as did many others who pioneered along with them) he was, of necessity, his own chemical, mechanical, and civil engineer, but he sought the advice of the best authority, Dr. Croft, Professor of chemestry at Toronto University. Williams was a man. They were the men who would not admit inability to build or do anything, the stuff all pioneers are made of; His first advertisement says that he worked with Dr. Croft for three years (1856 to 1859) before he was satisfied that his product was suitable and safe for use in lamps. He also sold the lamps that were of the best design.

Nature could not have chosen a more secure spot to hide her riches than at Bothwell and Oil Springs. At Bothwell, the oil was buried under 150 to 200 feet of quicksand, gravel, clay, and boulders; and at Oil Springs was 12 miles from the nearest railway, in an impenetrable swamp covered with a dense growth of hardwood. The clay subsoil was quite impervious to water (it made perfect underground oil storage); the terrain was absolutely flat; ~~sluggish~~ streams, blocked with dead trees and branches, meandered through low winding valleys. Every drop of water must either find its way over the surface of the ground to these occasional streams, or evaporate. The result was that every foot path became first a mire, then a succession of pools and drains. Men, and the very occasional woman in the district, wore knee-length boots during their waking hours. The Globe correspondent, 1861, says that one man wore his boots in the hotel bed, claiming that "the bed did the boots no injury". The problem of transportation was, at least, equal in importance to that of producing the oil; it was on the tongue of every visitor, and was only solved after the investment of what was to these men a huge sum of money.

After 1862, when kerosene produced in Ontario was put on the market in large quantities, the demand for illuminating oil in Canada was spontaneous. Except when great floods of oil created a surplus, little local advertising appeared until the years when it was in general use throughout the country. Demand for a share of foreign trade came at periods of great over-production, 1862, 1867, 1873. The refining industry had not

kept pace with the production and storage of crude oil. Skilled research chemists were needed to solve the problem of eradicating the sulphur compounds from the refined oil, and until this had been accomplished Europeans actually and literally turned up their noses at this vile-smelling Canadian product. After many improvements in refining there still remained a ~~sufficient repulsive~~ repulsive enough smell to place Canadian oils at a serious discount when in competition with the American non-sulphurous oils.

Prior to 1862 Ontario refiners, in their crude refineries, produced as much as 60 percent. illuminating oils from the crude oil, which undoubtedly included much of the gasoline fraction. The whale oil lamps then in use were all metal, and, under the intense heat of this fuel soon vaporized the oil in the bowl which caused many serious fires and explosions. The result was legislation in 1868 which corrected the refiners' mistake, and research that brought improvements in the lamp.

In the early days and until the advent of the internal combustion engine, the lighter fractions of the crude oil, known to us as gasoline, but then by various trade names, naphtha, petroleum spirit, etc., could not easily be disposed of and for many years the surplus was burned. During the American civil war, when turpentine was unobtainable from the southern states, much "petroleum spirit" was used as a substitute for turpentine. A lamp using gasoline was put on the market, and later a stove.

The disposal of lubricating oils and tar was another trade problem to be solved, and they sought and found markets as far afield as in India, where Canadian greases lubricated railway cars. Mineral oils did not replace animal fats for lubricating oil without serious opposition and keen competition.

APPENDIX "A"

The road from Wardsville that led to Dawn Mills and across Enniskillen township is shown in the military map of about 1850 as an improved road to Dawn Mills and west of this point a winter road fit only to be travelled in winter with sleighs. Mrs. Anne Jameson who wrote "Sketches in Canada" in 1837, says of the ~~main or improved roads:~~ The Burford Road: "The whole drive would have been productive of unmixed enjoyment, but for one most intolerable drawback. The roads were throughout so execrably bad, that no words can give you any idea of them. We often sank into mud-holes above the axletree; then, over trunks of trees laid across swamps, called here corduroy roads, where my poor bones dislocated. A wheel here and there, or broken shaft lying by the wayside, told of former wrecks and disasters. In some places they had, in desperation, flung huge boughs of oak into the mud abyss, and covered them with clay and sod, the rich green foliage projecting on either side. This sort of illusive contrivance would sometimes give way, and we were nearly precipitated into the midst. By the time we arrived at Blandford, my hands were swelled and blistered by continually grasping with all my strength an iron bar in front of my vehicle, to prevent myself from being flung out, and my limbs ached wofully. I never beheld or imagined such roads ----- no attempt is made at levelling or preparing a foundation".

Of the town line road between Howard and Harwich from the Talbot road to Chatham, she says: "The road was scarcely

passable; there were no longer cheerful farms and clearings, but the dark pine forest, and the rank swamp, crossed by those terrific corduroy paths (my bones ache at the mere recollection!) and deep holes and pools of rotted vegetable matter, mixed with water, black, bottomless sloughs of despond! The very horses paused on the brink of some of these mud-gulfs, and trembled ere they made the plunge downwards. I set my teeth, screwed myself to my seat, and commended myself to Heaven -- but I was well nigh dislocated! At length I abandoned my seat altogether, and made an attempt to recline on the straw at the bottom of the cart, disposing my cloaks, carpet bags, and pillow, so as to afford some support --- but all in vain; myself and all my well-contrived edifice of comfort were pitched hither and thither."

After following this town line to an inn, they turned in a westerly direction and "plunged at once into the deep forest where there was absolutely no road, no path, except that which is called a <u>blazed</u> path where the trees marked on either side are the only direction to the traveller." She says that the wheels "sank a foot into the black rich vegetable mould" and that the wagon very often had to be lifted or dragged over stumps and roots when entering and leaving corduroy stretches of swamp or morass, until at last they reached the open country along the Thames.

This could have been the description of the road that Tripp followed from Hardsville to Oil Springs in 1851, or of any settlers road in Kent or Lambton. Mahlon Burwell (the surveyor of 1823) says that when he turned North off the Longwoods Road toward Dresden, his men were continually assisting the horses out of mud holes by lifting on the spokes of the wheels.

Page

References

8 G. S. C. 1863 . Cat. of Minerals Canada G. S. C. 1862.

8 Abraham Gesner A practical treatise, etc.

14 Dr. Marcet Jour. Soc. Arts Vol. Xll page 296.

29 Sterry Hunt Can. Nat. Vol. Vl 1861 page 248.

29 Chas. Robb Can. Jour. New Series No. 34 July 1861. page 315.

37 M. Y. Williams G. S. C. Summ. Rept. 1918 Pt. E. page 34.

40 Sanford Fleming Can. Jour. New Series Vol. 8 page 246 and map page 185.

40 A. Winchell, Sketches of Creation 1870 Appx. Vlll page 443.

42 Thos. D. Rand Jour. Frank. Inst.

43 A. Winchell op. cit. page 443.

46 T. Sterry Hunt Geol. Surv. Can. 1866. page 246

46 Arthur B. Johnston Recollection of Oil Drilling at Oil Springs, Ont., Jan. 1928

48 M. L. Bladin "Const. of Rlys. in Canada up to 1885". Univ. Tor. Studies of Hist. & Econ. Vol. V. 1932

49 Robt. Bell Roy. Soc. Can. Vol. V. 1887. page 111.

69 J. H. Fairbank Rept. Royal Comm. Ont. 1890 and Robt. Bell op. cit.

71 Thos. D. Rand op. cit. page 63

71 Robt. Bell op. cit.

76 John D. Noble Rept. Roy. Comm. on Mineral Resources of Ont. 1890 page 165

81 J. H. Fairbank op. cit. page 161.

108 J. H. Fairbank op. cit. page 159.

117 Geo. R. Burnell Jour. Soc. Arts, London. Vol. X. page 156 et. seq. Jan. 31st., 1862.

121 Sir. Wm. Logan Geo. Surv. Can. 1863. page 543.

122 Arthur B. Johnson op. cit.

125 Jas. H. Kittridge Rept. of Royal Comm. Ont. 1890. page 161.

126 Wm. Woodward Rept. of Royal Comm. Ont. 1890. page 156.

127 J. H. Fairbank page 159.

127 Duncan Sinclair. Rept. Roy. Comm. Ont. 1890. page 166.

133 Robt. Bell op. cit.

134 T. Sterry Hunt Geo. Surv. Can. 1866.

137 J. V. Howell "Problems of Petroleum Geology" A.A. P.G. Tulsa Okla. 1934 page 19

143 Sir. Wm. Logan op. cit. page 786.

Page

148 M. L. Bladin op. cit.

149 Rept. of Roy. Comm. Ont. 1890 also Globe May 20th., 1862

152 John D. Noble op. cit.

154 Dr. Mancet op. cit.

168 Jas. H. Kittridge op. cit. page 162

169 Imperial Oil Review Dec. 1917 and April, 1918

172 Abraham Gesner, op. cit.

176 T. Sterry Hunt Can. Nat. op. cit. page 248 page 176 Chas. Robb op. cit. pages 315-316

182 (1) T. Sterry Hunt G. S. C. op. cit.

182 (2) Sanford Fleming op. cit. page 248

187 Jas. Kerr Rept. Roy. Comm. Ont. 1890 page 163

187 Fredrick Wolf Rept. Roy. Comm. Ont. 1890 page 165

188 Toronto Mail, Dec. 1st., 1888 and Atlas of Lambton County, 1880

195 H. Kittridge op. cit.

223 T. Sterry Hunt ~~op. cit~~ op. cit. Can. Nat. page 248 Chas. Robb op. cit., page 314

223 Sir. Wm. Logan op. cit.

224 Sanford Fleming op. cit. page 249

227 Robt. Bell op. cit.

Chapter VI: Ontario's Part in Petroleum History

The Harkness Files
Volume XIV
Unpublished Manuscripts

- THIS PAGE CREATED BY OGSR LIBRARY -

① Oil Springs
② Petrolia
③ Bothwell

Ontario's Part In the Petroleum Industry

By R. B. HARKNESS

Natural Gas Commissioner, Ontario

The average family in Ontario probably never heard of kerosene until that product of crude petroleum was advertised for sale in the newspapers in 1862, when it was in plentiful supply for the first time. Before this time few pioneer settlers could afford the luxury of artificial light. Tallow candles made at home were not common until much of the forest had been cleared and the country well settled. A refined turpentine called camphene, and a mixture of alcohol and camphene called "burning fluid", made in U.S.A. were advertised in London and Toronto in early 1855. Both of these were more dangerous than gunpowder and were responsible for the death or permanent disfigurement of many people, especially children. The *Caledonia Advertiser* for February 6th, 1856, tells of the 16-year-old daughter of James Fearman of Oneida township, being severely burned while filling a lamp with burning fluid or, as it was called in this instance, "rosin oil." She claimed to have extinguished the light before filling the bowl, however, the lamp and the quart bottle of "rosin oil" (which had cost $1.) burst into flames which enveloped her. Her father saved her from death by submerging her in the horse-trough.

Seepages of petroleum occur on every continent in the world and in the crude state was used for mortar, calking ships, embalming, medicinal purposes, and lighting. Attempts to refine these seepages and separate illuminating oil from the crude oil were made as early as 1780, but the product was usually described as yellow and smelly, and gave off much smoke when burned in lamps. In 1850, in England, Young patented a process of refining oil from coal. He called his illuminating oils "paraffine"; he also made lubricating oils and paraffin wax. Young's "paraffin" according to contemporary reports had a reddish colour and an unpleasant odour.

"Kerosene" was first produced and manufactured in the 1840's by Dr. Abraham Gesner, M.D., F.R.S. (surgeon, geologist, and chemist) of Hillsboro, Nova Scotia. He demonstrated his product at Charlottetown, P.E.I., in a lecture at that city in 1846. He distilled it from coal and later from Trinidad pitch and Albertite. He sold his patent for manufacturing kerosene to the North American Kerosene Gas Light Company of New York and remained with that company as their chemist. His lectures and writings on the distillation of kerosene were widely circulated at the time; in fact, leading chemists in most countries had interested themselves in making a better illuminating oil than whale oil, which was becoming scarce and expensive, and the burning fluid and camphene, which were very dangerous. Lamp designers were equally interested in improving lamps most of which were modifications of whale-oil lamps and quite inadequate.

Sir William Logan, Kt., L.L.D., F.R.S., provincial geologist, had visited a seepage of petroleum in Gaspé in 1843 and described it in the Report of Progress, 1844, Geological Survey of Canada (pages 41-42). He said that the oil reached the surface from an underground formation along a dyke in the sedimentary rocks. It can be said with assurance that in 1850 chemists and geologists and those who read scientific literature agreed that crude petroleum would provide a much better illuminating oil than whale oil, and that illuminating oil could be recovered from crude petroleum that seeped from the ground. A market for a good, safe illuminating oil was already established, and the public would have artificial light even at the risk of their lives. There was one well-known seepage described by Governor John Graves Simcoe, who passed it on his journey to Detroit on February 15, 1793. He said in his journal, "In proceeding down the Thames (La Tranche) River the Indians discovered a spring of an oily nature which upon examination proved to be petroleum." This was on the site of the present Bothwell oil field. The Indians and whites gathered it by dropping a blanket on the surface of the water and oil. Oil and water were then wrung out into a vessel, and the oil was skimmed and bottled. The oil was sold mostly as a liniment but was highly recommended for internal use.

While in the process of preparing a report and map of the soils of Canada West (Ontario), Logan received a sample of "gum bed" from Enniskillen township, Lambton County. Sterry Hunt, his chemist, in the Report of Progress, 1849-50, reported that it was suitable "for the construction of pavements, for paying the bottoms of ships, and for the manufacture of illuminating gas . . . it contains 78 to 81 per cent combustible and volatile matter." Logan then sent his assistant geologist, Alexander Murray, to investigate. His report appears in the Report of Progress, 1851-52. He says of the deposit:

"The black shales of the Hamilton group, in the Western Peninsula are in general more bituminous than the Utica slate. Several places in their distribution are characterized by bituminous springs, and a visit was made in the early part of the season, to a bed of nearly pure bitumen . . . The bed of bitumen, which in some parts has the consistence of mineral caoutchouc, occurs in the sixteenth lot of the second concession of Enniskillen in the County of Kent . . .

Reprinted from CANADIAN OIL AND GAS INDUSTRIES, February and March, 1951.

H 102-3

It does not seem to exceed half an acre, extending five chains in a North East direction with a breadth of half a chain . . . It would appear to have a thickness of two feet over about twenty-five square feet . . . The bitumen is underlaid by a very white clay, which I was informed had been bored through in one part for thirty feet."

Here in 1851 was a ready-made oil field completely described and with a prospectus written by Hunt and Murray with the authority of Sir William Logan behind it. The first of record in the field were the Tripp Brothers — Charles Nelson, and Henry. Henry was living in Woodstock, and Charles Nelson was in Bath in 1850, where he was a foreman in John Counter's stove foundry and had in that year sold his employer a patent application on a stove front. Charles formed a company, The International Mining and Manufacturing Company, and applied for a charter in 1852, which was not granted until he had made a third application in October, 1854.

The company was empowered to "erect works . . . for the purpose of making oils, paints, burning fluids, varnishes, and other things of the like in their properties in Enniskillen." The hand of Alexander Murray is thinly concealed in these and subsequent events. Sir William Logan could only afford to employ his geologists for half a year; in the remainder of the year they were free to participate in any activity. Murray had a farm on the outskirts of Woodstock and in all probability recruited his party in Woodstock (of which Henry Tripp may well have been one) for the examination of the Enniskillen seepage. Henry Tripp might have preceded Murray and have dug the test pit, 30 feet deep, referred to by Murray. The writer of the historical review of the Atlas of Lambton County, 1880, says "Tripp, a resident of Woodstock in 1850, bought from the government lot 18, con. I, and lot 16, con. II, Enniskillen, and several others in the district," which would suggest that he had preceded Murray, having read Hunt's report of 1849-50 on the seepage. Again the historian in the Atlas of Lambton County, 1880, informs us that, "In 1852 he (Tripp) erected buildings and machinery for the manufacture of asphalt, which enterprise did not succeed." This statement is confirmed by the catalogue of exhibits, "Canada at the Universal Exhibition (Paris), 1855." The International Mining and Manufacturing Company's exhibit of asphalt is referred to on pages 41, 48, 155, 372, and 395. The exhibit received "honourable mention." The Canadian mineral exhibits were collected by Sir Wm. Logan between October, 1854, and May, 1855. He wrote a descriptive article in this catalogue on the economic geology of the exhibits and says of the "gum beds" of Enniskillen, from which this asphalt has been refined, "This matter furnishes by distillation among other products, great quantities of naphtha."

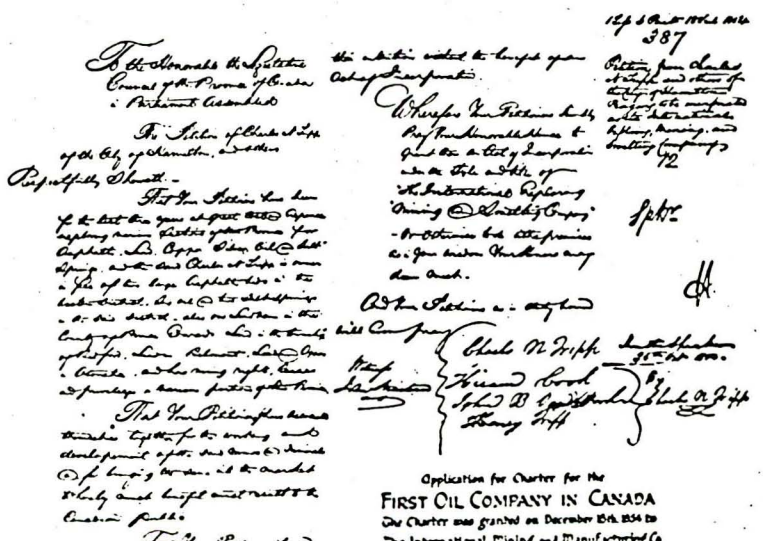
Tripp sent a large sample of seepage to Thomas Antisell, M.D., consulting and analytical chemist of No. 63 Franklin St., New York, and another (1,450 pounds) to the Hamilton Gas Company for test in the retorts. Dr. Antisell under date of February 19, 1853, reports that the crude material is "a semi-solid substance, soft and plastic in the fingers, blackish colour in the interior, fracture tenacious and stringy, without lustre . . . sticks to paper." He continues:

This is a very valuable variety of bitumen and applicable to all the purposes for which this substance is now in demand . . . It is valuable in the manufacture of Japan and other varnishes . . . the naptha liquids (benzole), which are now so extensively used as a solvent for gutta-percha . . . This bitumen is also adapted for illuminating purposes . . . as burning fluid . . . as an illuminating gas . . . but the manufacture of volatile liquids and illuminating gases appears to be its most appropriate use.

Thomas McIlwraith, manager of the gas company, says under date of February 7, 1855, that from 1,450 pounds he made 4,600 feet of gas in three hours, which gave 10 to 15 per cent more illumination than did ordinary coal gas.

It would seem that although Tripp's plans may have been as extensive as was set out in his charter, he could do little else than exploratory work and experimental distillation until the railway was completed, when he would be 15 miles from the railway; through 10 miles of hardwood swamp entirely undrained. Judging from the dates of Dr. Antisell's and Thomas McIlwraith's reports, each in February, he must have waited until the roads were frozen to haul his heavy loads. He produced asphalt, and, in doing so, illuminating oils. For both of these he had a ready market, but he would be limited to the extent of his ability to supply packages for these. The ship building trade along the St. Clair and Detroit Rivers would absorb all the asphalt that he could supply.

Space does not permit discussion of Tripp's finances, but he was undoubtedly seriously handicapped for money. Although he had been exploring the ground since 1851 he purchased no land until 1853. The transfers of land as recorded in the Registry Office of Lambton County show that land values increased by as much as 300 per cent in 1853 and that Tripp had to pay land speculators very high prices and this as a result of his own work. He advertised Dr. Antisell's and Thomas McIlwraith's reports in the



Application for Charter for the
FIRST OIL COMPANY IN CANADA
The Charter was granted on December 15th 1854 to
The International Mining and Manufacturing Co.
The original petition was made during the season of 1852

Hamilton Spectator from February until September, 1855, and no doubt used this as a means of raising funds. This appeal must have failed, for the register shows that his sales of land began early in 1856. Charles N. Tripp married Almira Cornish in 1855, a sister of a later mayor of London. He died in New Orleans in 1860. Henry Tripp moved to Schenectady, N.Y., where he died in 1896. He was prominent in that city as one of the early plate photographers. The purchasers of Tripp's properties were for the most part J. M. Williams and his associates. The Williams family say that J. M. Williams was first brought into the oil business by having sold a waggon to a man who could not pay him and that he had to take in payment some land at Oil Springs. What could fit Tripp's position with greater accuracy? Tripp and Williams both in Hamilton and Tripp 125 miles from the site of his operations.

James Miller Williams (1818-1890) was the first refiner (as distinguished from distiller) of petroleum on a commercial basis in Canada. He was born of Welsh parents in Camden, New Jersey, on September 14, 1818. After completing his education at the age of 14, he was apprenticed to a carriage maker. He and his parents came to London, Ontario, in 1840, when he entered the carriage-making industry with M. Holmes as a partner. In 1842 he married Miss M. C. Jackson, of London. He moved to Hamilton some years later and again with a partner, H. A. Cooper, made carriages. In 1854 he made railway coaches for the new railways and sold this business to Cooper in 1856, when he turned to the refining of illuminating oil. Sterry Hunt (chemist to the Geological Survey of Canada) who visited Oil Springs in December, 1860, and must have known Williams personally, says that Williams built his refinery at Oil Springs in 1857 and began refining oil. Hunt says that Williams soon found that —

By sinking wells in the clay beneath, it was possible to obtain great quantities of the material in the liquid state. Large numbers of wells were sunk by Mr. Williams and others — along Black Creek and about ten miles further north along Bear Creek. Nearly 100 wells had been sunk (December, 1860) . . . and many more have since been bored . . . The whole amount already obtained from the district is perhaps not less than 300,000 to 400,000 gallons.

Hunt explains that —

"Owing to the difficulties of communications (roads with bottomless mud holes) and of procuring casks sufficient for the oil, these wells have not been wrought in a continuous manner; large quantities of oil are, however, taken out at intervals of some days. . . . The price of crude oil at Wyoming Station is 13 cents per gallon. ($5.06 per barrel)". He says that Mr. Williams' oil was refined, in Hamilton, while that from Kelly's wells (present Petrolia) was sent to Boston, but that a refinery was to be erected at the wells.

Insert foolscap page here



James Miller Williams
1818 - 1890
First Oil Refiner in Canada

When J. M. Williams built his refinery in Hamilton at the foot of Wentworth Street at "Coal Oil Inlet," he incorporated the Canadian Oil Company (November 4, 1860) which business was carried on there until it was wound up by his estate in 1891. His first publicity was an advertisement in *The Hamilton Spectator* for July 4, 1860.'

"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 odor common to all oils. The odor 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 odor. We offer our oils at the following prices.

Illuminating oil	70 cents per gallon
Machinery oil	60 cents per gallon
Crude oil, 1000-4000-gals.	25 cents per gallon
Crude oil, 4000-100,000 gals.	16 cents per gallon

J. M. Williams & Co.

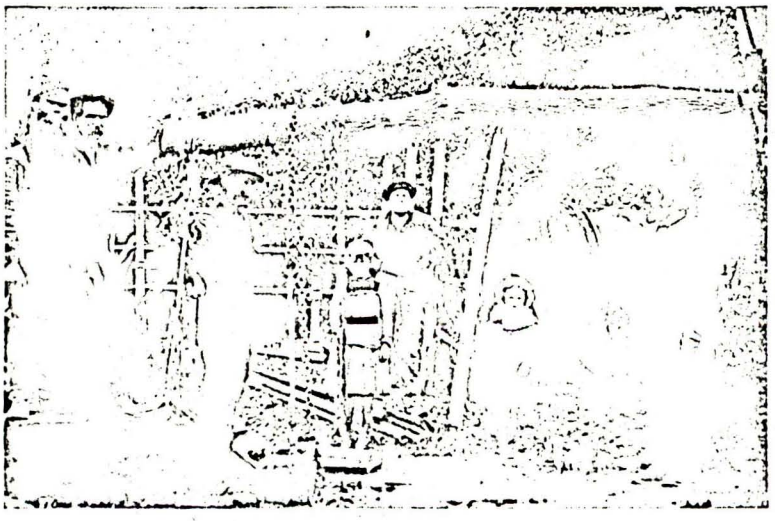
In this advertisement there is the story of three or four years of work to remove the strong sulphur odour in the illuminating oils of Lambton County, which for the next sixty years was to remain in spite of every effort to eradicate it. Williams must have made a big improvement in order to make such a statement. There is much evidence, which cannot be detailed here owing to limitations of space, that Williams turned to Dr. Abraham Gesner, the authority on refining. Gesner wrote a treatise on refining, "A Practical Treatise on Coal Petroleum and Other Distilled Oils" (Ballieu Bros., N.Y. 1860). The preface is dated November, 1860. He says of Lambton oil: "It differs very essentially from the bitumens of the West Indies and the oils require careful purification." This and the fact that he was interviewed by the *Spectator* in Hamilton on March 11, 1861, as well as the fact that Williams always associated himself with expert partners or advisers, leads the writer to believe that Gesner guided Williams in his refining methods. Williams won two gold medals at the International Exhibition in London, England, in 1862, one for being the first to produce crude oil and one for his refined oil. It would be almost impossible for him to do this without the help of Gesner.

There are plenty of authorities to show that Tripp, and later Williams, dug wells into the clay and obtained oil sufficient for their needs; and that they started the petroleum industry in Canada as early as 1855.

Many of the surface wells produced much more than the wells in the rock. They were from 45 to 70 feet deep, according to their location, i.e. in creek bottom or on the top of the bank. All writers on the beginning of the petroleum industry have overlooked Tripp's work altogether and with the exception of Frederick Clapp (Department of Mines; Mines Branch No. 291, Ottawa) have disregarded Williams work as an oil producer. They give "Colonel" Drake the laurels for having *drilled* the first producing oil well in "the world." This writer takes the view that the industry is not at all concerned with the manner of obtaining the crude oil from which marketable products are obtained. There is, however, a record of Williams' work in *The Toronto Globe*. The *Globe* sent a special reporter to the oil fields in August,

H102-32

1861, who reported that out of some 400 wells at Oil Springs in Enniskillen township, 32 were drilled into the rock; that Williams and Company owned 800 acres (part of Tripp's acreage) and had three wells drilled into the rock; and that one on the west gum bed (lot 16, con. II) was drilled 150 feet into the rock and had been in operation for two years (since August, 1859), and had produced 60 barrels per day for six days in succession. He states that several other wells were being drilled on this property and that one had reached 250 feet and that oil had repeatedly been found but not in paying quantities. Williams continued to produce oil from his property for many years and took his part in all activities in the oil field. He and all his contemporaries were terribly handicapped in bringing the product to market by reason of 12 miles of impassable road to Wyoming Station on the Great Western Railway. All writers have exhausted their superlatives on the depth of the mud holes in this road. In the spring and autumn a team of horses could not haul more than one barrel of oil over this road. In the winter as much as 16 barrels is reported as a load; only sleighs could haul a load of 4,480 pounds. Under these conditions the industry could not expand. It should also be remembered that there were no refineries in Canada before the discovery of crude petroleum and the producer must also be a refiner.



(Ontario Dept. of Mines photo)

A spring pole drill in operation. The two men on the extreme left throw their weight forward on the treadle, thereby depressing the end of the ash pole and allowing the drilling tool suspended by the chain, to strike on the bottom of the drill hole.

Although the foregoing information was printed in newspapers and in many scientific journals and was known to many oil men in Lambton County who lived well into the 20th century (J. H. Fairbank, who came to Oil Springs in 1860 died in Petrolia in 1917), the story that one John Shaw drilled in the first oil well in Canada on January 16, 1862, grew and thrived even in Lambton County. One of the authorities quoted was Alexander Winchell, who wrote "Sketches of Creation" (Harper and Brothers, New York 1870). He was writing of the great waste of Nature's resources and, in dealing with the waste of oil, featured Shaw's well and many others at Oil Springs in 1862, where the flow was so great that tankage could not be obtained. He had visited Oil Springs in 1865 and wrote from hearsay, which led him to exaggerate the waste. As he was not writing the history of the Oil Springs field, he may be forgiven for saying that Shaw drilled the first oil well in Canada; he has been referred to as the authority, and as a consequence has done Williams a great wrong. Shaw is constantly referred to as John Shaw, with the information that he died a penniless old man in Oil Springs. There were two Shaws: John Shaw, who may have been buried at public expense, appears in Sutherland's Directory of Lambton County of 1865 as an oil land proprietor; but the Shaw who drilled the great flowing well that was publicized throughout the newspaper world, was Hugh Nixon Shaw, who was a merchant at Cooksville born in Ireland in 1812 and asphyxiated in his oil well at Oil Springs, February 11, 1863.

He had already drilled one well (and possibly two others) along with some partners who, it is said, had a dispute with him and gave him one acre, subdivision 10, range B, lot 18, con. II, on dissolution of partnership. It was on this lot that Shaw set up his spring-pole drilling rig and completed a 2,000-barrel well on January 16, 1862. The *Globe* of January 28, 1862, gives a full account, from which the following has been condensed. Shaw began drilling in July, 1861, with a capital of $50 and long before January, 1862, had exhausted this capital and his credit with every one for 20 miles around. The day before the well came in he decided to abandon it after one more day's work. The reporter says, "To-day he has prospects of being the wealthiest man in Canada." The well was dug through 50 feet of clay, with dimensions 4 by 5 feet, and then drilled 3 inches in diameter through 158 feet of rock. The correspondent further states:

> Within 15 minutes of the last drill of the chisel, the oil was overflowing the surface of the earth, the well being entirely filled . . . .
>
> An iron pipe, 2½-inch diameter, was provided . . . . There was a leather bag 12 feet long filled with flax and wrapped around the [bottom of the] pipe and was lowered to the bottom of the well . . . . It [the oil] rushed up the pipe after this had been accomplished and spouted into the air 20 feet above the surface of the earth. Another pipe, of ¾-inch diameter, wrapped with another seed bag, was inserted into the 2½-inch pipe, which reduced the flow . . . . There are four receiving tanks of 120 barrels or 5,000 gallons each . . . and connected to the main upright pipe are four hoses leading one to each tank and from the tanks oil is drawn off into barrels of 40 gallons [American] each. I timed the filling of these barrels and found that in 1¾ minutes each barrel was filled.
>
> From the time that the flow was brought into partial subjection (which was Friday evening) upwards of 2,000 barrels have been taken away and more than this quantity has been lost.
>
> Through lack of barrels only 650 barrels could be taken away each day. The oil was 42° Be. sp. gr. and sold for $1 a barrel at the well. A correspondent of the *London Free Press*, February 6, 1862, confirms the above statements and fills in some details.

H102-33

The ¾-inch pipe was raised to 50 feet above the surface and stopped the flow of oil . . . . In all about 100,000 gallons of oil were lost (2,200 barrels) . . . . I measured the depth of oil in the creek and found it to average from 3 to 4 inches. The original flow was about 1,500 barrels, now with restricted flow it makes 500 barrels per day. I found Mr. Shaw to be intelligent and frank, easy of access, and really a gentleman in his deportment.

Mr. John D. Noble in his evidence (Rept. of Royal Comm. Mineral Resources of Ontario 1890, p. 165.) said "I was a vessel owner at Kingston. A schooner came back covered with oil, and I asked the Captain what was the cause of it. He said they had struck oil at Sydenham and could not stop the wells flowing and it was coming down the river a foot thick on top of the water . . . . " The depth of the oil is undoubtedly exaggerated but a scum of oil did extend over a part of Lake St. Clair.

Sir Sandford Fleming visited Oil Springs in December, 1862, or January, 1863, and read a paper before the Canadian Institute on February 29, 1863. He states that Shaw's well produced an estimated quantity of 35,000 barrels, that there had been found 30 flowing wells in all, and that production reached 12,000 barrels per day. The flowing wells covered an area of one square mile on the south side and adjacent to Black Creek. Most wells flowed oil continuously until they suddenly turned to a flow of an equal quantity of salt water. The deepest wells stopped flowing first. At the time of his visit only two wells were flowing, and they were the shallowest (i.e. higher on the dome) and within 100 feet distance. The closure in the producing area was 121 feet. There were many dry holes within the flowing area. Two wells at 50 feet distance gave a dry hole and a good producer (others confirm this statement). There were 100 refineries with a capacity of 1,500 barrels a day, while the daily production of the field averaged 400 barrels per day.

These stills produced an illuminating oil that was probably more dangerous than any burning fluid. Shaw patented a still that differed little from a whiskey still. He had no means of recording temperatures and simply allowed some lighter fractions to escape through a pipe without any control. Until sometime after the year 1862, Williams appears to have been the only one with a right to be called "a refiner."

When the "great flowing wells" at Oil Springs ceased to flow, the field practically shut down until pumps had been installed in the wells. This was not done at once, for deep-pumping equipment was not easily obtained; furthermore what could be obtained had not been designed for use in oil wells. As a consequence it was continually breaking down. When repairs had been made and a well again was in operation, a great accumulation of water had to be pumped off before oil again appeared. Every kind of power was used. In a few cases steam power was used, and in one case at least two wells were pumped by one engine. An air lift was also used, but most pumping was done with the spring pole. Even this was expensive as it required at least two men to operate the best spring pole and if much water had to be pumped it was unprofitable. The cost of producing oil skyrocketed, while the price of crude was on a downward trend. In the days of the "great flowing wells" oil poured forth and brought $10 per barrel, and when refineries had satisfied the limited demand and the little storage was filled, the price of crude oil dropped away to 75 cents. Refined oil, which had sold as high as $1 per quart, dropped to $1 per gallon and by the end of 1863 to 35 cents. At this time every newspaper in Ontario featured advertisements of coal oil, kerosene, and many other trade names. Refineries were spaced over the province: In 1863 there were in Sarnia 2, Oil Springs 10, Wyoming 3, London 2, Hamilton 2, Toronto 5, and Petrolia, Ingersoll, Woodstock, Port Credit, Brantford, and Bothwell one each. The use of kerosene for lighting became general over Ontario within the year 1862-63 and some export was reported; but when these great wells ceased to flow and the small reserve stock had been used, the refiners raised the price of crude until it touched $4 in the year 1864 and at the end of 1865, $11 per barrel. As the price of crude advanced so did the impetus for discovery of new sources of oil. In the years 1865 and 1866, many wells were drilled throughout Southwestern Ontario and on Manitoulin Island.



J. M. Lick and his two wells in the Bothwell field. No. 1 in the foreground was completed April 1, 1863 — a 200 barrel well. Photo was taken in 1866.

Operators prior to 1863 used a minimum of casing or tubing; it was scarce and expensive and was only used to control the flow of oil. Wells were drilled wet; and unless oil would flow against the head of water, the well was abandoned. A number of wells had been drilled to 400 feet, and in 1863 one was drilled to 1,000 feet. All of these encountered oil, but as they didn't flow they were abandoned, some after a short operation. The rise in the price of oil from 1864 to 1866 revived operations, but after 1866 Oil Springs closed down for seventeen years. The Excelsior Oil Company, with a Mr. Duggan as president and with the benefit of the experience gained in that interval, re-opened the field in 1883. Mr. Duggan cased his wells and opened up the "lower pay" at 450 feet. Wells of from 100 to 200 barrels initial flow were common, and the old operators of the 1860's returned to claim their properties. Since that year the field has been in continuous operation and reached its peak in 1898, when 133,366 barrels were produced. In 1949 the production was 25,692 barrels from 662 wells.

Bothwell

It has already been stated that

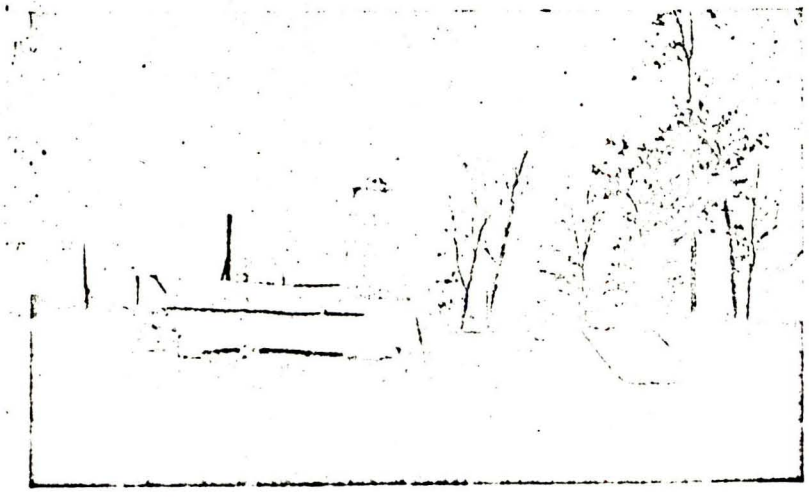
H102-34

seepages of oil occurred at Petrolia and Bothwell as well as at Oil Springs. On the authority of the editor of the *Chatham Planet*, Tripp, working for J. M. Williams, in 1857 dug a well in which he found oil and water at 27 feet. He was unable to overcome the water and abandoned it. No further work was done until about 1859 or 1860. The *Globe* correspondent in 1861 lists the operators at Bothwell, who were mostly American Army Officers, Duncan and Clark of Toronto (Yorkville) being the only large Canadian operators. They also owned wells at Oil Springs. When the American Civil War broke out in 1861, the American officers left to join their regiments. As a consequence of this and of the drop in the price of oil in 1862, the field suffered a serious slump. Two of the American operators, John M. Lick and a Mr. Jordon, remained. Together and separately they had completed three or four producing wells when they finished a well about April 1, 1863, that flowed 200 barrels per day. The location was in what is now known as Lick Ravine in lot 20, River Range, Zone Township; the depth was 224 feet. The oil was struck at 46 feet in the rock. The well cost $2,000, which they had begged and borrowed. This heralded a rush of oil men to Bothwell, and the field boomed until the end of 1866. There were many famous wells in Bothwell that flowed up to 400 barrels per day. Among these the best-known were Pepper, Lick, (two wells), Victoria, Empire, Chambers, Thayers, Wilcox, Colwell, and Dr. Pope's well.

The bringing in of the King wells in the Petrolia field sealed the fate of the Bothwell oil field. The market was flooded, and the price of oil fell to 50 cents per barrel in 1867. Another and equally pertinent reason for the shutting-down of the Bothwell field was the Fenian Raid.

As Canada called up her volunteer regiments in 1866 to turn back the expected Fenians invasion, the Americans in Canada left for home, most of them without disposing of their wells and equipment. A map of Bothwell dated May, 1866, shows that there were 203 wells in the field and that 31 wells were being pumped. Most of the wells had been drilled through the oil pay into salt water. The result of this was that the field was flooded with salt water, and when 172 wells were shut down, 31 wells could not control this flood with the equipment then available to them. Within a year the field was completely flooded and abandoned, not to be re-opened until 1896.

The man who is given credit for discovering the most prolific portion of the Bothwell field is Frank J. Carman. Mr. Carman came to Canada from New York State and had had extensive experience in both producing and refining oil in Pennsylvania, Ohio, and Wyoming. He came to Bothwell in 1896 and spent some time studying the elevation of the producing horizon. His study showed him that the oil wells occupied the highest portion of the field and that these wells had a westerly trend. Mr. Carman joined with J. H. Fairbank, of Petrolia, and beginning on the Goodyear farm they brought in the west end of the Bothwell field and extended their exploration and operations into the Thamesville field some nine miles to the west. The field reached its peak of production in 1898 with 66,404 barrels. In 1949 there were 147 wells in operation and 17,940 barrels of oil were produced.



Victoria Well in the Bothwell field. Photo was taken in 1866.

Petrolia

A special correspondent of the *Toronto Globe* (August, 1861) is authority for the statement that there was a natural spring of oil at Petrolia and that it was on the Adams property, lot 13, concession XI. As there is no other mention of this, one might be sceptical but for the fact that among the other properties purchased by Tripp in 1853 was lot 13, in concessions X and XI. He paid £206 for the two lots and sold them to one of his directors, Hiram Cook, in March, 1856, for £1,500. There is no record of any exploratory work having been done by Tripp, but the *Globe* correspondent states that Adams (the owner in 1860) "in digging his well [at this seepage] found that someone had dug sometime before him, as their digging could be traced by the filled-in earth. At 30 feet he found a deer horn in a good state of preservation and at 35 feet a rib." Rock had been reached at 50 feet, and some hundreds of barrels of oil had been pumped from the well. It is scarcely necessary to look farther than Tripp as the early well-digger. How else could he reap a profit of £1,294? He must have found a reasonably good well. Digging and drilling expanded from this oil spring. In August, 1861, there were 16 producing wells, 12 dug in the surface clay and 4 in the rock. According to Sir Sanford Fleming, it was in January, 1862, that the first flowing well was struck. Gas, oil, and water blew 15 feet in the air and caught fire. The well was on the Bligh farm and had a depth of 563 feet.

By the end of 1866, drilling had expanded the field until it was one mile wide and three miles long (along Bear Creek). The high price of oil at this time accelerated exploratory drilling. On November 23, 1866, Capt. B. King, of St. Catharines, manager of the North Eastern Oil Company, brought in a well that flowed over the derrick an average of 265 barrels per day for 41 days, and only partially open. About August 1, 1867, two fires broke out in the Petrolia field and burned out most of the field, with a loss of $100,000 in oil and equipment. The operators forthwith began a search for safer storage. The dense clay, from 50 to 90 feet deep, was impervious to oil and made perfect storage. Tanks 30 feet in diameter and 60 feet deep were dug in the clay and lined with boards laid flat. In all, underground storage for 500,000 barrels of oil was provided. This was storage for six months' production in the 1890's.

H 102-35

The "King well" was the first of many large producing wells to the west of Bear Creek. Pervious wells had been drilled in an easterly direction to present Highway 21. This westerly expansion continued through the village of Marthaville another two miles, and brought the production of the Petrolia field to one million barrels a day in the nineties. The production could have been very much more but for the restricted market for the "evil-smelling Canadian kerosene."

Perhaps the most famous of many great flowing wells in Marthaville, was the Deluge on the Webster property in lot 9, concession XI. It had been completed as a small pumper. On April 5, 1872, the well had been deepened 15 feet, when it "drilled itself in" with a loud report, which could be heard for a mile, and flowed oil over the derrick. The well settled to a daily production of 400 barrels. The value of lands immediately skyrocketed and sold for fabulous prices. Farms were subdivided into acre lots and these lots again into drilling sites, a dozen to an acre, and in some cases many more. Another large and famous well in the district was the Empire. In this area there were two oil horizons: the shallow horizon at 250 feet in the Middle Lime (Widder beds), and the deep horizon at 75 to 100 feet in the Big Lime (Dundee limestone) at an average depth of 460 feet below the surface. Another famous part of the Petrolia field was called Pithole, after an oil field in Pennsylvania.

In 1872 the price of oil dropped below $1 per barrel and continued below or slightly above the dollar mark for twenty-five years. This forced the operators to study economy.

The day of pumping wells with a spring pole passed when wells were deepened to 400 feet and also when the price dropped below $4 per barrel. At about the year 1862, steam power was first used for pumping and boilers were then fired with wood. J. H. Fairbank claims the credit for introducing the "Jerker System" of pumping many wells from one central power. When the Petrolia field expanded to the west, there were larger properties with 200 or more producing wells. These were drilled in straight lines, and pumps were connected to a central plant with ash poles strapped together. An authority in 1872 sa'd that it was unprofitable to operate a single well producing 5 barrels per day and supply an engine, pump, and necessary labour unless oil was worth over $1 per barrel.

Having reduced the cost of pumping, transportation was the next item to investigate. In the early days of these oil fields all transportation was by horsedrawn vehicle. In 1862 there were 400 teams of horses drawing oil from Oil Springs to Wyoming Station, a distance of 13 miles. There were easily double that number in the Petrolia field in the 1870's. In 1874 the Petrolia field had been extended westerly to the Sarnia township line, a distance of 8 miles, with the width of the field averaging 2½ miles from north to south; the production was three times greater than that of Oil Springs in 1862. The vehicular traffic over the roads throughout the field reached its peak in 1880 and had rendered these roads impassable in wet weather. The consequent delays forced shut-downs, and full tankage made it necessary for the operators to find other means of transportation.

In 1875, Vanalstyne and Smith led by building small-sized pipe lines from distant wells to the main gravelled road. The Noble Bros. and McDonalds, who followed shortly after, built pipelines that were common carriers. The introduction of gathering lines put hundreds of teamsters out of employment. That brought threats of violence. Most of the underground tanks were owned by the Petrolia Crude Oil Tanking Company, which had been formed by the oil producers about 1867 or 1868, and these gathering lines gradually passed into their hands. They later set up receiving stations in various parts of the field located conveniently to the wells.

Oil refined from Lambton crude oil carried a most offensive odor of sulphureted hydrogen. This and other sulphur compounds in the kerosene left a thick encrustation on a lamp wick, which caused a lamp to smoke and the housewife to demand that she have American kerosene (Pennsylvania crude oils contain no sulphur). Although by 1890 great advances had been made in reducing this sulphur, Canadian kerosene still sold at 5 cents per gallon less than American oil. Canadian refiners, who controlled the retail market, demanded and the Government imposed a heavy duty on all American refined oils. Canadian producers also demanded protection and the Government imposed a duty on imported American crude oil. It was not until 1904, when the Canadian fields failed to supply the demand for petroleum and its products, that the duty on imported crude oil was removed and the Canadian producer was given a bounty of 1½ cents per Imperial gallon on all oil produced and sold. The producers did not reap any benefit from these duties on American oil, and they accused the refiners of using the duty to bolster the price of their refined oils and of holding down the price of Canadian crude. Producers claimed that they must have at least $1 per barrel to make a profit. When kerosene retailed at 20 to 35 cents per gallon and the producer received 2 cents per gallon, the producers were "up in arms." An association of producers was formed on two occasions, 1873-74 and 1876, but on each occasion the association was short-lived, although it forced up the price of crude until it once reached



Pepper Well — a 400 barrel well drilled in 1864 in the Bothwell field.

Photo was taken in 1866.

H102-36

$2 per barrel. Most of the producers were in debt to the banks, and the banks did not like an association that controlled the operation of the properties. Another feature was that 1875 was a period of a most disastrous world depression, and a sick industry at such a time is not likely to be favoured by a banker.

The price of crude oil never dropped below $1 per barrel after the year 1890; and confidence was restored and exploratory work revived. The Bothwell field was reopened in 1895. The Leamington oil field was discovered about 1902, followed by the Tilbury oil field in 1905. These were known as deep fields. The only shallow field discovered was the Mosa field in 1916. There were some other shallow oil pools discovered, but their production was inconsequential and did not have any effect on the annual production. Recent discoveries are the Warwick shallow field in 1937 and the Becher deep field in 1946, both in Lambton County.

The industry is in a healthier state at present than it has been for some time as a result of a rise in the price of oil. The price in 1939 was $2 and in 1949 $3.53. More exploratory work is being carried on than at any time in the history of Canadian oil development. ●

Reprinted from

CANADIAN OIL and gas INDUSTRIES

February, March, 1951.

Mr. Legoff
City of Sarnia Planning Le
City Hall
Sarnia Ont

ONTARIO'S PART IN THE PETROLEUM INDUSTRY

by

R. B. Harkness.
Natural Gas Commissioner, Ontario.

It is generally assumed that the oil industry originated in the United States. This paper shows the honour of being the country in which oil was first produced belongs to Canada quite as much as to the United States. It is also designed to rescue the names of the early pioneers in the industry from obligiom - particularly the names of Charles Henry Tripp and Mr. James M. Williams. The pioneers of any industry encounter many difficulties; those which Tripp and Williams met and overcame would have daunted lesser men.

The average family ih Ontario probably never heard of kerosene until that product of crude petroleum was advertised for sale in the newspapers in 1862, when it was in plentiful supply for the first time. Before this time few pioneer settlers could afford the luxury of artificial light. Tallow candles made at home were not common until much of the forest had been cleared and the country well settled. A few settlers brought whale oil lamps with them from the British Isles; and whale oil in Upper Canada cost $1.50 per gallon or more and the supply was uncertain. Gas light was introduced in Toronto in December, 1841. A refined turpentine called camphene, and a mixture of alcohol and camphene called "burning fluid", made in U. S. A. were advertized in London and Toronto in early 1855. Both of these were more dangerous than gunpowder and were responsible for the death or permanent of many people, especially children.

Foot note

The Caledonia Advertiser for February 6th, 1956, tells of the 16-year old daughter of James Fearman of Oneida township, being severely burned while filling a lamp with burning fluid or, was it was called in this instances, "rosin oil." She claims to have extinguished the light before filling the bowl, however, the lamp and the quart bottle of "rosin oil" (which had cost $1) burst into flames which enveloped her. Her father saved her from death by submergining her in the horse-trough.

There were no refineries in Ontario or Canada other than an experimental plant or plants in Oil Springs in Lambton County, prior to 1860.

Seepages of petroleum occur on every continent in the world and in the crude state was used for mortar, calking ships, embalming, medicinal purposes, and lighting. There was one well-known seepage described by Governor John Graves Simcoe, who passed it on his journey to Detroit on February 15, 1793. He said in his journal, "In proceeding down the Thames (La Tranche) River the Indians discovered a spring of an oily nature which upon examination proved to be petroleum." This was on the site of the present Bothwell oil field. The Indians and whites gathered it by dropping a blanket on the surface of the water and oil. Oil and water were then wrung out into a vessel, and the oil was skimmed and bottled. The oil was sold mostly as a liniment but was highly recommended for internal use. Attempts were to refine these seepages and separate illuminating oil from the crude oil were made as early as1780, but the produce was usually described as yellow and smelly, and gave off much smoke when burned in lamps. In 1850, in England James Young patented a process of reining oil from coal He called his illuminating oils "paraffine"; he also made lubricating oils and paraffin wax. Young's "paraffin" according to contemporary reports had a reddish colour and an unpleasant odour.

"Kerosene" was first produced and manufactured in the 1840's by Dr. Abraham Gesner, M. D., F. R. S. (surgeon, geologist, and chemist) of Hillsboro, Nova Scotia. He demonstrated his produce at Charlottetown, P.E.I., in a lecture at that city in 1846. He distilled it from coal and later from TTrinidad pitch and Albertite. He sold his patent for manufacturing kerosene to the North American Kerosene Gas Light Company of New York and remained with that company as their chemist. His lectures and writin s on the distillation of kerosene were widely circulated at the time; in fact, leading chemists in most countries had interested themselves in making a better illuminating oil than whale oil, which was becoming scarce and expensive, and the burning fluid and camphene, which were very dangerous. Lamp

Lamp designers were equally interested in improving lamps most of which were modifications of whale-oil lamps and quite inadequate.

Sir William Logan, provincial geologist, had visited a seepage of petroeum in Gaspe in 1843.

Footnote described it in the Report of Progress, 1844, Geological Survey of Canada pp. 41-42.

He said that the oil reached the surface from an underground formation along a dyke in the sedimentary rocks. It can be said with assurance that in 1850 chemists and geologists and those who read scientific literature agreed that crude petroleum would provide a much better illuminating oil than whale oil, and that illiminating oil could be recovered from crude petroleum that seeped from the ground. A market for a good, safe illuminating oil was already established. Even at the risk of their lives the public were buying mostly anything offered described as "illuminating oil" that would produce artificial light.)

While in the process of preparing a report and map of the oils of Canada West (Ontario), Logan received a sample of "gum bed" from Enniskillen township, Lambton County. Sterry Hunt, his chemst, in the Report of Progress, 1849-50, reported that it was suitable "for the construction of pavements, for paying the bottoms of ships, and for the manufacture of illuminating gas ... it contains 78 to 81 per cent combustible and volatile matter." Logan then sent his assistant geologist, Alexander Murray, to investigate. His report appears in the Report of Progress, 1851-52. He says that the deposit: was a bituminous spring located on lot 16, con. II Enniskillen township covering one-half acre and 2 feet thick over an area of twenty-five square feet.

Here in 1851 was a ready-made oil field completely described and with a prospectus writteby Hunt and Murray with the authority of Sir William Logan behind it. The first of record in the field were the Tripp Brothers -- Charles Nelson, and Henry. Henry was living in Woodstock, and Charles Nelson was in Bath in 1850, where he was a foreman in John Counter's stove foundry and had in that year sold his employer a parent application on a stove front. Charles formed a company, The International Mining and Manufacturing Company, and applied for a charter in 1852, which was not granted until he had made a third application in October, 1854. Murray had a farm on the outskirts of Woodstock and in all probability recruited his party in Woodstock (of which Henry Tripp may well have been one) for the examination of the Enniskillen seepage. Henry Tripp may have preceded Murray and have dug the test pit, 30 feet deep, referred to by Murray. The writer of the historical

review of the Atlas of Lambton County, 1880, says "Tripp, a resident of Woodstock in 1850, bought from the government lot 18, con. I, and lot 16, con. II, Enniskillen, and several others in the district," which would suggest that he had preceded Murray, having read Hunt's report of 1849-50 on the seepage. Again the historian in the Atlas just mentioned informs us that, "In 1852 he (Tripp) erected buildings and machinery for the manufacture of asphalt, which enterprise did not succeed." This statement is confirmed by the catalogue of exhibits, "Canada at the Universal Exhibition (Paris), 1855." The International Mining and Manufacturing Company's exhibit of asphalt is referred to on pages 41, 48, 155 & 372, and 395. The exhibit received "honourable mention."

Tripp sent a large sample of seepage to Thomas Antisell, M. D., consulting and analytical chemist of No. 63 Franklin St., New York, and another (1,450 pounds) to the Hamilton Gas Company for test in the retorts. Dr. Antisell under date of February 19, 1853, reports that the crude material is "a semi-solid substances, soft and plastic in the fingers, blackish colour in the interior, fracture tenacious and stringy, without lustre... sticks to paper." He continues: This bitumen is also adapted for illuminating purposes ... as burning fluid ... as an illuminating gas ... but the manufacture of volatile liquids and illuminating gases appears to be its most appropriate use.

Thomas McIlwraith, manager of the gas company says under date of February 7, 1855, that from 1,450 pounds he made 4,600 feet of gas in three hours, which gave 10 to 15 per cent more illumination than did ordinary coal gas.

It would seem that although Tripp's plans may have been extensive as was set out in his charter, he could do little else than exploratory work and experimental distillation until the railway was completed. Even then he would be 15 miles from the railway; the road passing through 10 miles of hardwood swamp entirely undrained. Judging from the dates of Dr. Antisell's and Thomas McIlwraith's reports, each in February he must have waited until the roads were frozen to haul his heavy loads. He produced asphalt, and, in in doing so, illuminating oils. For both of these he had a ready market, but he would be limited to the extent of his ability to supply packages for these. The ship building trade along the St. Clair the St. Clair and Detroit Rivers would absorb all the asphalt that he could supply.

Space does not permit discussion of Tripp's finances, but he was undoubtedly seriously handicapped for money. Although he had been exploring the ground since 1851 he purchased no land until 1853. The transfers of land as recorded in the Registry Office of Lambton County show that land values increased by as much as 300 per cent in 1853 and that Tripp had to pay land speculators very high prices and this as a result of his own work. He advertised Dr. Antisell's and Thomas McIlwraith's reports in the Hamilton Spectator from February until September, 1855, and no doubt used this as a means of raising funds. This appear must have failed, for the register shows that his sales of land began early in 1856. Charles N. Tripp married Almira Cornish in 1855, a sister of a later may or London. He died in New Orleans in 1860. Henry Tripp moved to Schenectady, N. Y., where he died in 1896. He was prominent in that city as one of the early plate photographers. The purchasers of Tripp's properties were for the most part J. M. Williams and his associates. The Williams family say that J. M. Williams was first brought into the oil business by having sold a waggon to a man who could not pay him and that he had to take in payment some land at Oil Springs. What could fit Tripp's position with greater accuracy? Tripp and Williams were both in Hamilton and Tripp was 125 miles from the site of his operations.

James Miller Williams (1818-1890) was the first refiner (as distinguished from distiller) of petroleum on a commercial basis in Canada. He was born of Welsh parents in Camden, New Jersey, on September 14, 1818. After completing his education at the age of 14, he was apprenticed to a carriage maker. He and his parents came to London, Ontario, in 1840, when he entered the carriage-making industry with M. Holmes as a partner. In 1842 he married Miss M. C. Jackson, of London. He moved to Hamilton some years later and again with a partner, H. A. Cooper, made carriages. In 1854 he made railway coaches for the new railways and sold this business to Cooper in 1856, when he turned to the refining of illuminating oil. Storry Hunt (chemist to the Geological Survey of Canada) who visited Oil Springs in December, 1860, and must have known Williams personally, says that Williams built his refinery at Oil Springs in 1857 and began refining oil. Hunt says that Williams soon found that - -

By sinking wells in the clay beneath, it was possible to obtain great quantities of the material in the liquid state. Large numbers of

wells were sunk by Mr. Williams and others --- along Black Creek and about ten miles further north along Bear Creek. Nearly 100 wells had been sunk(December, 1860) ... and many more have since been bored --- The whole amount already obtained from the district is perhaps not less than 300,000 to 400,000 gallons.

Hunt explains that ---

"Owing to the difficulties of communications (roads with bottomless mud holes) and of procuring casks sufficient for the oil, these wells have not been wrought in a continuous manner; large quantities of oil are, however, taken out at intervals of some days.., The price of crude oil at Wyoming Station is 13 cents per gallon. ($5.06) per barrel)". He says that Mr. Williams' oil was REFINED, IM HAMILTON, WHILE THAT FROM KELLY'S WELLS (PRESENT PETROLIA) WAS SENT TO BOSTON, BUT THAT A REFINERY WAS TO BE ERECTED AT THE WELLS.

When J. M. Williams built his refinery in Hamilton at the foot of Wentworth Street at "Coal Oil Inlet," he incorporated the Canadian Oil Company (November 4, 1860) which business was carried on there until it was wound up by his estate in 1891. His first publicity was an advertisement in The Hamilton Spectator for July 4, 1860.

"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 odor common to all oils. The odor 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 odor. We offer our oils at the following prices.

Illuminating oil 70 cents per gallon
Machinery Oil 60 cents per gallon
Crude oil, 1000-4000 gallons 25 cents per gallon
Crude oil, 4000-100,000 gals. 16 cents per gallon
J. M. Williams & Co.

In this advertisement there is the story of three or four years of work to remove the strong sulphur odour in the illuminating oils of Lambton County, which for the next sixty years was to remain in spite of every effort to eradicate it. Williams must have made a big improvement in order to make such a statement. There is much evidence, which cannot be detailed here owing to limitations of space, that Williams turned to Dr. Abraham Gesner, the authority on refining. Gesner wrote a treatise on refining. "A Practical Treatise on Coal Petroleum and Other Distilled Oils" (Ballieu Bros., N. Y. 1860). The preface is dated November, 1860. He says of Lambton oil: "It differs very essentially from the bitumens of the West Indies and the oils require careful purification." This and the fact that he was interviewed by the Spectator in Hamilton on March 11, 1861, as well as the fact that Williams always associated himself with expert partners or advisers, leads the writer to believe that Gesner guided Williams in his refining methods. Williams won two gold medals at the International Exhibition in London, England, in 1862, one for being the first to produce crude oil and one for his refined oil. It would be almost impossible for him to do this without the help of Gesner.

There are plenty of authorities to show that Tripp, and later Williams, dug wells into the clay and obtained oil sufficient for their needs; and that they started the petroleum industry in Canada as early as 1855.

Many of the surface wells produced much more than the wells in the rock. They were from 45 to 70 feet deep, according to their location, i.e. in creek bottom or on the top of the bank. All writers on the beginning of the petroleum industry have overlooked Tripp's work altogether and with the exception of Frederick Clapp (Department of Mines; Mines Branch No. 291, Ottawa) have disregarded Williams work as an oil producer. They give "Colonel E. L. Drake the laurels for having drilled the first producing well in "the world". This writer takes the view that the industry is not at all concerned with the manner of obtaining the crude oil from which marketable products are obtained. There is, however, a record of Williams' work in The Toronto Globe. The Globe sent a special reporter to the oil fields in August, 1861, who reported that out of some 400 wells at Oil Springs

in Enniskillen township, 32 were drilled into the rock; that Williams and Company owned 800 acres (part of Tripp's acreage) and had three wells drilled into the rock; and that one on the west gum bed (lot 16, con. II) was drilled 150 feet into the rock and had been in operation for two years (since August, 1859), and had produced 60 barrels per day for six days in succession. This Williams equalled if not preceded Drake in "drilling" a producing oil well. This is quite apart from the oil he had produced and refined from dug wells in preceding years. The Globe reporter states that several other wells were bein- drilled on this property and that one had reached 250 feet and that oil had repeatedly been found but not in paying quantities. Williams continued to produce oil from his property for many years and took his part in all activities in the oil field. He and all his contemporaries were terribly handicapped in bringing the product to market by reason of 12 miles of impassable road to Wyoming Station on the Great Western Railway. All writers have exhausted their superlatives on the depth of the mud holes in this road. In the spring and autumn a team of horses could not haul more than one barrel of oil over this road. In the winter as much as 16 barrels is reported as a load; only sleights could haul a load of 4,480 pounds. Under these conditions the industry could not expand. It should also be remembered that there were no refineries in Canada before the discovery of crude petroleum and the producer must also be a refiner.

Without enlarging to some extent on industries in which it is necessary to drill holes in the ground to a considerable depth, an erronious impression may be left that the practice of drilling the rock originated with the oil industry. Leaving out hand drilling in the mineral industry, drilling for fresh,mineral, and salt water, had long preceded drilling for oil. Many of the same tools now in use were used 150 years ago. In 1827 the Chinese[1] had drilled wells to 3,000 feet.

---

1. M. Huc "Travels in the Chinese Empire" Vol.I pp. 300-302

10

Water wells 1,000 to 2,000 feet deep were drilled in France and England in the 1840's with a "spring pole" of the same type used in Oil Springs in the 1850's and early 1860's. The mineral water well at The Welland House in St. Catharines 500 feet deep was drilled in 1854 with a small steam engine and light cable tools. Mr. Arthur B. Johnston (an old driller from a family of drillers) says in his book[2]

½

---

2. Arthur B. Johnston

"The belief of many people to-day is that the first wells were drilled by spring pole and tread board, which is entirely a mistaken one. This method was used by men who rushed frantically to obtain wells and who, because of impossible roads, were unable to bring the necessary equipment Many of these wells had to be drilled by steam rigs afterwards."

The "spring pole" drilled was merely a long pole or tree with the butt end fixed in the ground and inclined so that the top end was held some eight feet more or less above ground. A fulcrum or block was placed near the butt end to keep the pole in this position. The drill was suspended from the top end and the power was supplied by one or two men. The fulcrum was so placed that when the man or men stepped on a tredal and added their weight to that of the drill on the top end, that end of the pole was depressed and the iron drill fell free a distance of about 12 to 18 inches and struck a blow on the bottom of the hole. It can be seen that this was not enough power to drill anything but very soft rock and very shallow holes.

The plank road from Wyoming to Oil Springs so improved transportation the boilers, engines and other heavy equipment could be brought to the oil fields and only those who were without the necessary finances continued to use the spring pole for drilling or pumping.

The first drilling cable was of heavy manilla hemp. These were unsatisfactory ~~for where~~ for drilling through the soft shale, called "soap". The "soap" would ~~bolt up~~ "ball up" on the line and interfere with the free fall of the drill. Ash poles bolted together in 40 foot lengths were substituted for the manilla cables and were used as early as 1865 until[1] about 1902 when

---

1. Chatham Planet, june 8, 1865

Mr. M. J. Woodward patented his "underground swivel". This facilitated the turning of the drilling bit on the end of a steel cable and the poles gradually went out of favour. Within the last 25 to 30 years gas or gasoline engines have replaced the steam boiler for drilling and more recently the "walking beam" on the drilling rig is being replaced by the "spudder."

Although the foregoing informarion was printed in newspapers and in many scientific journals and was known to many oil men in Lambton County who lived well into the 20th century,[1] the story that one John Shaw drilled

1. J. H. Fairbank, came to Oil Springs in 1860 died in Petrolia in 1917

in the first oil well in Canada on January 16, 1862, grew and thrived even in Lambton County. One of the authorities quoted was Alexander Winchell, who wrote "Sketches of Creation" [2]. He was writing of the great waste of Nature's

2. Harper and Brothers, New York 1870. Sketches of Creation

resources and, in dealing with the waste of oil, featured Shaw's well and many others at Oil Springs in 1862, where the flow was so great that tankage could not be obtained. He had visited Oil Springs in 1865 and wrote from hearsay, which led him to exaggerate the waste. As he was not writing the history of the Oil Springs field, he may be forgiven for saying that Shaw drilled the first oil well in Canada; he has been referred to as the authority, and as a consequence has done Williams a great injustice. Shaw, is constantly referred to as John Shaw, with the information that he died a penniless old man in Oil Springs. There were two Shaws: John Shaw, who may have been buried at public expense, appears in Sutherland's Directory of Lambton County of 1865 as an oil land proprietor; but the Shaw who drilled the great flowing well that was publicized throughout the newspaper world, was Hugh Nixon Shaw. The latter was born in Ireland in 1812, he had been a merchant at Cooksville Upper Canada and he died on February 11, 1863 having been asphyxiated in his oil well at Oil Springs. When he came to this country is unknown, but his oldest son Bartholemea was born in Canada in 1836. His occupations were varied. When he purchased land in Cooksville in 1843 he described himself as a "Painter;" when concerned in another land transaction in 1848, he is described as a merchant and Insurance Agent; and when he mortgaged land in 1862 he stated that he was a "Coal Oil Refiner." Before 1862 he had already drilled one well (and possibly two others) In association with some partners after a difference of opinion he and his partners parted company. Shaw it is said was given one acre,[3] on the dissolution of the partnership. It was on

3. B, lot 18, con. II. .....

this lot that Shaw set up his spring pole drilling rig and completed a 2,000

B. Subdivsion 10 Ramge B, lot 18, con. II, Enniskillen township. This parcel of land is shown on a map in the possewsion of Mr. Charles O. Fairbank of Petrolia. The map was made by his grandfather Mr. H J. H. Fairbank. It shows Shaw's well and many other wells drilled before and after Shaw's well of January, 1862. The notes on the map would lea one to believe that it was an assessor's record. The only date is in 1865 but the map was undoubtedly made by Fairbank in 1860 ~~when~~ when the town was laid out. See County of Lambton Gazette 1864-65

January 16, 1862. The Globe of January 28, 1862, gives a full account, from which the following has been condensed. Shaw began drilling in July, 1861, with a capital of $50 and long before January, 1862, had exhausted this capital and his credit with every one for 20 miles around. The day before the well came in he decided to abandon it after one more day's work. The reporter says, "Today he has prospects of being the wealthiest man in Canada." The well was dug through 50 feet of clay, with dimensions 4 or 5 feet, and then drilled 3 inches in diameter through 158 feet of rock. The correspondent further states:

"Within 15 minutes of the last drill of the chisel, the oil was overflowing the surface of the earth, the well being entirely filled ..... An iron pipe, $2\frac{1}{2}$ inch diameter, was provided ..... There was a leather bag 12 feet long filled with flax and wrapped around the (bottom of the) pipe and was lowered to the bottom of the well ... it (the oil) rushed up the pipe after this had been accomplished, and spouted into the air 20 feet above the surface of the earth. Another pipe, of $\frac{3}{4}$ inch diameter, wrapped with another seed bag, was inserted into the $2\frac{1}{2}$ inch pipe, which reduced the flow ..... There are four receiving tanks of 120 barrels or 5,000 gallons each ..... and connected to the main upright pipe are four hoses leading one to each tank and from the tanks oil is drawn off into barrels of 40 gallons (American) each. I timed the filing of these barrels and found that in $1\frac{3}{4}$ minutes each barrel was filled.

From the time that the flow was brought into partial subjection (which was Friday evening) upwards of 2,000 barrels have been taken away and more than this quantity has been lost."

Through lack of barrels only 650 barrels could be taken away each day. The oil was 42° Be. sp. gr. and sold for $1 a barrel at the well. A correspondent of the London Free Press, February 6, 1862, confirms the above statements and fills in some details.

"The $\frac{3}{4}$-inch pipe was raised to 20 feet above the surface and stopped the flow of oil ..... In all about 100,000 gallons of oil were lost (2,200 barrels)..... I measured the depth of oil in the creek and found it to average from 3 to 4 inches. The original flow was about 1,500 barrels, now with restricted flow it makes 500 barrels per day. I found Mr. Shaw to be intelligent and frank, easy of access, and really a gentleman in his department."

Mr. John D. Noble in his evidence said "I was a vessel owner at

1. Reprt of Royal Commission Mineral Resources of Ontario, 1890, p. 165

Kingston. A schooner came back covered with oil, and I asked the Captain what was the cause of it. He said they had struck oil at Sydenham and could not stop the wells flowing and it was coming down the river a foot thick on top of the water..." The depth of the oil is undoubtedly exaggerated but a scum of oil did extend over a part of Lake St. Clair.

Sir Sandford Fleming visited Oil Springs in December, 1862, or January 1863, and read a paper before the Canadian Institute on February 29, 1863. He states that Shaw's well produced an estimated quantity of 35,000 barrels, that there had been found 30 flowing wells in all, and that production reached 12,000 barrels per day. The flowing wells covered an area of one square mile on the south side and adjacent to Black Creek. Most wells flowed oil continuously until they suddenly turned to a flow of an equal quantity of salt water. The deepest wells stopped flowint first. At the time of his visit only two wells were flowing, and they were the shallowest (i.e. higher on the dome) and within 100 feet distance. The closure in the producing area ~~ak~~ was 121 feet. There were many dry holes within the flowing area. Two wells at 50 feet distance gave a dry hole and a good producer (other confirm this statement). There were 100 refineries with a capacity of 1,500 barrels a day, while the daily production of the field averaged 400 barrels per day.

These stills produced an illuminating oil that was probably more dnagerous than any burning fluid. Shaw patended a still that differed little from a whiskey still. He had no means of recording temperatures and simply allowed some lighter fractions to escape through a pipe without any control. Until sometime after the year 1862, Williams appears to have been the only one with a right to be called "a refiner.

Mr. J. H. Fairbank came to Oil Springs in 1860 from Clifton (Niagara Falls) where he left his wife and family with his parents in law, the Chryslers. He is reputed to have arrived there empty handed which is quite possibly true as he called himself "Hard Luck John." He was a surveyor and he had sold insurance in Clifton both of these professions he continued to practise in Oil Springs. His grandson Mr. C. O. Fairbank of Petrolia has very kindly allowed the writer to take extracts from his grandfather's Journal Diary which covers the interval September, 1862 to June, 1864 There were then in Oil Springs many who were better financially established than Mr. Fairbank

J. M. Williams was the largest producer. He had lately, 1859, moved his refinery to Hamilton. Bradley Bros., Hugh Shaw, W. E. Sandborn, H. C. Shannon, Whipple Bros., M. H. Lidelm Culver (of Simcoe), Kelsey and L. B. Vaughan all had good wells and were substantial producers. Mr. J. H. Fairbank had no well of his own until 1863, long after Hugh Shaw's great flowing well came in in January 1862, and it was not listed among the largest wells in Oil Springs. He can therefore be considered as a small operator and to reflect the struggle that a small operator had to reach success. His diary opens with a bargain with one O'Dell for a "horsepower" at $2.00 a month with an option to buy it for $28.00. This

---

"Horsepower" are still in use in Welland County Gas Field. A horse or horses are hitched to a pole. The horse plods around a circle rotating the pole which actuates the power.

---

horsepower operated the agitator at his refinery. His well was pumped by a spring pole powered by two men. He ~~xxx~~ spent thefirst two weeks of October with the help of a blacksmith and a wheelwright erecting, tearing down and rebuilding his horsepower footings and shaft, which operated the agitator. The illuminating oil from the still was pumped or transferred by hand to a tank where it was agitated in an acid bath. It was then neutralized by washing in caustic soda to remove the evil smelling sulphur compounds that plagued the Canadian Oil Refiner then and for years to come. Barrels of crude and refined oil were filled by hand. Oil was transferred from one tank to another in the refinery by hand. The still that he used (and that was not paid for until (July, 1 863) was a Hugh Shaw patent still. It was described by a corrdspondent of The Toronto Globe (March 13, 1862) "Shaw's still looks like two sugar kettles placed one above the other forming an iron globe from the top of which rises an iron pipe which is connected with the worm. From this iron pipe rises another through the roof to the open air, which allows the benzole to escape as a vapour. The remaining vapour condenses in the worm and from there drains to a collecting tank. By this method 50 per cent illuminating oil is gained. "The remainder is lost." The purification follows and agitation in acid washing and settling, bleaching etc.

Shaw's still must have been very imperfect. Mr. Fairbank nearly broke his heart over the thing. He says on Saturday, October 17th, 1862 "ran still ---til dark and quite fully resolved that I won't run a damned leaky old kettle that acts as if it would "go up" any minute for love or money - don't want to become as nervous as an old maid and feel like a coward all the time. I'm down on the thing and won't stand it anyway. Can stand work as well as anyone but damn a leaky still. Them's my sentiments" A Sundays rest evidently changed his attitude for on Monday he was again running his still.

His daily life was an endless battle against difficulties that required instant solution. He must hire strong young horses to haul crude oil through deep mud from his well to his refinery and the refined oil from his refinery to the railway 12 miles distant. He must have a team of docile and strong horses to plod the endless circuit of the horse power that opeated his agitator. Such animals were not always available to him and he often spent a whole day in search of a team of horses. He had hundreds of cords of wood to cut and haulf from the neighbouring woods to his refinery. He was continually borrowing and returning sulphuric acid and caustic soda. The acid was often diluted with one half its volume of water. He was continually in search of empty barrels that had to be hauled from Wyoming 12 miles and which cost $2.00 each; this too frequently was more than the value of a barrel of crude oil. He very often records that he is coopering (assembling barrels) and filling far into the night. He was fighting mud and bottomless mud holes in the roads, every day. Wherever a wheeled vehicle moved the road must be covered with poles (corduroyed) or planks. Fairbank continually records "cutting skids or skidding roads". i.e. corduroying roads, in and around his well and refinery. He has many times in need of iron pipe, rods, pump barrels. valves and other fittings. On one occasion he searched the oil field all day for three 2½" couplings. There were tanks to build, leaks to stop and endless and constant repairs, alterations and rebuilding of work equipment. In spite of all this he was able to find time to help a neighbouring operator to set an engine, line a shaft, or make a stubborn belt run true. When these demands had been dealt with, he could turn his attention to selling his product. His principal market was in London but as the months passed and his skill improved his market for refined oil extended. In 1863 he was refining and treating (purifying) refined oil for others. In January, 1863

he rented a steam engine at $1.00 per day or $25.00 a month and installed it in his refinery. He now could transfer oil from tank to tank and the acid sludge to a holder, with much less danger to the operator, and with a minimum fire hazard. It is worthy of mention that although refineries in the neighborhood were constantly ablaze, Fairbank never had a fire in his well or refinery. His hands were painfully burned with acid on one occasion but it did not diminish his labour in the inspection and management of his properties.

Turning to the social life in Oil Springs in 1862, Mr. Fairbank's family was in Clifton (Niagara Falls) and since 1860 he had a choice of living quarters in the local hotel or a boarding house. Of the hotel it is recorded that the beds did double duty serving both those who slept by day or by night. The guest who failed to bolt or blockade his bedroom door at night might find in the morning that he had a guest with most of bis bedding, sleeping on the floor. "The Globe" correspondent speaking of hotel accommodation and sanitation says that when the proprietor reprimanded a guest for sleeping with his boots on, the guest assured him that the bed had don his boots no harm. Mr. Fairbank was busy in October, 1862 building a shanty. He hired a man at $1.00 per day to"mud" the shanty. On its completion, his mother joined him and his lot was greatly improved. Later in the year his sister visited them for a few weeks. It would scarcely be expected that he would spend many evenings in social activities in view of his responsibilities. He makes no mention of any entertainment in 1862 but in 1863 he had tea at Davidson's and later in the year and in 1864 he played euchre on a few occasions at Jas. Bennets, anoyher well owner. Sunday in 1862 has been for him a day of rest and for writing home, but in 1864 he attended the Methodist Episcopal Church which was served by two pastors, Rev. Richard Beale and Rev. Mr. Livingstone. He says that one was a find speaker and the other "made an ass of himself." When he had a toothache in August, 1863 he searched all day for a "dentist" and finally had the tooth extracted by Dr. Northrup. The directory of 1865 mentions no dentist but lists Dr. S. Street Macklim, M. D. Evidently a dentist was qualified to practise if he had a pair of forceps. The practise of medicine had not as yet been fixed either by education or legislation. It is significant that when Mr. Fairbank injured his leg most painfully he treated it himself by rubbing it alternately with alcohol and

At Christmas, 1862 Mr. Fairbank bought a new suit of clothes at Fysh and Thompsons but he did not go home for Christmas. The explanation very possibly is found in his entry of December 26th "damned by every luck and no cash." His entry for December 25th reads "Up late and went to the refinery. Finished skidding (corduroying). Oil not settling any. Repaired pump. In p.m. went down and moved Thompson's engine. Very muddy. Had Hyman's team working. Rather quiet Christmas minus turkey and "such like". At work in mud and oil all day, such is Enniskillen. Received nothing from somebody and gave something to nobody. Total 0". Christmas 1863 spent nearly two weeks at home. He had had a new suit and overcoat, tailor made complete with brocaded vest. He had paid $2.00 for the pattern of the vest in Detroit. His dawn till dark labours in rain snow mud and mosquitoes had finally gained him a rich reward. His credit balance as of March 1st, 1864 is $5755 without valuing his real estate. He had drilled a new well 219 feet deep and proved to be a big producer. The well came in when most others wells had ceased to flow. Oil had increased in price from $1.00 in August to $4.50 per barrel in October, 1863. In the month of February, 1864 he had his most profitable month. He says that his capital has increased $3159 in that month.

Mr. Fairbank and others like him showed that in 1862 a man with his barehands, could make a success in the oil industry if he were ~~drick~~ willing to work around the clock. Most present day oil wells of 1,000 barrels or over are deep wells and cost $100,000 and more. The man with no capital must be a genius and have more than one man's share of luck who can at the present day equal Mr. Fairbank's record. And still men do.

When the "great flowing wells" at Oil Springs ceased to flow, the field practically shut down untio pumps had been installed in the wells. This was not done at once for dee-pumping equipment was not easily obtained; furthermore what could be obtained had not been designed for use in oil wells. As a consequence it was continually breaking down. When repairs had been made and a well again was in operation, a great accumulation of water had to be pumpted off before oil again appeared. Every kind of power was used. In a few cases steam power was used, and in another at least two wells were pumpted by one engine. An air lift was also used, the equipment being made in Brantford.

However most pumping was done with the spring pole. Even this was expensive as it required at least two men to operate the best spring pole and if much water had to be pumped it was unprofitable. The cost of producing oil skyrocketed, while the price of crude was on a downward trend. In the days of the "great flowing wells" oil poured forth and brought $10 per barrel, and when refineries had satisfied the limited demand and the little storage was filled, the price of crude oil dropped away to 75 cents. Refined oil, which had sold as high at $1 per quart, dropped to $1 per gallon and by the end of 1863 to 35 cents. At this time every newspaper in Ontario featured advertisements of coal oil, kerosene, and many other trade names. Refineries were spaced over the province. In 1863 there were in Sarnia 2, Oil Springs 10, Wyoming 3, London 2, Hamilton 2, Toronto 5, and Petrolia, Ingersoll, Woodstock, Port Credit, Brantford, and Bothwell one each. The use of kerosene for lighting became general over Ontario withih the year 1862-63 and some export was reported; but when these great wells ceased to flow and the small reserve stock had been used, the refiners raised the price of crude until it touched $4 in the year 1864 and and the end of 1865, $11 per barrel. As the price of crude advanced so did the impetus for discovery of new sources of oil. In the years 1865 and 1866 many wells were drilled throughout Southwestern Ontario and on Manitoulin Island.

Operators prior to 1863 used a minimum of casing or tubing; it was scarce and expensive and was only used to control the flow of oil. Wells were drilled wet; and unless there was enough gas present to make the oil flow against the head of water, the well was abandoned. A number of wells had been drilled to 400 feet, and in 1863 one was drilled to 1,000 feet. All of these encountered oil, but as they didn't flow they were abandoned, some after a short operation. The rise in the price of oil from 1864 to 1866 revived opeations, but after 1866 Oil Springs closed down for seventeen years. The Excelsior Oil Company, with a Mr. Duggan as president and with the benefit of the experience gained in that interval, re-opened the field in 1883. Mr. Duggan shut off the water with casing and opened up the "lower pay" at 450 feet. Wells of from 100 to 200 barrels initial flow were common, and the old operators of the 1860's returned to claim their properties. Since that year the field has been in continuous operation, and reached its peak in 1898, when 133,366 barrels were produced. In 1949 the production was 25,692 barrels from 662 wells.

Bothwell

It has already been stated that seepages of oil occurred at Petrolia and Bothwell as well as at Oil Springs. On the authority of the editor of the Chatham Planet, Tripp, working for J. M. Williams, in 1857 dug a well in which he found oil and water at 27 feet. He was unable to overcome the water and abandoned it. No further work was done until about 1859 or 1860.

The settlement of Bothwell commenced in 1852. In that year the Great Western Railway was located through the district and the Hon. Geo. Brown purchased 4000 acres (some authorities say 5,000 acres) lying north of the Indian Reserve, on the north side of the Thames River, Zone township. When the railway was completed Mr. Brown had a townsite surveyed to the north of the railway and he proceeded to clear away the timber. He sold part to the Great Western Railway as fuel for the locomotives; the larger logs were sawn in three mills and processed in a furniture factory all owned by Mr. Brown. The townsite was advertised in The Globe, and lots were auctioned. His land lying outside the town was put into cultivation and grazing. He had 200 cattle, 800 sheep, 25 horses and 30 milk cows in the middle 50's. The advertising and sales of lots brought a premature land boom which was followed by a slump in the late 50's. In these years Mr. Brown paid his men in I. O. U.'s then called "Browns scrip" and these passed as currency in the neighbourhood. The future of the settlement was saved by the discovery of oil.[1]

---

1. Chatham Planet July 6, 1864 and Lambton Atlas 1880.

It has been already stated that a seepage of oil was known at Bothwell for over half a century before it was put to any use. A Bothwell correspondent to the Chatham Planet (Augustth, 1864) tells of the early days. "Oil had been oozing out of the banks of the Thames for longer than I can name. I well remember having it pointed out to me 16 years ago. (1848) one of these spots near Gardners Mills (Cashmere lot SLR Mosa tp.) where a hole had been sceoped out near the bank and collected a thick deposit of oil on the surface of the water. I was informed that the only use made of oil at that time was by the Indians, who drew a wool blanket across the hole and pressed (wrung) the oil

into a bottle or other vessel. It was used by them in the crude sate bother internally and externally for the cure of diseases and wounds. It was not until the discovery of such large deposits in the township of Enniskillen that the oil was put to more practical use."

"Another place where oil made itself manifest was at Alan's farm about a mile below Gardners Mills, and it was here that some enterprising Americans first commenced to bore. They chose the low flat next to the river bank, and, if I mistake not, sunk no less than three wells using cribbing for a considerable depth before driving the pipe. In the first two very troublesome quicksands were met with which caused them to cave in, and they had to be abandoned. With the third well they were a little more fortunate and had a good show of oil at a comparatively small depth. But, owing to defective machinery, quicksands or both combined, it also was given up, and, although the derrick is still standing, work has never been resumed. It was then that Mr. Lick who had been superintendent of the last mentioned well undertook the sinking of one for The Thames Oil Well Company of Bothwell, he himself being about the largest shareholder ..."

More and detailed information about the three first wells at Bothwell is found in The Globe (May 4, 1863) the story of a visit to Bothwell by the Editor of the Chatham Planet. He says "No. 1 well is located on the flat on the immediate bank of the Thames and was commenced by Mr. Tripp a Canadian sent by Mr. Williams of London. Tripp dug the well to a depth of some 27 feet without meeting with any special indication of oil, but one night as Tripp was leaving off work he found that by sticking his pick into the soil that he heard a hollow sound ..... To his surprise the next morning --- he found it full of oil and water. Afterwards an attempt was made to drive an iron pipe down into this well. When the pipe had been driven a considerable distance, it broke, and the well was abandoned. This well was commenced some six years ago (1857). At present the water in the cribbing is covered with oil giving every indication of oil beneath the surface."

No. 2 well 20 rods from No. 1 also on the flat commenced in August, 1861 by Jordan and Seymour of Erie, Pa., dug and bored 137 feet Oil was found in the bottom 8 feet.

No. 3 well by Jordon and Lick 50 rods from No. on the brow of the hill about 50 feet above the river on the north side. It was begun in September, 1862 and is now 224 feet deep. The well was dug 8 feet square to 80 feet then drillin was begun. On March 1st, 1863 they struck oil at 180 feet which flowed. Quick sand and gas at 137 feet held up drilling for two weeks. The well pumps 150 barrels per day. The well flowed 1500 barrels. The well cost $2000 plus the owners labour.

The Chatham Planet and The Globe carried the news of the oil field at Bothwell. Both quoted other sources of information and they are equally vague about the location of the wells they describe. Lick drilled many wells with different partners and for different Companies. He definitely began his drilling on the Allen farm lot 30, R. R. Mosa township and extended his operations westward into lot 21 Zone where he drilled a number of wells; at least two were in the ravine now known as Licks Ravine (known as Big Hollow Creek in 1861) but these were drilled in 1864 or later.

Lick is first mentioned in The Globe of August 27, 1861 when he is drilling along the town line on the Allen farm. He had a 10 H. P. engine operating a "very simple drilling rig" and had driven 72 feet of 7 inch cast iron pipe and was having trouble with quick sand which shot (on one occasion) 37 feet up his drive pipe.

There is still evidence of this early drilling to be seen. The well at Gardners Mill which seems to be much older than Licks operations, May be the site of Tripps digging in 1857. There is at this place a hole 10 feet in diameter and 6 feet deep on the bank of the river. The present operator of the farm says that he has filled up and plowed over three ~~of xxxx~~ other wells sites in the vicinity. On the Allen farm at about the location of the Oil Springs (now not in evidence) is another large pit and at 30 yards distant an iron pipe protruding from the ground. Any other location of an old well site on the farm on the brow of the river bank (50 feet above the river) will have long since disappeared by cultivation. On the opposite side of the road on top of the hill (lot 21, R. R. Zone) there are many pits marking the location of old dug wells. These can all be recognized on the map of Bothwell Oil field of May 1866. Lick's first big producer that established the oil field was actually owned by the Thames Oil Company and

was subsequently known as the "old Company Well". It is marked on the 1866 Bothwell Oil Field map at least ¼ mile from the top of the bank of the river and probably 100 yards from the road (town line) whereas the well was described as being on the brow of the hill (bank) and on the town line. There is a pit now to be seen that answers this description and it is also marked on the map. Lick's two wells in the Lick Ravine shown in the photo can both be identified the one on the top of the bank by a well defined pit and the one in the ravine bottom is, on occasions, still pumped. There are also several pits along the river bottom and on the bank of the Thames in lots 19 to 21 RR. in Zone, which mark the site of wells dug in probably 1859-62 before boring with an auger and driving pipe through the surface had been introduced. Mr. H. N. Courtland writing in the London. Prototype and copied in The Globe April 26, 1863 says that Licks big well is in Zone a few rods from the river and on the town line. The description of the location given in two independent reports as on the brown of the hill could not be mistaken for the location of the well marked on the map of 1866. A surveyor or draughtsman arriving three years after the event might easily make this mistake.

The Editor of Kent Atlas says that the first 1000 barrels from Lick's well was sold at $1 per barrel and the proceeds divided among the shareholders seated on and around a large log in the town line the log acting as a table.

Licks big well made a fortune for many more than Lick. Hon. George Brown sold his 5,000 acres for at least $250,000 to a group from Glasgow, Scotland, incorporated under the name of the Bothwell Land and Petroleum Company and locally known as the "Scotch Co." or "Glasgow Co.". In the true British manner they sent out several officials. Mr. McEwan Manager, Mr. Pratt secretary-Treasurer, Mr. Walker land agent, Mr. Wilson superintendent offarms and Mr. Chambers Oil Field Superintendent. The Company began a heavy drilling program. They scorned the use of power operations most everything by man power.

The town and the oil field boomed from 1863 to 1866. Land values went to $300 per acre in the oil field and at "fabulous prices" at a distance of 18 miles east and west and 2 miles either side of the river. Oil was selling at $4.50 per barrel and for one period Bothwell had greater production than either Oil Springs or Petrolia. Bothwell boomed and new buildings both residential and industrial were springing up. The Kent Atlas says" The Green Mountain House was built on the river front in September 19 R. R. Zone and

busses ran at frequent intervals to the Railway station." "Either side of Main Street from the Railway grounds to Oak Street had been built up with business blocks some three stories high and of brick, including hotels banks, billiard halls, gaming houses, and numerous other institutions usually found in a town of six or seven thousand, the larger number of which were transients. A magnificent public hall called Gatling Hall after the owner (a brother of the inventor of the famous Gatling Gun) graced Geot Scott? Street West, fronting the railway, while just west of it stood an immense frame hotel built by John Lick, which had been opened a very short time when the crash came which left Bothwell a commercial ruin." In 1867 a most disatrous fire swept through these empty buildings and burned most of them. Licks hotel was not among those consumed and remained for years unoccupied.

At the end of 1866 the field had been developed to lot R. R. Zone township in the west and as far east as the Big B in the Thames lot con. of Aldborough. Wells had been drilled from one to two miles north and south of the river. The map of 1866 shows producing wells.

The Globe correspondent in 1861 lists the operators at Bothwell, who were mostly American Army offficers. Among those mentioned are General Hill house, Adjutant General, New York State. General McDonald of Madison Wisconsin, Capt. Lester and Capt. Wiggins. George Gatling a brother of the inventor of the Gatling Gun. Duncan and Clark of Toronto (Yorkville) was the only large Canadian operators. They also owned wells at Oil Springs. When the American Civil War broke out in 1861 the American officers left to joint their regiments. As a consequence of this and of the drop in the price of oil in 1862, the field suffered a serious slump. Two of the American operators, John M. Lick and a Mr. Jordon, remained. Together and separately they had completed three or four producing wells mentioned above when they finished a well about April 1, 1863 that flowed 200 barrels per day, in the Lick Ravine in lot 20, River Range, Zone township; the depth was 224 feet. The oil was struck at 46 feet in the rock. The well cost $2,000. This heralded a rush of oil men to Bothwell, and the field boomed. There were many famous wells in Bothwell that flowed up to 400 barrels per day. Among these the best known were Pepper, Lick, (two wells), Victoria, Empire, Chambers, Thayers, Wilcox, Colwell, and Dr. Pope's well.

The fate of the Bothwell field was sealed in the summer of 1866 when the great producing wells in Petrolia the first of which was the King well, came in. The ending of the American Civil War also contributed as it released many experienced workmen to the Pennsylvania fields when production increased and prices declined. The market both in Canada and the U. S. A. was flooded with oil and the price of oil in Canada fell to 50 cents per barrel in 1867. Another and equally pertinent reason for the shutting-down of the Bothwell field was the Fenian Raid. As Canada called up her volunteer regiments in 1866 to turn back the expended Fenians invasion, the Americans in Canada left for home, most of them without disposing of their wells and equipment. A map of Bothwell dated May, 1866 shows that there were 203 wells in the field and that 31 wells were being pumped. Most of the wells had been drilled through the oil pay into salt water. The result of this was that the field was flooded with salt water, and when 172 wells were shut down, 31 wells could not control this flood with the equipment then available to them within a year the field was completely flooded and abandoned, not to be re-opened until 1896.

The man who is given credit for discovering the most prolific portion of the Bothwell field is Frank J. Carman. Mr. Carman came to Canada from New York State and had had extensive experience in both producing and refining oil in Pennsylvania, Ohio and Wyoming. He came to Bothwell in 1896 and spent some time studying the elevation of the producing horizon. His study showed him that the oil wells occupied the highest portion of the field and that these wells had a westerly trend. Mr. Carman joined with J. H. Fairbank, of Petrolia, and beginning on the Goodyear farm they brought in the west end of the Bothwell field and extended their exploration and operations into the Thamesville field some nine miles to the west. The field reacjed ots ¼eal pf ¼rpdictopm om 1898 with 66,404 barrels. In 1949 there were 147 wells in operation and 17,940 barrels of oil were produced.

Whatever lack of entertainment there was at Oil Springs was probably caused by that dreadful, impossible, bottomless mud road from railway station Wyoming/to Oil Springs. On the contrary, Bothwell was on the main line of the Great Western and in a well drainedsandy country, luxuries were obtainable to those who couldafford them. So in entertainment Bothwell ~~xxx~~ fared much better than Oil Springs or Petrolia.

The Chatham Planet (June 15, 1865) tells of a very merry "Petroleum Hop" at Bothwell. It had not been the first as the above correspondent (who came from London) had learned of the good times and made a special visit. The following is a series of extracts, -

"At Griffiths Hotel (The Royal Hotel) the new dining room had been handsomely decorated by Mr. Allen (on whose farm near Cashmere lot 30 ~~con.~~ S.L.R. Mosa township, on oil spring was first discovered). At the head of the room was a mottor "Welcome to Bothwell", done in white ~~edge~~ cedar brought from Niagara Falls. On the either side was the Union Jack and the Stars and Stripes. Along the sides of the room were several oil paintings and water colours also some ~~xxxxx~~ models of engines and pumps. Alternating with these were flags and evergreens. But when Mrs. Griffith with her assistants, Mrs. Allen and Mrs. Boon completed the picture with substantial delicasies, flowers, and other adornments, the whole combined to make a general display which I can honestly say I never saw surpassed in Hamilton or Toronto. The Ball Room was distant about 200 yards (from the dining room in the hotel) and this space was laid down with smooth planking on each side of which was planted evergreen trees" (The ball room was in Mr. Lukes new machine shop).

"Capt. Young and Mr. Jeffrey did wonders in producing such a grand effect on the Ball Room in such a short time at their command. At the head of the room above "God Save the Queen" and below "Liberty and Union" At the centre a crown with letters V. R.; and an eagle with U, S. Also a Beaver and a Maple Leaf. Over the entrance door were the words "First Petroleum Hop"; all being done most appropriately in cedar sprigs. The joists were covered in red, white and blue cotton. The whole interior of the roof and sides were set off with evergreen and flags which gave sort of cool appearance to the room. The music was supplied by Smart's London Quadrill Band, and it is little praise to say that they gave complete satisfaction. When the company had assembled at ~~1p~~ 10 o'clock, the sight was very pleasing. The plain costumes of the general company was well set off by the blue uniforms of the

United States Officers, the bright scarlet of the Canadian Volunteers and the gayer dresses of the ladies who numbered about 40 and came from far and near. Col. Cross and Mr. Jordon most gallantly undertook to see that their comfort was attended to, and it was so."

"It was well into morning when supper was announced and I will merely say that Mrs. Griffith's spread was the praise of all and was done justice to. Dancing was afterward resumed and was kept up until 6 A. M. and broad daylight."

The correspondent pronounced it one of the best nights that he had ever had in his life and made a firm resolve never to miss one of them.

Petrolia

The special correspondent of the Toronto Globe (August, 1861) is authority for the statement that there was a natural spring of oil at Petrolia and that it was on the Adams property, lot 13, con. XI. As there is no other mention of this, one might be sceptical but for the fact that among the other properties purchased by Tripp in 1853 was lot 13, in concessions X and XI. He paid £206 for the two lots and sold them to one of his directors, Hiram Cook, ~~xxxxxx~~ in March, 1856, for £1,500. There is no record of any exploratory workhaving been done by Tripp, but the Globe correspondent states that Adams (the owner in 1860) "in digging his well (at this seepage) found that someone had dug sometime before him as their digging could be traced by the filled-in earth. At 30 feet he found a deer horn in a good state of preservation and at 35 feeta rib." Rock had been reached at 50 feet, and some hundreds of barrels of oil had been pumped from the well. It is scarcely necessary to look farther than Tripp as the early well digger.. How else could he reap a profit of £1,294? He must have found a reasonably good well. Digging and drilling expanded from this oil spring. In August, 1861 there were 16 producing wells, 12 dug in the surface clay and 4 in the rock. According to Sir Sanford Fleming it was in January, 1862, that the first flowing wellwas struck. Gas, oil and water blew 15 feet into the air and caught fire. The well was on the Bligh farm and had a depth of 563 feet.

The village of Petrolia in 1866 was a cluster of log and frame buildings at the intersection of the road between concessions X and XI with the Wyoming plank road (present Queens Highway No. 21). It had a population of 500. After the completion of the "King territory" in 1867, and the completion of the branch railwaylin from Wyoming in the same year, the village moved to the railway station, the present site of Petrolia. It was inevitable that the railway should come to Petrolia but the history of the Oil Springs fields collapsed in 12 months was most serious drawback. The Great West Railway Company would not construct the line but a local company sparked by J. H. Fairbank who was secretary. Tripp of the Company procured the charter and began construction. This show of courage prompted the Great West Railway to buy out the local company and own the railway

By the end of 1866, drilling had expanded the field until it was one mile wide and three miles long (along Bear Creek). The high price of oil at this time accelerated exploratory drilling. On November 23, 1866, Capt. B. King, of St. Catharines, manager of the North Eastern Oil Company brought in a well the famouls "King Well" on lot 11, con. XI, that flowed over the derrick an average of 265 barrels per day for 41 days, and only partially open. There wasabout 2,000 barrels wasted about August 1, 1867, two fires broke out in the Petrolia field. The first fire was at Mr. J. D. Nobles well on N. E. corner of the west quarter of lot 12, con. XI. There was a large initial flow of gas which caught fire immediately. Six men in the drilling rig were more or less burned and Rod McKenzie, who was lame, fell four times getting away and was severely burned. There was no casing in the well and the men wereat a loss to know how to put the fire out. The event was described as the Petrolia Topic August 3, 1867. Wooden tanks holding 40,000 barrels were only 40 rods distant placing the whole field in great danger. Mr. J. H. Fairbank headed a party which "sipped" toward the well but were driven off by the heat. A second party under Councillor Taylor continued the "sap" (within 20 feet)of the well. They pushed forward a pipe with an elbow fixed on the end. This elbow they placed over the strem of oil, thereby diverting most of the flow away from the fire. The party then pushed a wagon full of manure to the well head and dumped it on the fire. A second load extenguished the fire completely. The unpainted part of the

story that is current is that a "board of strategy" met in the bar of one of the local hotels. Following a lengthy discussion and a cargo of liquid courage, the "board" agreed on the manure treatment. The wagon was towed to the well and the "board" rushed in and overturned them on the buring well head.

The second fire occured about three days after the first fire was extenguished. A night pumper at Lanes well carelessly brought his lantern too near an open ank and the gas ignited. It happened on Saturday night August 2nd, 1867. In a few hours a "tank farm" of 20 acres with 40,000 barrels of oil stored in wooden tanks, was in flames. As well as this 12 operating wells, (one flowing and burning) engines, boilers, pumps, drilling rigs, and a general assortment of oil field equipment was enveloped.

A dispatch to the London Free Press from an eye witness tells of the conflagraxtion. He had climbed to the top of a derrick and seated there related events in the form of a picture with a background of a pitch black night. He tells of the scene lighted by a stripendous eruption of flame, mounting hundreds of feet into the air, of orange shaded through deep red and purple into a pall of oily smoke backer than the night. He tells of men working fractically fixing a pipe to a full tank of oil dangerously close to the border of this inferno, in order to drain the oil to a more remote tank. They only succeeded in spreading the fire to a new area. The great heat melted steel tanks. These steel and wooden tanks as they caught fire, burst and sent oil along a ditch into a tributary of Bear Creek. The crest of this rushing wave of burning oil gave the creek the appearance of a firy dragon winding along the valley. His description of the bursting of many steam boilers housed in drilling rigs and pump houses is filled with real action and drama. The explosions sent fragments of smoke stacks, derricks and flaming debris in all directions. One red hot piece of boiler plate passed too near the witness for his safety and he forthwith returned from this great spectacle to a place of safety. The fire equipment of the surrounding towns was totally inadequate to deal with so great a hole . They employed their efforts to restricting the area and let the fire burn out. The loss in oil and equipment was well over $100,000.

In all 15 acres of the heard of the field was destroyed. There was scarcely a tank left in the field and an order for 1,000 barrels of oil could not be filled. A shortage of oil developed and the price went up. This gave new courage to the operators and they set to work with new vigour.

They first sought a means of safer storage. Oil had been stored in small underground pits and tanks from the late 1850's, when wooden tanks of 50 barrels capacity were the largest available. W. E. Sanborne took his royalties of oil and stored it in an earth tank. Mr. Fairbank dug and puddled an earth tank of 500 barrels capacity in 1863. The operators turned to underground storage. The dense clay, from 50 to 90 feet deep, was impervious to oil and made perfect containers Tanks 30 feet in diameter and 60 feet deep were dug in the clay and lined with boards laid flat. In all, underground storage for 500,000 barrels of oil was provided. This was storage for six months' production in the 1890's. The"King Well" was the first of many large producing wells to the west of Bear Creek. Previous wells had been drilled in an easterly direction to present Highway 21. This westerly expansion continued through the village of Marthaville another two miles, and brought the production of the Petrolia field to one million barrels a year in the nineties. The production could have been very much more but for the restricted marked for the "evil-smelling Canadian kerosene."

Perhaps the most famous of many great flowing wells in Marthaville, was the Deluge on the Webster property in lot 9, concession XI. It has been completed as a small pumper. On April 5, 1872, the well had been deepened 15 feet, when it "drilled itself in" with a loud report, which could be heard for a mile, and flowed oil over the derrick. The well settled to a daily production of 400 barrels. The value of lands immediately sky-rocketed and sold for fabulous prices. Farms were subdivided into acre lots and these lots again into drilling sites, a dozen to an acre, and in some cases many more. Another large and famous well in the district was the Empire. Inthis area there were two oil horizons: the shall horizon at 250 feet in the Middle Lime (Widder beds), and the deep horizon,at 75 to 100 feet in the Big Lime (Dundee limestone) at an average depth of 460 feet below the surface. Another famous part of the Petrolia field was called Pithole, after an oil field in Pennsylvania.

In 1872 the price of oil dropped below $1 per barrel and continued below or slightly above the dollar mark for twenty-five years. This forced the operators to study economy.

The day of pumping wells with a spring pole passed when wells were deepened to 400 feet and also when the price dropped below $4 per barrel. At about the year 1862, steam power was first used for pumping and boilers were then fired with wood. J. H. Fairbank claims the credit for introducing the "Jerker System" of pumping many wells from one central power. When the Petrolia field expanded to the west, there were larger properties with 200 or more producing wells. These were drilled in straight lines, and pumps were connected to a central plant with ash poles strapped together. An authority in 1872 said that it was unprofitable to operate a single well producing 5 barrels per day and supply an engine, pump and necessary labour unless oil was worth over $1 per barrel.

Having reduced the cost of pumping, transportation was the next item to investigate. In the early days of these oil fields all transportation was by horsedrawn vehicle. In 1862 there were 400 tems of horses drawing oil from Oil Springs to Wyoming Station, a distance of 13 miles. There were easily double that number in the Petrolia field in the 1870's. In 1874 the Petrolia field has been extended westerly to the Sarnia township line, a distance of the of 8 miles, with the width of field averaving 2½ miles from north to south; the production was three times greater than that of Oil Springs in 1862. The vehicular traffic over the roads throughout the field reached its peak in 1880 and had rendered these roads impassable in wet weather. The consequent delays forced shut-downs, and full tankage made it necessary for the operators to find other means of transportation. In 1875, Vanalstyne and Smith led by building small-sized pipe lines from distant wells to the main gravelled road. The Noble Bros. and McDonalds, who followed shortly after, built pipe lines that were common carriers. The introduction of gathering lines put hundreds of teamsters out of employment. That brought threats of violence. Most of the underground tanks were owned by the Petrolia Crude Oil Tanking Company, which had been formed by the oil producers about 1867 or 1868, and these gathering lines gradually passed into their hands. They later set up receiving staions in various part of the field located coveniently to the wells.

Oil refined from Lambton crude oil carried a most offensive odor of sulphureted hydrogen. This and other sulphur compounds in the kerosene left a thick encrustation on a lamp wick, which caused a lamp to smoke

and the housewife to demand that she have American kerosene (Pennsylvania crude oils contain no sulphur). Although by 1890 great advances had been made in reducing this sulphur, Canadian kerosene still sold at 5 cents per gallon less than American oil. Canadian refiners, who controlled the retail market, demanded and the Government imposed a heavy duty on all American refined oils. Canadian producers also demanded protection and the Government imposed a duty on imported American crude oil. It was not until 1904, when the Canadian fields failed to supply the demand for petroleum and its products, that the duty on imported crude oil was removed and the Canadian producer was given a bounty of 1½ cents per Imperial gallon on all oil produced and sold. The producers did not reap any benefit from these duties on American oil, and they accused the refiners of using the duty to bolster the price of their refined oils and of holding down the price of Canadian crude. Producers claimed that they must have at least $1 per barrel to make a profit. When kerosene retailed at 20 to 35 cents per gallon and the producer received 2 cents per gallon, the producers were "up in arms." An association of producers was formed on two occasions, 1873-74 and 1876, but on each occasion the association was short lived, although it forced up the price of crude until it once reached $2 per barrel. Most of the producers were in debt to the banks, and the banks did not like an association that controlled the operation of the properties. Another feature was that in 1875 was a period of a most disastrous world depression, and a sick industry at such a time is not likely to be favoured by a banker.

The price of crude oil never dropped below $1 per barrel after the year 1890; and confidence was restored and exploratory work revived. The Bothwell field was re-opened in 1895. The Leamington oil field was discovered about 1902, followed by the Tilbury oil field in 1905. These were known as deep fields. The only shallow field discovered was the Mosa field in 1916. There were some other shallow oil pools discovered, but their production was inconsequential and did not have any effect on the annual production. Recent discoveries are the Warwick shall field in 1937 and the Becher deep field in 1946, both in Lambton County.

The industry is in a healthier state at present than it has been for some time as a result of a rise in the price of oil. The price in 1939 was $2 and in 1949 $3.53. More exploratory work is being carried on than at any time in the history of Canadian oil development.

763,933 barrels,of 35 gallons, of crude oil consumed during the year in the manufacture of illuminating oils. ~~That~~ Besides and above the 7, 905,666 imperial gallons of refined petroleum and naphtha inspected during the year, there were also 2,836, 729 imperial gallons produced in the refineries and not yet inspected at the close of the year. As this would represent a stock carried over from year to year in the counting of 5,000, 000 gallons of refined oil which is much more than the real stock carried, it shows that the calculations based on the number of packages of refined oil inspected give an incorrect and too low a result. The figures in Table A are consequently believed to be (1/3) one third too low.. It is to be regretted that the Inland Revenue Department does not keep a record of the number of packages." After comparing the returns from the refiners with the returns from the Tanking Companies he says. "Compared with the direct returns from the refiners, the above statement shows that the refiners must have received directly from the wells about 180, 000 barrels of crude petroleum".

The above goes to show that any calculated estimate is an underestimate. The unrecorded waste, leakage in transit, evaporation, private sales to industries (1) and exported refined petruleum not inspected and therefore not uncluded in the Excise returns, represent a very considerable quantity.

---

(1) E. D. Ingall in Geo. Survey of Can. Vol. xiv 1901 page 91, says that crude oil sold for gas making, fuel, and lubricating, according to returns received from shippers amounted to 113,715 barrels.

In the production figures in table on page , to the total crude oil as represented by its equivelant in refined illuminating oil as recorded by the Department of Excise, has been added a quantity in line with the known differences stated in this text.

Chapter VII: Production

The Harkness Files
Volume XIV
Unpublished Manuscripts

- THIS PAGE CREATED BY OGSR LIBRARY -

PRODUCTION

To establish the actual production of oil in Ontario from the beginning of the industry is a most difficult if not impossible task. Sir Wm. Logan, Sterry Hunt, Chas. Robb, and Sanford Fleming give figures of production from Oil Springs and probably Petrolia prior to January 1863, none of which compare very favourably. None of them mentioned Bothwell and Sir William Logan did not include the waste from "the great flowing wells of Oil Springs in 1862. Between July 1863 and May 1868, there is no mention of the quantity of oil produced in Ontario.

In the year 1868 the Petroleum Inspection Act was passed imposing a tax on crude petroleum refined in Ontario. The record of the tax collected ~~on crude oil refined~~ plus the quantity of crude exported provided the production statistics, ~~and~~ From May 1868 until June 1877, After June 1877, when the tax on crude was discontinued, ~~is the sole source of~~ information on production can only be gained by converting the quantity of oil refined into terms of crude and adding thereto exports of b

From 1877 until 1882, the Inspection returns do not separate imported illuminating oils from those of Canadian origin and again an interpolation must be made. To complicate matters further exports of crude and refined were not separated. Nova Scotia and New Brunswick exported large quantities of "crude and refined", some of which came from the U.S.A., and possibly some from Ontario refineries. There was no refinery, in these provinces using petroleum, until the year . Estimates have been made of the crude oil produced by converting illuminating oil refined into terms of crude oil. This, of course, gives an underestimate equal to the crude oil exported and the crude oil used as such.

Any possibility of arriving at actual annual production figures vanished when the underground tankage was built in Petrolia following the great fire of August 1866. Between the years 1867 and 1870, joint Stock Companies built in Petrolia underground tankage with a capacity up to 500,000 barrels. The many refineries in Petrolia built for their own purposes, underground tankage

with an estimated minimum capacity of 100,000 barrels. When prices were very low and producers shut down, the refiners bought what oil was offered and drew their required balance from storage. With rising prices and increased production, refiners, producers and speculators ran oil into storage until the trade became top heavy, storage was filled, and refiners found it was more profitable to again draw from storage until prices came back to normal. These peaks and slumps in production are known only for an occasional year; the remainder must be estimated on a basis of a few references to production and quantities in storage, found in the newspapers.

PRODUCTION Oil Springs

The opening general remarks on production apply mainly to Oil Springs. Oil was a new commodity and few thought that it was of any permanency. Consequently records in the 50's and early 60's, are few and of doubtful value.

- Hunt and Robb (1), who visited Oil Springs about December 1860, have each given us an estimate of the production of this field prior to the date of their visit. Robb says "200,000 gallons, (5,000 barrels)" and Hunt says "300,000 to 400,000 gallons (7,500 to 10,000 barrels)". Sir William Logan (2) says "that the production prior to July 1st., 1861, was 5,529 barrels".

(1) Sterry Hunt, op. cit., page 248. Chas. Robb, op. cit. page 314.

(2) Sir William Logan, op. cit.

Logan's figure was based on shipments reported by the station master of the Great Western Railway at Wyoming. Large shipments would begin only after Williams moved his refinery from Oil Springs to Hamilton in May 1860, and it is probably that the small production and shipments prior to May 1860 have been overlooked. Williams' production and that of others, from 1857 until May 1860, is probably ignored, and Hunt's maximum estimate of 10,000 barrels would probably be much nearer the truth.

At this point the first puzzle confronts us. Logan states that the shipments of oil from Wyoming, from June 1861 to June 1862, was 31,510 barrels, whereas the exports of petroleum for the same period, as given by the Department of Excise, was 41,527 barrels. The Globe estimates exports for the Calendar year 1862 at 35,000 barrels, and remarks on the universal use of kerosene in Ontario in one year's time. The "Globe", September 7th., 1861, gives the daily production of 51 wells out of 400 wells in Oil Springs at 1,050 barrels and the oil in storage as 10,000 barrels. It is very clear that the field was only operated to capacity in the dry summer months and the frozen winter months, on account of

the impossibility of hauling heavy loads of oil over the dreadful roads leading to the Railway at Wyoming in the spring and fall. There is no other alternative than declaring Logan's estimate too low. The only possible means of reconciling Logan's figures with those of the Department of Excise, and the reports of Ontario consumption, is that Logan did not include the production of the Bothwell field, but this field could not supply 10,000 barrels of oil plus the Canadian consumption, as there was only one insignificant well producing prior to Lick's discovery in March 1863. Fleming's (1) figures are a considerable help.

---

(1) Sanford Fleming, op. cit., page 249.

He says (probably January, 1863) "I was informed that although only about 150,000 barrels of Petroleum have been shipped, a total quantity of 300,000 barrels must have been discharge up to this date from the wells; about half the total yield having been allowed to run to waste". Logan's total for this same period is 94,607, and this figure is too low to meet with probabilities. The writer has, therefore, undertaken a study of the probable production based on the best reports available.

The "Globe" of January 24th., 1867, and again in a quotation from the Montreal "Herald" in March 30th., 1867, says that the consumption of refined oil in 1865 is estimated to be 75,000 barrels and in 1866 is conservatively at 100000 barrels. As this is kerosene, the crude equivalent must be calculated at the ratio of refined to crude that prevailed in that year. The problem resolves itself into an equation. Exports plus home consumption minus imports equals the production of Ontario wells.

CRUDE PRODUCTION - Oil Springs

Year	Exports	Home consumption Refined	Imported Refined	Total Ontario Refined	Ratio Crude to Refined	Crude Equivalent
1862	41,527	Est. 20,000	1,125	60,402	50	120,804 plus 150,000 waste
1863	10,597	Est. 40,000	2,500	48,097	60	80,162 plus 10,000 bbls. in storage
1864	6,328	Est. 60,000	870	65,450	65	100,700
1865	1,127	Est. 75,000	620	75,507	70	107,870
1866	155	100,000	1,530	98,635	65	151,175

This approximates Fleming's estimate for 1862 and allows for a reasonable home consumption. For the following years the home consumption is an interpolation between the known year 1866 and the statement of the "Globe", that, in the year 1862, kerosene had come into almost universal use. The division into the three fields, oil Springs, Petrolia, and Bothwell, has been made in a much less accurate estimate. It is simply a comparison of the number of producing wells, and the daily production and a hope that all editors and

The story of the reopening of the Oil Springs Field in 1882 is told by Dr. Bell, in a paper delivered before the Royal Society of Canada, Vol. V. 1887. On page 111 he gives the production of oil from the field from 1883 to 1886 inclusive.

From 1886 until 1898, ~~when~~ the year that accurate statistics were first kept by both the Department of Mines in Ontario and Canada, the production figures are estimates based on the reports in the press and various other sources.

Bothwell Production

The production of the Bothwell field, prior to 1896, is a complete mystery. As an oil field, it was ignored by geologists, travellers, and writers; the only reference to it is in the "Daily Press", a synopsis of which has already been given in the chapter on Bothwell.

There could have been little production in Bothwell prior to Lick's well, completed about March 1st., 1863. This well flowed 1,500 barrels before being put on the pump, when it made from 150 to 200 barrels per day.

A dispatch of February 27th., 1864, from the Chatham "Planet" says that there are a dozen or more producing wells in the Bothwell field; settled production being between 10 and 25 barrels.

A dispatch of June 1865 says that Lick's well had produced 7,000 barrels during the previous 12 months and ~~not~~ then was producing 400 barrels per week; 50 wells were being drilled. The settled production seemed to be more than 1864. In January, 1866, the wells drilled and in progress total 200.

A March report says that the production had trebled and averaged 30 to 40 barrels per day with a few wells of 100 barrels and over. This March report says that there ~~are~~ were 300 wells ~~not~~ then going down and that in one week 25 engines arrived at Bothwell station. These can be seen in the photo page 25th — — The Bothwell Oil Exchange.

A report of April 25th says that the Old Company wells produced 7,000 barrels in the eighteen months just past. A later report says that the oil shipped in January, 1866, ~~was~~ was double that of December 1865, ~~and~~ that February shipments ~~will~~ would double January, and March ~~will~~ would exceed February. On April 30th., 1866, there ~~were~~ was 10,000 barrels of oil on hand and further dispatches to the end of 1866 tell of new wells from 25 barrels to 100 barrels per day.

January 2nd., 1867, dispatch from London "Advertiser", gives us the first indication of the Bothwell disaster. It says

that Bothwell ~~is~~ was very dead ~~with~~ and had only a very few wells pumping, ~~and~~ that the price dropped in one year from $11.50 to $1.50. January 24th., 1867, dispatch says that there ~~is~~ was a stock of 6,500 barrels on hand; ~~and~~ on March 30th., 1867, the Montreal "Herald" says that Bothwell oil on hand totaled 7,000 barrels; production was 250 barrels per day.

It is evident that the number of wells reported is an over estimate. New wells are reported in January 1866, as 200, and in March, 300.The map of December 1865 and May 1866 contradict this. There were probably 200 wells operating in 1866 producing probably 10 barrels per day; one third the stated rate of settled production. In 1937, 100 of these same wells produced just less than one barrel per day. It is evident that this field in 1866 could produce 10 times the 1937 production, or 252,750, provided it could be marketed.

In the table of production on page will be found an estimate of the production of the Bothwell Oil field between the years 1862 and 1867. It has been based on the information mentioned in the preceding pages, and this has been substantially discounted for periods of "shut downs" and general over estimates.

The statement that the Bothwell Oil Field shut down in 1867 is not entirely true. Every few years mention is seen in the press of some operation at Bothwell. However, as no mention is made of oil having been shipped, these operations have not been credited with any production.

PETROLIA

In order to determine the production of the Petrolia field when no separate records were kept, it has been necessary to deduct from the total annual production, that of other fields and ~~design~~ credit the remainder to Petrolia. As all other fields shut down in 1867 in the face of the overwhelming production from the Petrolia field, and no new field produced any oil of any quantity, until the Oil Springs Field reopened in the year 1881, the total Canadian production of crdue oil, between the years 1866 and 1881, must have come from the Petrolia Field.

This annual production table from the year 1865 to 1888, has been built up from the fragments of information in the Petrolia "Advertiser", Petrolia "Topic", London "Free Press", Canada "Year Book", Canadian "News" (London), the "Globe" Toronto, and other sources of information. Reference to this information will be found under General notes on Production.

GENERAL

~~It is possible to arrive at~~ the production of oil in Ontario from say 1857 ~~to February 1868~~ has already been referred to ~~less Bothwell, but there are no records of any kind from 1863 to 1868.~~ The quantity of crude oil refined by Ontario refiners from April 1868 to June 1877, has been obtained from the records of the Department of Excise; to these must be added, crude oil used as such and crude oil exported; but crude exported is reported with refined in these years.

From 1877 until 1882 domestic and imported kerosene inspected by packages and reported in one total, which report changed from a fiscal to a calendar year in 1880. During the same years crude and refined oil exported was reported in one total by calendar years. After 1882 kerosene of Canadian origin was inspected and reported separately. This has been converted into terms of crude by using a fairly accurate factor.. It does not include kerosene exported where inspection was not requested, and crude sold to others than refiners. The Petrolia "Topic", March 1st., 1892, published figures purported to be the produce of petroleum in Ontario from 1882 until 1891. These figures exceed the calculated figures by from 10,000 barrels to 140,000 barrels. They are presumed to be the sales of oil by Tanking Companies and through the Petrolia Oil Exchange where practically all oil was sold. Even this would not include direct sales by owners of oil wells adjacent to a refinery when they could sell without paying toll to the Tanking Companies and also oil produced by refiners from wells on their own property. It is evident that the figures obtained by calculating crude from returns of inspected illuminating oil does fall very short of accuracy and the returns for the years 1870, 1880, 1887, 1891 and 1895 show this quite clearly. The 1870 and 1880 returns are published with the statistics accompanying the decennial census of Canada. The 1870 production of crude is given for the fiscal year, but converting to a Calendar year it is 60,000 barrels less than the census report. In 1880 the difference is 90,000 barrels; in 1887 - 180,000 barrels; in 1891 - 173,967 barrels; in 1895 - 169,000 barrels, and 1901 - 113,715 barrels. These are fairly consistant and are a guide in

estimating the average yearly production.

The best that can be hoped for at this date is average yearly production based on kerosene refined, because of the several difficulties previously mentioned and because of the even greater unknown factor resulting from the enormous storage capacity at Petrolia. These tanks along with the storage at refineries, held a year's supply for Ontario and allowed and equal amount for export. The production peaks are, therefore, not reflected in the refinery figures; for instance a Petrolia producer, who should speak authoratively, says that in 1872 or 1873 over one million barrels of oil were produced whereas the best estimate the writer can give is 610,280 barrels. There was a considerable recession in 1873 when the Bradford Field of Pennsylvania came in and flooded the market.

The loss by evaporation during deodorization in bonded warehouses average, for the years 1871 to 1877 the only years recorded, 295,500 gallons or approximately 8,000 barrels in terms of crude. Waste, leakage, and a considerable quantity used by producers and refiners would no doubt more than double this. Occasionally there is mention of the crude oil and tar used as fuel in the refineries and when the price of oil was at low points it was cheaper to use crude oil under steam boilers than to purchase wood for fuel. The "Globe", October 26th., 1866, mentions a patent steam generator which uses petroleum as fuel. A later dispatch mentions a regular train running from London to Sarnia that used crude petroleum as fuel. These were experiments, but these and other references through later years show that experiments were constantly being carried out to find a means of using the surplus crude oil that was held in storage. During all the years that crude oil was less than one dollar per barrel, a very considerable quantity would have been sold for uses other than to be refined into illuminating oil, and therefore not recorded in any way.

The Department of Mines at Ottawa began to record the statistics of the petroleum industry in 1887. In the report of

that year (pages 54 and 55) the difficulty of obtaining accurate statistics is clearly shown. The statistician says that "there were 763,933 barrels, of 35 gallons, of crude oil consumed during the year in the manufacture of illuminating oils. Besides, and above, the 7,905,666 Imperial gallons of refined petroleum and naphtha inspected during the year, there were also 2,836,729 Imperial gallons produced in the refineries and not yet inspected at the close of the year. As this would represent a stock carried over from year to year in the counting of 5,000,000 gallons of refined oil which is much more than the real stock carried, it shows that the calculations based on the number of packages of refined oil inspected give an incorrect and too low a result. The figures in Table "A" are consequently believed to be one third too low. It is to be regretted that the Inland Revenue Department does not keep a record of the number of packages". After comparing the returns from the refiners with the returns from the Tanking Companies he says "Compared with the direct returns from the refiners, the above statement shows that the refiners must have received directly from the wells about 180,000 barrels of crude petroleum".

The above goes to show that any calculated estimate is an underestimate. The unrecorded waste, leakage in transit, evaporation, private sales to industries (1) and exported refined

---

(1) E. D. Ingall in Geo. Survey of Can. Vol. XIV 1901, page 91, says "that crude oil sold for gas making, fuel and lubricating, according to returns received from shippers amounted to 113,715 barrels".

---

petroleum not inspected and, therefore, not included in the Excise returns, represent a very considerable quantity.

In the production figures in table on page , to the total crude oil as represented by its equivalent in refined illuminating oil as recorded by the Department of Excise, has been added a quantity in line with the known differences stated in this text.