CANADA
DEPARTMENT OF MINES AND RESOURCES

MINES AND GEOLOGY BRANCH
BUREAU OF GEOLOGY AND TOPOGRAPHY

GEOLOGICAL SURVEY

MEMOIR 237

PALÆOZOIC GEOLOGY OF THE LONDON AREA, ONTARIO

BY

J. F. Caley

OTTAWA
EDMOND CLOUTIER
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1943

Price, 50 cents

No. 2470

CANADA
DEPARTMENT OF MINES AND RESOURCES

MINES AND GEOLOGY BRANCH
BUREAU OF GEOLOGY AND TOPOGRAPHY

GEOLOGICAL SURVEY

MEMOIR 237

PALÆOZOIC GEOLOGY OF THE LONDON AREA, ONTARIO

BY

J. F. Caley

OTTAWA
EDMOND CLOUTIER
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1943

Price, 50 cents No. 2470

CONTENTS

CHAPTER I

CHAPTER II

CHAPTER III

CHAPTER IV

CHAPTER V

72906—1½

CHAPTER V—*Concluded*

CHAPTER VI

Illustrations

Palæozoic Geology of the London Area, Ontario

CHAPTER I

INTRODUCTION

GENERAL STATEMENT

The London area in southwestern Ontario is bounded by longitudes 81°00′ and 82°00′, and by latitude 44°00′ and the shore of Lake Erie. It comprises the counties of Middlesex and Huron, the greater part of Perth and Elgin, and a small part of Kent and Lambton. The total area is approximately 4,400 square miles.

Field work in this area was carried out by the writer during 1939 for the purpose of revising the existing geological map and reporting, so far as possible, on all phases of the bedrock geology. More than 20 years have elapsed since publication of the latest geological map[1] of this area, and during that time considerable additional information has been made available, particularly through drilling for petroleum and natural gas. Over a large part of the area the bedrock is concealed beneath a mantle of glacial drift and may, therefore, be studied only by means of drilling samples. Information thus obtained furnishes additional structural and stratigraphic data and permits of a more accurate placing of certain geological contacts than was formerly possible. The value of such an investigation and revision becomes evident when one considers the fact that it is with these Palæozoic rocks that the oil, gas, gypsum, salt, road metal, building stone, structural shales, etc., in southern Ontario are associated.

HISTORICAL SKETCH

Prior to the establishment of the Geological Survey, Canada, considerable geological work had been done by the New York Survey. The succession worked out by the New York geologists was, in general, traced across the border into Canada, and many of the stratigraphic names used in New York have subsequently become a part of the literature of the Palæozoic geology of Ontario.

One of the earliest geological accounts dealing with southern Ontario was made by Alexander Murray.[2] In 1843 Murray examined the country between Georgian Bay and Lake Erie: he divided the Palæozoic rocks there into ten divisions and correlated them with existing divisions in New York State.

The Reports of Progress of the Geological Survey for the years between 1843 and 1863 contain accounts of the rocks present in the Ontario Peninsula. In 1863 Logan's "Geology of Canada" was published, giving a summary of the work of the Geological Survey from its beginning (1842).

[1]Geol. Surv., Canada, Dept. of Mines, Map 1715 (1918).

[2]Murray, A.: Geol. Surv., Canada, Rept. of Prog. 1843, pp. 51-91.

Following publication of Logan's 1863 report and continuing throughout the remainder of the last century, additional geological work was conducted in the Ontario Peninsula, results of which may be found in the Reports of Progress and Annual Reports of the Survey for that period. During that time, however, no basic changes were made in Logan's interpretation of the stratigraphy.

More recent work in the area has dealt with the rocks largely according to the system to which they belong, the Silurian and Devonian representatives having been investigated more or less independently.

Silurian rocks underlie the entire area, but only in the extreme northeast part do they constitute the uppermost bedrock and nowhere do they outcrop. In 1912 the Geological Survey commenced a complete revision of the Silurian rocks of the Ontario Peninsula under the direction of M. Y. Williams: this work culminated in publication of Memoir 111, in 1919.[1]

The Devonian rocks of the present area were investigated by Alexander Murray[2] in 1848, and the subdivisions adopted from the New York State classification. For many years Murray's nomenclature was followed by subsequent workers who, however, recognized that the Devonian is in reality much more complex.

Within the present area, Devonian rocks are exposed at only a few localities and, moreover, only in the general vicinity of Thedford are there sections of any appreciable thickness.

In 1888 Calvin[3] reported on the Hamilton rocks exposed near Thedford, pointing to a threefold division each part of which had a characteristic fauna.

In 1902, Shimer and Grabau[4] described in some detail what they termed the Hamilton group of Thedford, and attempted a correlation with the Hamilton beds of Eighteen-mile creek, New York.

These same Devonian rocks were again reported on by Williams in Guide Book No. 4, published by the Geological Survey in 1913.

In 1915 Stauffer[5] published an account of the Devonian rocks of southwestern Ontario: this work contains the latest and most detailed classification of Devonian rocks occurring within the London area.

In addition to the foregoing, important contributions to our knowledge of the Devonian geology in this part of Ontario have been made by Nicholson, Rominger, Whiteaves, Parks, and others.

SELECTED BIBLIOGRAPHY

Bassett, C. F.: Stratigraphy and Palæontology of the Dundee Limestone of Southeastern Michigan; Bull. Geol. Soc. Am., vol. 46, 1935, pp. 425-462.

Caley, J. F.: Palæozoic Geology of the Brantford Area, Ontario; Geol. Surv., Canada, Mem. 226, 1941.

Calvin, S.: Observations on the Vertical Range of Certain Species of Fossils of the Hamilton Period in Western Ontario; Am. Geol., vol. 1, pp. 81-86 (1888).

Carman, J. F.: Sylvania Sandstone of Northwestern Ohio; Bull. Geol. Soc. Am., vol. 47, 1936, pp. 253-266.

Chapman, E. J.: Minerals and Geology of Canada, 1864.

——— An Outline of the Geology of Ontario; Can. Jour., vol. 14, N.S., pp. 580-589 (1875).

[1]Williams, M. Y.: Geol. Surv., Canada, Mem. 111, 1919.
[2]Murray, A.: Geol. Surv., Canada, Rept. of Prog. 1848-49.
[3]Calvin, S.: American Geologist, vol. 1, pp. 81-86 (1888).
[4]Shimer, H. W., and Grabau, A. W.: Geol. Soc. Am., vol. 13, pp. 149-186 (1902).
[5]Stauffer, C. R.: Geol. Surv., Canada, Mem. 34, 1915.

Clapp, F. G.: Petroleum and Natural Gas Resources of Canada; Dept. of Mines, Mines Branch, vol. II, 1915.

Clarke, J. M.: Early Devonic History of New York and Eastern North America; N.Y. State Mus., Mem. 9, 1908.

Cole, L. H.: The Salt Deposits of Canada; Mines Branch, Dept. of Mines, No. 325, 1915.

——— The Salt Industry of Canada; Mines Branch, Dept. of Mines, No. 716, 1930.

Daly, R. A.: The Calcareous Concretions of Kettle Point, Lambton County, Ont.; Jour. of Geol., vol. 8 (1900), pp. 135-150.

Goldring, Winifred: Handbook of Palæontology, Part 2, The Formations; N.Y. State Mus., Handbook No. 10, 1931.

Goudge, M. F.: Limestones of Canada, Part IV, Ontario; Bur. Mines, Dept. of Mines and Resources, No. 781, 1938.

Grabau, A. W., and Sherzer, W. H.: The Monroe Formation; Michigan Geol. and Biol. Surv., Pub. 2, 1909.

Grabau, A. W., and Shimer, H. W.: Hamilton Group of Thedford, Ont.; Bull. Geol. Soc. Am., vol. 13, 1902, pp. 149-186.

Harkness, R. B.: Natural Gas Fields of Ontario; Geol. of Natural Gas, A.A.P.G., 1935, pp. 59-87.

Heinrich, O. J.: The Manhattan Salt Mine at Goderich, Canada; Trans. Am. Inst. Min. Eng., vol. 6, 1879, pp. 125-144.

Hume, G. S.: Oil and Gas in Eastern Canada; Geol. Surv., Canada, Ec. Geol. Ser., No. 9, 1932.

——— The Geology of the Oil Fields and Some Prospective Oil Areas in Canada; Geol. Mag., vol. LXXVIII, No. 1, 1941, pp. 6-12.

Hunt, T. Sterry: The Goderich Salt Region; Geol. Surv., Canada, Rept. of Prog. 1866-69, pp. 211-244.

——— The Goderich Salt Region; Trans. Am. Inst. Min. Eng., vol. 5, 1877, pp. 538-560.

Keele, J.: Preliminary Report on the Clay and Shale Deposits of Ontario; Geol. Surv., Canada, Mem. 142, 1924, pp. 26-28.

Kindle, E. M.: Unconformity at the base of the Onondaga Limestone in New York and Its Equivalent, west of Buffalo; Jour. Geol., vol. 21, 1913, pp. 301-319.

Logan, Sir Wm.: Geology of Canada; Geol. Surv., Canada, Rept. of Prog. from its beginning to 1863.

Murray, A.: Rept. on the District Lying Between Georgian Bay on Lake Huron and the Lower Extremity of Lake Erie; Geol. Surv., Canada, Rept. of Prog. 1843, pp. 51-59.

Murray, A. N.: Limestone Oil Reservoirs of the Northeast United States and of Ontario, Canada; Ec. Geol., vol. 25, 1930, pp. 452-469.

Newberry, J. S.: Ohio Geol. Surv., Rept. of Prog., 1869.

Newcombe, R. B.: Middle Devonian Unconformity in Michigan; Bull. Geol. Soc. Am., vol. 41, pp. 725-738 (1930).

Nicholson, H. A.: Palæontology of the Province of Ontario, 1874.

Parks, W. A.: Building and Ornamental Stones of Canada; Mines Branch, Dept. of Mines, No. 100, 1912, vol. 1.

——— Devonian Stromatoporoids of North America; Univ. of Toronto Studies, Geol. Ser., No. 39, 1936.

Prosser, C. S.: The Huron and Cleveland Shales of Northern Ohio; Jour. Geol., col. 21, 1913, pp. 323-362.

Rominger, C.: Fossil Corals; Geol. Surv., Mich., vol. III, 1873-1876.

Sherzer, W. H.: Geology of Wayne County; Mich. Geol. and Biol. Surv., Pub. 12, 1911.

Stauffer, C. R.: The Devonian of Southwestern Ontario; Geol. Surv., Canada, Mem. 34, 1915.

——— Relative Age of the Detroit River Series; Bull. Geol. Soc. Am., vol. 27, 1916, pp. 72-78.

——— The Middle Devonian of Ohio; Geol. Surv., Ohio, Bull. 10, 1919.

Stewart, J. S.: Factors Controlling Pressure in Petroleum Reservoirs; Trans. Roy. Soc., Canada, vol. 34, 1940, pp. 123-134.

Ulrich, E. O.: The Chattanoogan Series with Special Reference to the Ohio Shale Problem; Am. Jour. Sci., vol. 34, 1912.

Whiteaves, J. F.: Contributions to Canadian Palæontology; vol. 1, pp. 91-125.

Williams, M. Y.: The Silurian Geology and Faunas of the Ontario Peninsula, and Manitoulin and Adjacent Islands; Geol. Surv., Canada, Mem. 111, 1919.

——— The Ohio Shales of Southwestern Ontario; Geol. Surv., Canada, Sum. Rept. 1917, pt. E, pp. 26-28.

——— The Hamilton Formation at Thedford and Vicinity; Geol. Surv., Canada, Guide Book 4, 1913, pp. 101-110.

——— Oil Prospects of Southwestern Ontario; Geol. Surv., Canada, Sum. Rept. 1917, pt. E, pp. 19-26.

FIELD WORK

The bedrock is everywhere overlain by a mantle of glacial drift, and only at a few places where streams have cut entirely through the surface deposits and on the shore of Lake Huron can natural outcrops be seen. Quarrying has also exposed various thicknesses of rock at several localities. All streams and the lake shore were traversed and the outcrops accurately located. Elevations of any recognizable horizons both in quarries and at outcrops were obtained in an effort to determine any structure that might be present. All natural gas and oil wells were located and their elevations determined, and these data, together with the results of detailed examination of well samples and drillers' logs, were used as a basis for preparation of subsurface structure maps covering a number of townships, particularly in the southern part of the area. The stone quarries and brick yards were also located, detailed examination of the exposed strata made, and, so far as possible, information obtained from the operators regarding utilization of the rock.

ACKNOWLEDGMENTS

The writer is indebted to Colonel R. B. Harkness, Ontario Natural Gas Commissioner, for permission to examine the many drilling records in his custody.

The owners and superintendents of the quarries visited greatly facilitated the work by permitting examination of rocks exposed in their respective workings.

Farmers on whose property oil and gas wells have been drilled gave considerable assistance by pointing out well locations where these were not readily seen.

Efficient assistance was rendered in the field by J. E. McCormack.

CHAPTER II

GENERAL CHARACTER OF THE AREA

The area lies within the western part of the St. Lawrence physiographic region and is bordered on the south, and, to some extent, on the west, by lakes Erie and Huron, respectively. Except at Rondeau Harbour, the Lake Erie shoreline consists of practically continuous cliffs of boulder clay and sand, which rise abruptly from lake level (572 feet) to an altitude averaging 675 feet above sea-level. At Rondeau Harbour the shore is low and sandy and partly swampy. From the north boundary of the area to about the latitude of Bayfield the Lake Huron shoreline is also cliff-like, the land rising abruptly from lake level (581 feet) to an average elevation of about 650 feet. The remainder of this shoreline, though generally steep, becomes progressively lower until, from Port Frank onward, it is essentially a low, sandy beach.

Topographically the area is divisible into a north and south part, the boundary being approximately the latitude of the town of St. Marys. North of this latitude the land surface as a whole slopes gradually westward to the shore of Lake Huron, from a maximum altitude of about 1,200 feet. The southern part slopes generally south and southwest to Lake Erie from a maximum altitude of about 1,100 feet in the region immediately south of St. Marys. The topography is for the most part gently undulating with low relief, although some districts are irregularly and steeply hilly, and others relatively flat and plain-like.

The entire region has been glaciated and the bed-rock is covered by a variable thickness of drift. These superficial deposits control the topography, so that the present land surface in no way reflects either the relief or the structure of the underlying rock. The overburden seems to be thickest in the southern part of the area where boring records show depths up to 337 feet before reaching bed-rock. The following table, compiled from drilling records at hand, shows minimum and maximum thicknesses of drift encountered in the townships indicated.

Township	Thickness of drift	
	Minimum	Maximum
	Feet	Feet
Adelaide	85	218
Aldborough	142	292
Brooke	7	116
Bosanquet	2	185
Blanchard	18	23
Caradoc	80	215
Dunwich	148	316
Dorchester North	101	162
Delaware	60	240
Euphemia	12	108
Ekfrid	130	259
East Williams	182	243

Township	Thickness of drift	
	Minimum	Maximum
	Feet	Feet
Goderich	92	134
Grey	16	.....
Harwich	58	210
Howard	76	330
Hibbert	75	.....
Hullett	67	120
Logan	140	.....
London	130	186
McKillop	93	.....
McGillivray	55	160
Metcalfe	48	174
Mosa	30	283
Nissouri East	81	100
Nissouri West	75	140
Orford	68	240
Southwold	218	337
Tuckersmith	98	.....
Warwick	37	140
Wawanosh East	96	.....
West Williams	130	193
Yarmouth	200	320
Zone	37	213

The London area lies within one of the most densely settled parts of Canada and is, therefore, easy of access. Four main highways cross the area in a general east-west direction; these are connected at convenient intervals so that all cities and most of the larger towns are located on paved highways. In addition, a grid of secondary gravel roads enclose practically every concession.

The principal and most important industry is agriculture, and practically the entire area is under cultivation. Dairying and stock raising occupy an important place in that industry. The production of natural gas and oil also constitutes an important industry in Middlesex, Kent, and Lambton counties, and quarrying of limestone for chemical purposes, lime, road metal, etc., is carried on extensively at St. Marys and to a lesser degree at other places. Brick yards are operated at Thedford, and the town of Goderich is an important centre for the production of salt.

Considerable manufacturing is carried on in many of the towns, such as London, St. Marys, Wingham, Clinton, Goderich, St. Thomas, and Ridgetown.

CHAPTER III

STRATIGRAPHY

GENERAL STATEMENT

The entire area is underlain by Palæozoic sedimentary strata, the Ordovician, Silurian, and Devonian systems each being represented. The sediments rest upon the uneven surface of Precambrian igneous and metamorphic rocks that outcrop along the north shore of Lake Huron and Georgian Bay as the Canadian Shield. The thickness of the sediments varies from place to place within the present area. The deepest boring for which samples are available is in Harwick township: this well shows 3,504 feet of Palæozoic sediments, of which 505 feet are Devonian, 1,256 feet Silurian, and 1,727 feet Ordovician. Below the Ordovician, 16 feet of basal sand and shale was penetrated. Wells in Brooke and Bosanquet townships indicate an additional 400 feet of Devonian strata stratigraphically above those shown in the foregoing well.

The lower half of the Ordovician consists essentially of limestones and dolomitic limestones with frequent thin zones and partings of grey shale (Trenton and older limestones). These strata are overlain by shales, commonly black and bituminous at the base (Billings formation) and grey with many limestone bands toward the top (Meaford-Dundas), the whole followed by the characteristic red shales of the Queenston formation. These Ordovician rocks are everywhere overlain by Silurian representatives and, over most of the area, by Devonian rocks also: they are, therefore, known only from boring samples.

The Silurian rocks begin with a series of grey limestone and grey, greenish, and reddish shale with many thin calcareous bands (Medina formation). These strata are followed by grey and buff dolomites and grey shale (Niagaran), which is in turn overlain by interbedded, grey, calcareous shale and brown dolomite with gypsum, anhydrite, and, in places, beds of salt (Salina formation). The uppermost Silurian rocks are grey and brown dolomite (Bertie-Akron formation). Although these rocks underlie the entire area, they form the uppermost bed-rock only at the extreme northeast corner: even there, they are concealed beneath superficial deposits and are, therefore, known only from samples from wells drilled elsewhere in the area.

The Devonian representatives consist, in ascending order, of limestone and dolomitic limestone with chert and small, though varying quantities of sand (Norfolk formation). These rocks are overlain by a series of grey and bluish shale with some limestone horizons (Hamilton formation), the whole of which is followed, in the southwest part of the area, by the black Kettle Point shale; these last named shales form the youngest bed-rock in the area.

Except at the extreme northeast part of the area, Devonian strata form the uppermost bed-rock, but outcrop at only a few places on some of

the streams and along the shore of Lake Huron. They have been exposed at several additional localities by quarrying.

The Palæozoic sediments of the London area have never been subjected to severe deformative forces. Their regional attitude is a gentle dip in a general southwesterly direction away from the Canadian Shield. Considered in the broadest sense, the area as a whole probably is part of a downwarp or basin structure directly related to both the Cincinnati Arch and the Michigan Basin.

In the present work an effort has been made to map lithological units and to define the formations with respect to types of sedimentation and geological history rather than solely with respect to their contained faunas. Consequently, only those divisions that can be separated lithologically appear on the accompanying maps.

TABLE OF FORMATIONS

System	Formation	Thickness
		Feet
	Kettle Point	0—85+
Devonian	Hamilton	195—340
	Norfolk	430—679
	Bertie-Akron[1]	50—145
	Salina[1]	340—1,020
Silurian	Guelph[2] / Lockport[2]	100—316
	Rochester[3]	0—70
	Clinton[3]	0—35
	Medina[3]	92—161
	Queenston[2]	26—385
Ordovician	Meaford[3] / Dundas[3]	359—500
	Billings[2]	112—156
	Trenton and older Palæozoic limestones[3]	765—917

[1]Concealed only by glacial drift.

[2]Subsurface formations.

[3]Subsurface formations; only in southern part of the area.

DESCRIPTIONS OF FORMATIONS

INTRODUCTION

The Guelph-Lockport and older formations everywhere in this area are overlain by the Salina formation and are, therefore, seen only in well cuttings. With the exception of the Trenton and older Palæozoic limestones, each of the pre-Salina formations has been traced westward from its respective outcrop area[1] by means of boring samples. They are identified in wells in the present area purely on lithology; definitions of the several formational names may be found in the above cited reports. Only a few wells penetrate the entire sedimentary succession. The following logs prepared from drilling samples will illustrate the lithology of all the formations.

Log of H. Trewartha No. 1 Well

Location: lot 23, con. 2, Hullett tp.

Formation	Depth	Thickness	Lithology
	Feet	Feet	
	0–150	150	Surface drift.
Norfolk	150–215	65	Limestone: greyish brown; little white chert at 170–200 feet.
	215–225	10	Limestone: greyish brown, magnesian; rounded sand grains at 215–220 feet.
	225–250	25	Unreliable samples of drift material mixed with limestone.
	250–275	25	Limestone: magnesian, brown, finely crystalline.
	275–315	40	Dolomite: brownish, finely crystalline.
	315–490	175	Dolomite: brown, finely crystalline; some porosity at 475–480 and 485–490 feet.
	490–575	85	Dolomite: brown, finely crystalline; little chert at 560–575 feet.
	575–595	20	Dolomite; greyish brown; much white chert.
	595–625	30	Dolomite: greyish brown; little chert.
	625–640	15	Dolomite: greyish brown; much chert.
	640–745	105	Dolomite: greyish brown; much chert in lower 40 feet.
	745–780	35	Chert: light grey; some brown dolomite.
Bertie-Akron	780–795	15	Dolomite: brownish grey.
	795–880	85	No samples.
	880–885	5	Dolomite: brown.
Salina	885–905	20	Argillaceous dolomite: dark grey; little gypsum.
	905–925	20	Dolomite: brown, fine grained.
	925–965	40	Argillaceous dolomite: dark grey; some grey shale.
	965–980	15	Argillaceous dolomite: little reddish shale; little gypsum.
	980–1,005	25	Dolomite: shaly, grey; much gypsum at 995 to 1,000 feet.
	1,005–1,015	10	Dolomite: brown; little gypsum.
	1,015–1,035	20	Shale: limy, dark grey.
	1,035–1,055	20	Dolomite: brown; much grey, limy shale.
	1,055–1,100	45	Dolomite: argillaceous, grey; some brown dolomite.
	1,100–1,115	15	Dolomite: brown; little grey, limy shale.
	1,115–1,220	105	Limy shale: dark grey; some brown dolomite; rounded sand grains at 1,150–1,155 and 1,160–1,165 feet.

[1]Caley, J. F.: Geol. Surv., Canada, Mem. 224, 1940; Mem. 226, 1941.

Log of H. Trewartha No. 1 Well—Concluded

Formation	Depth	Thickness	Lithology
	Feet	Feet	
Salina	1,220–1,250	30	Salt: little brown dolomite at 1,235 – 1,240 feet.
	1,250–1,465	215	Salt: little dolomite in many samples.
	1,465–1,495	30	Dolomite: brown, fine grained.
	1,495–1,585	90	Dolomite: brown, fine grained; much grey, limy shale.
	1,585–1,590	5	Dolomite: grey; much salt.
	1,590–1,625	35	Salt: little brown dolomite, 1,590–1,595 feet.
	1,625–1,630	5	Limestone: light brown; little gypsum.
	1,630–1,650	20	Limestone; dark grey, magnesian.
	1,650–1,690	40	Dolomite, dark brown, fine grained.
	1,690–1,745	55	Dolomite: grey; limestone at 1,725–1,730 feet.
	1,745–1,760	15	Gypsum: about 50 per cent brown dolomite.
Guelph-Lockport	1,760–1,790	30	Dolomite: brown, fine and medium crystalline.
	1,790–1,815	25	Dolomite: brownish grey, crystalline.
	1,815–1,830	15	Limestone; light greyish brown; much crystalline calcite.
	1,830–1,860	30	Limestone: grey and brownish, crystalline.
Medina	1,860–1,870	10	Shale: red.
	1,870–1,900	30	Shale: green and grey; little red shale.
	1,900–1,955	55	Limestone: grey; little red and grey shale; Bryozoa.
	1,955–1,960	5	Shale: grey and red.
	1,960–1,970	10	Limestone: grey; little grey shale.
	1,970–1,975	5	Shale: grey; little red shale and grey limestone.
	1,975–1,980	5	Limestone: grey; little grey shale.
Queenston	1,980–2,240	260	Shale: red; little green shale; little limestone at 2,110–2,120 feet.
Meaford-Dundas	2,240–2,605	365	Shale: grey; some limestone fragments in most samples; Bryozoa at 2,570–2,580 feet.
Billings	2,605–2,705	100	Shale: dark grey.
	2,705–2,735	30	Shale: dark grey to black; some brown and grey limestone.
Trenton and older Palaeozoic limestones	2,735–2,825	90	Limestone: grey, dense.
	2,825–2,890	65	Limestone: grey, dense; magnesian at 2,860–2,865 feet.
	2,890–2,935	45	Limestone: brownish grey, dense; some grey shale at 2,900–2,905 and 2,930–2,935 feet.
	2,935–3,185	250	Limestone: grey and brown, dense; some dark grey shale throughout.
	3,185–3,365	180	Limestone: brown and grey, dense; little chert at 3,200–3,210 feet.
	3,365–3,445	80	Limestone: grey and brown, crystalline and dense.
	3,445–3,480	35	Limestone: brownish grey; few fragments of fine-grained sandstone 3,450–3,475 feet; little grey shale 3,470–3,480 feet.
Basal beds	3,480–3,485	5	Sandstone: matrix of greenish grey shale.
	3,485–3,500	15	Sandstone: some greenish shale; some biotite.
Precambrian	3,500–3,531	31	Decomposed igneous rock.

Log of St. Mary's Cement Company Well

Location: lot 21, con. 17, Blanchard top.

Formation	Depth	Thickness	Lithology
	Feet	Feet	
Norfolk	23–145	122	Limestone: buff, fine grained.
	145–251	106	Limestone: brown and buff, fine grained.
	251–322	71	Limestone: magnesian; brown, finely crystalline; black, bituminous streaks.
	322–372	50	Dolomite: brown, finely crystalline.
	372–383	11	Chert; some brown dolomite.
	383–442	59	Dolomite: brown, finely crystalline; little chert.
	442–462	20	Dolomite: brownish grey, finely crystalline; little chert; black, bituminous streaks.
	462–493	31	Dolomite: brownish grey, finely crystalline; much chert.
Bertie-Akron	493–559	66	Dolomite: brownish grey and buff, fine grained; some porosity at 510–521 feet.
Salina	577–600	23	Dolomite: brown, fine grained; little grey, limy shale; trace of gypsum.
	600–612	12	Shale: grey, limy; trace of gypsum.
	612–706	94	Shale: limy; dark greenish grey; traces of gypsum; brown dolomite at 700 feet.
	706–729	23	Dolomite: brown, fine grained; little grey shale.
	729–752	23	Shale: limy; dark greenish grey; trace of gypsum.
	752–804	52	Dolomite: brown, fine grained; little grey shale.
	804–856	52	Shale: limy; greenish grey; little brown dolomite.
	856–997	141	Dolomite: brownish grey and buff, fine grained; traces of gypsum.
Guelph-Lockport	997–1,058	61	Dolomite: buff, crystalline.
	1,058–1,152	94	Dolomite: brownish grey and brown, finely crystalline; porous.
	1,152–1,176	24	Dolomite: grey, crystalline.
	1,176–1,272	96	Dolomite: light grey to white, crystalline; some porosity at 1,219, 1,260, and 1,272 feet.
Rochester	1,272–1,300	28	Shale: dark grey.
Clinton	1,300–1,323	23	Dolomite: brownish grey.
Medina	1,323–1,355	32	Shale: greenish grey; little grey limestone.
	1,355–1,390	35	Limestone: grey, crystalline; little green shale.
	1,390–1,410	20	Limestone: shaly, grey.
	1,410–1,415	5	Shale: greenish grey; little grey, shaly lime.
Queenston	1,415–1,771	356	Shale: red; little green shale.
	1,771–1,796	25	Shale: greenish; some grey, impure limestone and red shale.
Meaford-Dundas	1,796–1,816	20	Limestone: grey, impure; little shale.
	1,816–1,856	40	Shale: greenish grey.
	1,856–1,950	94	Shale: grey; little grey limestone.
	1,950–2,030	80	Shale: dark greenish grey; traces of grey, crystalline limestone.
	2,030–2,253	223	Shale: grey; traces of grey limestone in upper 100 feet.
Billings	2,253–2,259	6	Shale: brownish grey.
	2,259–2,344	85	Shale: dark grey, bituminous.
	2,344–2,365	21	Shale: dark grey to black, bituminous.
Trenton and older Palæozoic limestones	2,365–2,617	252	Limestone: brownish grey, fine grained.
	2,617–2,718	101	Limestone: grey, crystalline; little grey and greenish shale throughout.

Log of St. Mary's Cement Company Well—Concluded

Formation	Depth	Thickness	Lithology
	Feet	Feet	
Trenton and older Palæozoic limestones	2,718–2,855	137	Limestone: brownish grey, finely crystalline; little grey shale.
	2,855–2,885	30	Shale: limy, greenish grey; little brown limestone.
	2,885–3,003	118	Limestone: brown, fine grained; little grey shale at 2,885–2,905 feet.
	3,003–3,153	150	Limestone: brownish grey and buff, finely crystalline; little grey shale at 3,015, 3,098, and 3,133 feet.
Basal beds	3,153–3,165	12	Clear quartz; green shale; brownish limestone; trace fine sandstone.
Precambrian	3,165–3,174	9	Clear quartz; pink feldspar; mica; green chloritic shale.

Location: lot 23, range 1, North Longwood road, Caradoc tp.

Location	Depth	Thickness	Lithology
	Feet	Feet	
	0–170	170	No samples; probably surface drift.
Norfolk	170–220	50	Limestone: cream coloured, finely crystalline; some pyrite at 190–195 feet.
	220–230	10	Sand: rounded grains.
	230–260	30	Limestone: cream coloured, dense.
	260–500	240	Limestone: cream coloured and brownish grey, finely crystalline and dense; some black, bituminous streaks.
	500–635	135	Limestone: brownish grey, finely crystalline; light grey chert throughout.
	635–665	30	Chert: light grey; little grey, calcareous sandstone; glauconite at base.
Bertie-Akron	665–770	95	Dolomite: brownish grey, finely crystalline.
Salina	770–820	50	Dolomite: argillaceous, dark grey, finely crystalline; trace gypsum at 805–820 feet.
	820–1,025	205	No samples.
	1,025–1,230	205	Dolomitic shale and shaly dolomite: grey; little gypsum at 1,025–1,040 and 1,225–1,230 feet.
Guelph-Lockport	1,230–1,410	180	Dolomite: brownish grey and buff, finely crystalline.
	1,410–1,480	70	Dolomite: grey, finely crystalline.
	1,480–1,500	15	Dolomite: light grey, crystalline; little pyrite.
Rochester	1,500–1,540	40	Shale: calcareous, dark grey.
Clinton	1,540–1,550	10	Dolomite: grey, finely crystalline.
	1,550–1,560	10	Unreliable sample.
Medina	1,560–1,580	20	Shale: grey and greenish grey.
	1,580–1,600	20	Mixture of grey and greenish shale with grey and reddish, impure limestone.
	1,600–1,640	40	Shale: grey; some greenish grey shale and grey limestone.
	1,640–1,650	10	Limestone: grey, crystalline.
	1,650–1,660	10	Shale: grey and greenish grey; little grey limestone.
Queenston	1,660–2,020	360	Shale: red.

Location: lot 23, range 1, North Longwood road, Caradoc tp.—*Concluded*

Formation	Depth	Thickness	Lithology
	Feet	Feet	
Meaford-Dundas	2,020–2,090	70	Shale: grey; little grey limestone throughout.
	2,090–2,110	20	Shale: grey; much grey limestone.
	2,110–2,120	10	Limestone: grey; much grey shale.
	2,120–2,130	10	Shale: dark greenish grey.
	2,130–2,250	120	Shale: grey; traces of limestone at 2,140, 2,160, and 2,190–2,200 feet.
	2,250–2,290	40	Shale: dark grey.
	2,290–2,370	80	Shale: grey; grey, crystalline limestone throughout.
	2,370–2,520	150	Shale: grey; Bryozoa at 2,410–2,420 feet.
Billings	2,520–2,620	100	Shale: black.

Log of Union Gas Company of Canada, Limited, Well No. 1

Location: lot 7, range 5 S., Ekfrid tp.

Formation	Depth	Thickness	Lithology
	Feet	Feet	
	0–200	200	Surface drift.
Norfolk	200–270	70	Limestone; brownish grey, fine grained.
	270–300	30	Limestone: cream coloured, fine grained; little chert.
	300–405	105	No samples.
	405–460	55	Limestone: brownish grey, fine grained, and granular.
	460–550	90	Limestone: brownish grey, fine grained, and granular; dark, bituminous streaks 470–490 feet; cherty limestone 530–550 feet.
	550–600	50	Limestone: grey, sandy; chert throughout.
	600–650	50	Limestone: brownish grey, fine grained; much chert.
	650–660	10	Chert; some brown limestone.
	660–670	10	Limestone: brownish grey, fine grained; much chert.
	670–680	10	Chert; little grey limestone.
	680–690	10	Limestone: grey; equal amount chert.
	690–710	20	Chert; little grey limestone.
	710–730	20	Limestone: sandy, grey; much chert.
	730–755	25	Limestone: brown, fine grained; much chert; little sand and glauconite at the base.
Bertie-Akron	755–835	80	Dolomite: brown; little pyrite at 800 feet; porous at 765–770 and 830–835 feet.
Salina	835–840	5	Dolomite: brown, fine grained; equal amount grey shale.
	840–850	10	Shale: calcareous, dark grey; some gypsum.
	850–870	20	Dolomite: buff, dense.
	870–945	75	Shale: dolomitic, grey; trace of anhydrite.
	945–1,080	135	Dolomite: buff, dense; some grey, limy shale; little gypsum.
	1,080–1,120	40	Shale: dolomitic, grey; little pink anhydrite.
	1,120–1,145	25	Dolomite: shaly, grey; little anhydrite.
	1,145–1,160	15	Anhydrite.
	1,160–1,230	70	Dolomite: buff, dense.
	1,230–1,245	15	Dolomite: shaly, grey; little anhydrite.
	1,245–1,250	5	Anhydrite.
	1,250–1,315	65	Dolomite: buff, dense; much anhydrite at 1,270–1,280 and 1,031–1,315 feet.

Log of Union Gas Company of Canada, Limited, Well No. 1—Concluded

Formation	Depth	Thickness	Lithology
	Feet	Feet	
Guelph-Lockport	1,315–1,500	185	Dolomite: brownish grey and brown, finely crystalline.
	1,500–1,520	20	Dolomite: light grey, crystalline; some porosity.
Rochester	1,520–1,565	45	Shale: dark grey.
Clinton	1,565–1,585	25	Dolomite: grey, finely granular; little green shale at 1,585 feet.
Medina	1,585–1,590	5	Sandstone: shaly, grey; equal amount of green shale.
	1,590–1,595	5	Shale: grey; little grey limestone.
	1,595–1,610	15	Shale: greenish grey.
	1,610–1,620	10	Shale: greenish grey; little red, impure limestone; *Helopora* sp.
	1,620–1,670	50	Shale: greenish grey; little grey, crystalline limestone throughout; Brachiopod fragments.
	1,670–1,680	10	Limestone: grey, crystalline; little greenish shale.
	1,680–1,700	20	Shale: greenish grey; little grey, crystalline limestone.
Queenston	1,700–2,085	385	Shale: red; little green shale.
Meaford-Dundas	2,085–2,100	15	Shale: greenish grey; little grey limestone.
	2,100–2,170	70	Shale: grey; little grey, crystalline limestone throughout; Ostracods at 2,140 feet.
	2,170–2,235	65	Shale: dark grey; little grey, crystalline limestone at 2,200, 2,215, and 2,235 feet.
	2,235–2,270	35	Shale: grey.
	2,270–2,280	10	Shale: greenish grey.
	2,280–2,550	270	Shale: grey; little limestone at 2,460 feet; Bryozoa at 2,460 feet.
Billings	2,550–2,585	35	Shale: dark grey.
	2,585–2,680	95	Shale: black, bituminous.
Trenton and older Palæozoic limestones	2,680–2,780	100	Limestone: brownish grey, finely crystalline; traces grey shale in most samples.
	2,780–2,830	50	Limestone: dark brownish grey, crystalline.
	2,830–3,140	310	Limestone: dark brownish grey, crystalline; little grey shale in most samples.
	3,140–3,160	20	Limestone: grey, fine grained; little dark shale.
	3,160–3,285	125	Limestone: brown and brownish grey, fine to dense.
	3,285–3,290	5	Limestone: cream coloured, dense; little pyrite.
	3,290–3,475	185	Limestone: dark brownish grey, fine grained; Bryozoa at 3,320 feet.
	3,475–3,480	5	Limestone: cream coloured, dense; little greenish shale.
	3,480–3,505	25	Limestone: brown, fine grained; much cream-coloured, dense limestone; little greenish shale.
	3,505–3,525	20	Limestone: brownish grey, fine grained; little grey, limy shale.
	3,525–3,535	10	Limestone: brownish grey, fine grained; little greenish shale; some clear quartz grains.
Basal beds	3,535–3,545	10	Sand: calcareous, grey, coarse; pyrite; green and grey shale.
	3,545–3,555	10	Rounded and angular quartz; grey, coarse sandstone; green shale.
Precambrian	3,555–3,582	27	Biotite granite.

Log of H. English No. 1 Well

Location: lot 2, con. 4, Harwich tp.

Formation	Depth	Thickness	Lithology
	Feet	Feet	
	0–285	285	No samples; probably surface drift.
Norfolk	285–310	25	Limestone: grey, finely granular; trace pyrite.
	310–345	35	Limestone: grey, crystalline; trace pyrite at 320 feet; Protosalvinia at 330–340 feet.
	345–360	15	Limestone: grey, dense; crinoid columns.
	360–415	55	Limestone: grey, dense; grey chert throughout; Protosalvinia 365 to 370 feet.
	415–420	5	Limestone: grey, fine grained; some black, bituminous films; a few rounded sand grains.
	420–465	45	Limestone: grey-buff, finely crystalline.
	465–505	40	Limestone: grey-buff, finely crystalline; traces of gypsum throughout; few black, bituminous streaks.
	505–565	60	Limestone: grey-buff, finely crystalline; black, bituminous streaks throughout; trace gypsum at 525 feet.
	565–605	40	Limestone: brownish grey, finely crystalline; light grey chert throughout; trace gypsum.
	605–695	90	Limestone: grey, finely crystalline, cherty; trace gypsum at 630, 655, 690, and 695 feet.
	695–700	5	No sample.
	700–715	15	Chert: light grey; some grey limestone.
	715–745	30	Limestone: grey, crystalline; much light grey chert; trace of glauconite at 725 and 730 feet.
	745–750	5	Chert: light grey; some grey, crystalline limestone.
	750–755	5	Limestone: grey, crystalline; much grey chert; trace glauconite.
	755–790	35	Sand: rounded and semi-rounded grains; trace of gypsum at 770, 785, and 790 feet; little grey limestone at 785 and 790 feet.
Bertie-Akron	790–810	20	Limestone: magnesian, brown, finely granular.
	810–835	25	Limestone: magnesian, brownish grey, finely crystalline; black streaks at 815–820 feet.
	835–935	100	Limestone: magnesian, brownish grey, finely crystalline; black streaks at 890 feet; pyrite at 925 feet.
Salina	935–960	25	Limestone: shaly, grey, fine grained; some gypsum.
	960–970	10	Dolomite: brown, dense; much gypsum.
	970–1,065	95	Shale: calcareous, dark grey; trace gypsum throughout; brown dolomite 1,055–1,060 feet.
	1,065–1,095	30	Dolomite: buff, dense; little gypsum throughout.
	1,095–1,105	10	Shale: dolomitic, dark grey; little gypsum.
	1,105–1,145	40	Dolomite: buff, fine grained; trace gypsum; dark grey, shaly dolomite at base.
	1,145–1,150	5	No sample.
	1,150–1,185	35	Dolomite: brownish grey, fine grained; trace gypsum.
	1,185–1,205	20	Shale: dolomitic, dark grey; much brown dolomite; trace gypsum.
	1,205–1,235	30	Shale: limy, dark grey; trace gypsum.
	1,235–1,240	5	Gypsum; little grey, limy shale.
	1,240–1,260	20	Shale; limy, dark grey; little brown dolomite.
	1,260–1,280	20	Dolomite: buff-grey, finely crystalline.
	1,280–1,440	160	Salt.
	1,440–1,490	50	Dolomite: brownish grey, finely crystalline; trace gypsum.

Log of H. English No. 1 Well—Concluded

Formation	Depth	Thickness	Lithology
Salina	Feet	Feet	
	1,490–1,530	40	Dolomite: grey, finely crystalline; little grey, limy shale at 1,515–1,530 feet; pyrite at 1,520 feet.
	1,530–1,535	5	Gypsum; little dark grey, limy shale.
	1,535–1,540	5	Dolomite: grey, finely granular; trace gypsum.
Guelph-Lockport	1,540–1,560	20	Dolomite: grey, crystalline; trace gypsum.
	1,560–1,565	5	No sample.
	1,565–1,580	15	Dolomite: buff, crystalline.
	1,580–1,585	5	No sample.
	1,585–1,590	5	Dolomite: grey, finely crystalline.
	1,590–1,595	5	No sample.
	1,595–1,680	85	Dolomite: grey and brownish grey, crystalline to granular.
	1,680–1,710	30	Dolomite: brown, finely crystalline.
	1,710–1,805	95	Dolomite: brownish grey, finely crystalline to dense.
	1,805–1,813	8	Dolomite: bluish grey; finely crystalline.
	1,813–1,856	43	Dolomite: light grey, crystalline; trace pyrite at 1,835 feet.
Rochester	1,856–1,879	23	Shale: dark grey, limy; traces of grey dolomite.
Clinton?	1,879–1,885	6	Dolomite: grey, crystalline; mixed with grey, limy shale; trace pyrite.
Medina	1,885–1,914	29	Shale: green and red; little grey, crystalline limestone.
	1,914–1,920	6	Shale: red; trace green shale.
	1,920–1,955	35	Shale: grey; trace red shale.
	1,955–1,970	15	Shale: grey; traces of grey dolomite and red shale.
	1,970–1,988	18	Shale: grey; little red shale and grey dolomite; Bryozoa at 1,985 feet.
	1,988–2,035	47	Dolomite: grey, crystalline.
	2,035–2,046	11	Shale: grey; some grey dolomite.
Queenston	2,046–2,073	27	Shale: red; little green shale.
	2,073–2,357	284	Shale: red.
Meaford-Dundas	2,357–2,506	149	Shale: dark grey; little grey, crystalline limestone throughout.
	2,506–2,716	210	Shale: dark grey.
Billings	2,716–2,872	156	Shale: dark grey to black.
	2,872–2,891	19	Limestone: magnesian, brownish grey, crystalline.
Trenton and older Palaeozoic limestones	2,891–3,029	138	Limestone: brownish grey, finely crystalline; fossiliferous at 2,977, 2,985, and 3,029 feet.
	3,029–3,073	44	Limestone: brownish grey, crystalline; traces grey shale throughout.
	3,073–3,240	167	Limestone: brownish grey, crystalline.
	3,240–3,389	149	Limestone: brownish grey, crystalline; much black, bituminous shale.
	3,389–3,732	343	Limestone: brownish grey, finely crystalline to dense.
	3,732–3,767	35	Limestone: brownish grey, dense.
	3,767–3,773	6	Limestone: brownish grey, dense; little pyrite.
Basal beds	3,773–3,785	12	Mixture brown limestone, green shale, grey sand, black shale; little pyrite.
	3,785–3,789	4	Sand: rounded and semi-rounded grains; little grey dolomite.

QUEENSTON AND OLDER FORMATIONS

The basal beds represent the sediments of the initial encroachment of the sea over the Precambrian land surface. They differ in lithology and thickness from place to place and include arkose, sandstone, shale, arenaceous limestone, and dolomite.

No satisfactory criteria have been found in well cuttings by which the thick series of dominantly calcareous rock between the basal beds and the base of the Billings formation can be subdivided or placed in their respective formations. The series includes the Trenton and probably part of the Black River group and is here logged as a single unit.

The Billings formation is typically a dark grey to nearly black, bituminous shale, becoming grey and brownish in its upper part. It grades upward into the Dundas shale, the upper contact being difficult to place in well cuttings. The contact is placed where the shale becomes more grey than black; this position seems to roughly coincide with the complete disappearance of any bituminous content.

The Dundas formation is mainly a grey shale with occasional thin limestone bands; it grades upward into the Meaford formation, which is dominantly grey shale with some greenish shale, and grey, crystalline limestone beds, which seem to increase in both thickness and number in the upper part of the formation. No definite line of separation between the Dundas and Meaford can be placed in well cuttings and the two have been logged as a single lithological unit.

The Queenston is typically a brick-red, argillaceous and sandy shale with many green-coloured bands and mottlings. The Meaford-Queenston contact is sharp and readily recognized in well samples. The formation represents the youngest Ordovician strata in the area.

The following table summarizes the thickness in feet of the various Ordovician formations in the foregoing logs:

Formation	Townships				
	Hullett	Blanchard	Caradoc	Ekfrid	Harwich
Queenston	260	381	360	385	311
Meaford-Dundas	365	457	500	465	359
Billings	130	112	100+	130	156
Trenton and older Palaezoic limestones	745	788	.....	855	901

MEDINA FORMATION

The Medina formation includes all the strata between the Queenston below and the Clinton above, or, where the Clinton and Rochester are absent, between the Queenston below and the Lockport above. This usage of the term was proposed in a previous report.[1] The formation in the Niagara Peninsula includes three members, which, in ascending order, are the Whirlpool, Manitoulin, and Cabot Head.

[1] Caley, J. F.: Geol. Surv., Canada, Mem. 224, 1940, pp. 25, 26.

In the London area the Whirlpool sandstone has not been recognized in any of the well cuttings so far examined. However, the member may be represented at least in the eastern part of the area as 2 to 10 feet of sandstone have been reported[1] in cuttings from wells located in several of the townships adjoining on the east.

The Manitoulin member immediately overlies the Queenston formation. It consists of grey limestone and grey and greenish shale. The contact with the Queenston red shale is sharp and readily recognized.

The Cabot Head member overlies the Manitoulin. It is grey, green, and red shale with small amounts of grey limestone at several horizons. The contact with the Manitoulin is gradational and in general cannot be definitely placed in well cuttings. As the Cabot Head at the outcrop typically contains red, limy shale, its presence in wells is recognized chiefly by this character. However, in view of the difficulty in separating the two members, the Medina formation has been logged as a single unit.

The following logs prepared from well cuttings illustrate the lithology of the Medina as it is present in the townships specified. The presence of the two members is indicated wherever possible by a division based purely on lithology and colour. The logs indicate the general lithological similarity of the Medina wherever it has been penetrated.

Township	Formation	Depth	Thickness	Lithology	Member
		Feet	Feet		
Euphemia	Medina	1,880–1,900	20	Shale: red, green, grey; trace of grey limestone.	Cabot Head
		1,900–1,910	10	Shale: green, grey, red; trace of grey sandstone.	
		1,910–1,940	30	Shale: greenish grey; trace of reddish and grey limestone.	
		1,940–1,970	30	Shale: grey; little grey and reddish limestone throughout.	
		1,970–2,010	40	Dolomite: grey, crystalline; much greenish grey shale throughout.	Manitoulin
		2,010–2,030	20	Shaly limestone: grey.	
Brooke	Medina	2,215–2,220	5	Shale: reddish, limy; some grey dolomite.	Cabot Head
		2,220–2,260	40	Shale: greenish grey; trace grey limestone at 2,250 feet; little reddish, shaly limestone at base.	
		2,260–2,290	30	Shale: grey; little grey limestone.	
		2,290–2,295	5	Dolomite: grey, crystalline; much grey shale.	
		2,295–2,300	5	Shale: grey; much grey dolomite; Bryozoa.	
		2,300–2,325	25	Limestone: grey, crystalline; much greenish grey shale; pyrite at 2,320 feet.	Manitoulin
		2,325–2,335	10	Shale: grey, limy.	
		2,335–2,340	5	Limestone: grey, fine grained, shaly.	
		2,340–2,345	5	Shale: greenish grey; little red, shaly limestone.	

[1]Caley, J. F.: Geol. Surv., Canada, Mem. 226, 1941, p. 12.

Township	Formation	Depth	Thickness	Lithology	Member
		Feet	Feet,		
Dunwich	Medina	1,663–1,687	24	Sandstone: grey, fine grained (indicative of Grimsby facies?); much red and green shale.	Cabot Head
		1,687–1,735	48	Shale: greenish grey; trace red, impure dolomite at 1,699 feet.	
		1,735–1,759	24	Shale: greenish grey; little grey limestone; crystalline.	
		1,759–1,793	34	Limestone: grey, crystalline; grey shale throughout.	Manitoulin
Yarmouth	Medina	1,450–1,460	10	Shale: grey and greenish.	Cabot Head
		1,460–1,465	5	Sandstone: grey, fine grained (indicative of Grimsby facies?); some grey shale.	
		1,465–1,475	10	Shale: grey.	
		1,475–1,485	10	Shale: greenish grey; some grey and reddish, impure limestone.	
		1,485–1,495	10	Limestone: red and grey; some greenish shale; Bryozoa.	
		1,495–1,520	25	Shale: greenish grey; little grey limestone throughout.	
		1,520–1,550	30	Limestone: grey, crystalline; some greenish grey shale throughout.	Manitoulin
		1,550–1,560	10	Mixture greenish grey shale and grey, crystalline limestone.	
		1,560–1,565	5	Shale: green; little grey limestone.	
Hullett	Medina	1,860–1,870	10	Shale: red.	
		1,870–1,900	30	Shale: green and grey; little red shale.	
		1,900–1,955	55	Limestone: grey; little red and grey shale; Bryozoa.	
		1,955–1,960	5	Shale: grey and red.	
		1,960–1,970	10	Limestone: grey; little grey shale.	
		1,970–1,975	5	Shale: grey; little red shale and grey limestone.	
		1,975–1,980	5	Limestone: grey, little grey shale.	
Blanchard	Medina	1,323–1,355	32	Shale: greenish grey; little grey limestone.	Cabot Head
		1,355–1,390	35	Limestone: grey, crystalline; little green shale.	Manitoulin
		1,390–1,410	20	Limestone: shaly, grey.	
		1,410–1,415	5	Shale: greenish grey; little grey, shaly limestone.	
Caradoc	Medina	1,560–1,580	20	Shale: grey and greenish grey.	
		1,580–1,600	20	Mixture of grey and greenish shale with grey and reddish, impure limestone.	
		1,600–1,640	40	Shale: grey; some greenish grey shale and grey limestone.	
		1,640–1,650	10	Limestone: grey, crystalline.	
		1,650–1,660	10	Shale: grey and greenish grey; little grey limestone.	

Township	Formation	Depth	Thickness	Lithology	Member
		Feet	Feet		
Ekfrid	Medina	1,585–1,590	5	Sandstone: shaly, grey (indicative of Grimsby facies?); equal amount of green shale.	
		1,590–1,595	5	Shale: grey, little grey limestone.	
		1,595–1,610	15	Shale: greenish grey.	
		1,610–1,620	10	Shale: greenish grey; little red, impure limestone; *Helopora* sp.	
		1,620–1,670	50	Shale: greenish grey, little grey limestone throughout.	
		1,670–1,680	10	Limestone: grey, crystalline; little greenish shale.	
		1,680–1,700	20	Shale: greenish grey; little grey, crystalline limestone.	
Harwich	Medina	1,885–1,914	29	Shale: green and red; little grey, crystalline limestone.	Cabot Head
		1,914–1,920	6	Shale: red; trace green shale.	
		1,920–1,955	35	Shale: grey; trace of red shale.	
		1,955–1,970	15	Shale: grey; traces of dolomite and red shale.	
		1,970–1,988	18	Shale: grey; little red shale and grey dolomite. Bryozoa at 1,985 feet.	
		1,988–2,035	47	Dolomite: grey, crystalline.	Manitoulin
		2,035–2,046	11	Shale: grey; some grey dolomite.	

CLINTON FORMATION

The Clinton formation is not everywhere present. Owing to the fact that most of the wells are concentrated in the southern part of the area and that relatively few wells penetrate this horizon, the exact distribution of the Clinton cannot be stated. However, wells in Hullett, Brooke, and Euphemia townships apparently contain no Clinton, which suggests that the formation may be absent in the northern and extreme western part of the area.

The Clinton, where present, occupies a position between the Medina below and the Rochester formation above. It is lithologically similar wherever it occurs and consists of grey and brownish grey, crystalline dolomite. The contacts are sharp and it is easily separated in well cuttings from the greenish and red Medina shale below and the dark grey Rochester shale above. The following table gives the thickness present in the townships specified.

County	Township	Thickness
		Feet
Elgin	Yarmouth	20
Middlesex	Nissouri West	29
Perth	Blanchard	23
Elgin	Dunwich	30
Middlesex	Caradoc	20
Middlesex	Ekfrid	20
Lambton	Bosanquet	10
Kent	Harwich	6
Elgin	Southwold	9
Kent	Orford	1

The foregoing figures indicate a thinning of the formation westward across the area from 29 feet in Nissouri West township on the east to 1 foot in Orford township on the west.

ROCHESTER FORMATION

The Rochester formation has approximately the same distribution as the underlying Clinton. It immediately overlies the Clinton and is itself overlain by the Lockport formation. It consists, wherever it has been penetrated, of dark grey shale and calcareous shale and is readily distinguishable by its lithology from both the Clinton dolomite below and the Lockport dolomite above.

The following table gives the thickness present in the townships specified.

County	Township	Thickness
		Feet
Elgin	Yarmouth	50
Elgin	Southwold	42
Middlesex	Nissouri West	33
Perth	Blanchard	28
Elgin	Dunwich	42
Middlesex	Caradoc	40
Middlesex	Ekfrid	45
Kent	Harwich	23
Kent	Orford	25
Lambton	Euphemia	40
Lambton	Brooke	50
Lambton	Bosanquet	50

GUELPH-LOCKPORT BEDS

Although the Guelph and Lockport formations were mapped separately in the areas adjoining to the east, no satisfactory criteria were found upon which the two could be separated in well samples: they were, therefore, logged as a single unit under the term Guelph-Lockport.[1] In the London area the same conditions prevail: the two formations as seen in well cuttings are lithologically alike and form a unit that cannot be subdivided. The usage cited above is, therefore, continued.

The Guelph-Lockport occupies a position between the Rochester formation below and the Salina formation above, or, where the Rochester and Clinton are absent, between the Medina below and the Salina above. The beds consist of a succession of fine-grained, crystalline, and granular dolomite, which is commonly buff or brownish grey in the upper part, becoming grey and even almost white toward the base.

Where the beds rest upon the Medina, the contact is sharp, and the line of division between the light grey Guelph-Lockport dolomite and the greenish and red shale of the Medina formation is easily recognized. In like manner, where the Rochester is the underlying formation, the separation between the Guelph-Lockport dolomite and the Rochester shale is also easily recognized.

The upper limit of the Guelph-Lockport is not easily placed in well samples. This contact is discussed on a succeeding page when describing

[1]Caley, J. F.: Geol. Surv., Canada, Mem. 224, 1940, pp. 60, 72; Mem. 226, 1941, p. 29.

the delimitation of the Salina formation. In well samples there is a recognizable change in texture either at, or within a few feet of, the lowest occurrence of the gypsum fragments so characteristically associated with the Salina formation. The contact is placed at this change. Above it, the lower 100 to 300 feet of the Salina is everywhere a brown, finely crystalline to dense dolomite with variable quantities of gypsum throughout, whereas below it the Guelph dolomite is buff or brown in colour but distinctly crystalline and in many wells even granular in texture, and, although fragments of selenite are not uncommon, the white gypsum rarely occurs. Tables illustrating this contact zone appear on later pages under the heading of Salina Formation. The detailed lithology of the beds is shown in the logs of deep wells given in the first part of this chapter.

The following table gives the thickness of the Guelph-Lockport in the townships specified.

County	Township	Thickness
		Feet
Elgin	Southwold	296
Elgin	Yarmouth	255
Middlesex	Nissouri West	294
Middlesex	London	251
Middlesex	London	230
Perth	Blanchard	275
Huron	Hullett	100
Middlesex	Caradoc	270
Middlesex	Ekfrid	210
Kent	Harwich	316
Kent	Orford	293
Lambton	Euphemia	193
Elgin	Dunwich	285
Elgin	Dunwich	310
Lambton	Brooke	165
Lambton	Bosanquet	140

SALINA FORMATION[1]

Distribution. The Salina formation has an areal extent of less than one square mile: it immediately underlies the drift only at the extreme northeast corner of the area and nowhere does it outcrop. Boring samples show it to be present beneath younger strata throughout the remainder of the area.

Lithology. Only by means of boring samples can the Salina formation be studied. As thus examined the formation exhibits, in general, alternations of grey and brown zones, each of which presents a lithology peculiar to itself. The brown consists of fine-grained to dense dolomite, and the grey varies from argillaceous dolomite to dolomitic shale that may perhaps more properly be described as an argillo-calcareous mud rock. The formation as a whole is, therefore, more or less calcareous, the nearest approach to a true shale being some thin zones of grey and greenish, soft, argillaceous rock observed in samples from a few of the wells, notably in Delaware, McGillivray, Southwold, and Nissouri West townships. Traces of gypsum are present throughout practically the entire formation, and in many of the wells examined it occurs in zones up to 5 feet thick, commonly within the

[1]The history of the name "Salina" is given in Geol. Surv., Canada, Mem. 226, pp. 38-39 (1941).

lower 100 feet of the formation. In the western half of the area, well records from McGillivray, Dunwich, Hullett, Bosanquet, Euphemia, Harwich, and Brooke townships show thicknesses of salt aggregating as much as 350 feet. The salt may occur at one, two, or three horizons in a single well, and individual beds range from 25 to 295 feet in thickness. The greatest aggregate thickness so far observed is penetrated by a well on lot 10, con. 13, Brooke tp., in which the mineral occurs in three separate beds of 30, 295, and 25 feet respectively.

Delimitation and Thickness. The lower limit of the formation is not everywhere easy to locate in well samples, due to a similarity between the lower Salina and the upper Guelph dolomites. In all the well samples examined, however, there was found to be a recognizable change in texture either at or within a few feet of the lowest occurrence of the white gypsum fragments so characteristically associated with the Salina. The contact is placed at this change. Above this horizon the lower 100 to 300 feet of the Salina is everywhere a brown, finely crystalline to dense dolomite with small but variable quantities of gypsum practically throughout. Below, the Guelph dolomite is brown or buff but distinctly crystalline, and in many wells of an even granular texture, and, though fragments of selenite are not uncommon, the white gypsum rarely occurs. As already intimated, some wells show a few feet of dolomite between the lowest gypsum occurrence and the highest, easily recognizable, crystalline to granular Guelph dolomite: this doubtful zone is placed in the Salina. No evidence to indicate other than a conformable relationship between the Salina and underlying Guelph has been observed in the well samples. The doubtful zone referred to above, in which in some wells the rock is neither typical Salina nor typical Guelph, may be interpreted as being transitional between the two formations. Similar conditions were found to prevail in the adjoining area[1] to the east where, in addition to well samples, the contact zone was available for study at one locality through a number of test core borings.

The Salina-Bertie-Akron contact is also conformable, and in most of the wells examined can readily be placed with reasonable assurance and consistency. It is placed above the highest occurrence of anhydrite or gypsum usually associated with medium to dark grey, shaly dolomite or dolomitic shale. This horizon is almost invariably overlain by at least 50 feet of brown or brownish grey, finely crystalline dolomite with, in some wells, dark bituminous streaks, and which represents the Bertie-Akron formation. The following table illustrates the character of both the upper and lower contact zones as well as the lithology of the Salina formation in the townships specified. The table is based on examination of samples from one well in each township.

[1]Caley, J. F.: Geol. Surv., Canada, Mem. 226, 1941.

Township	Depth	Thickness	Lithology	Formation
	Feet	Feet		
Blanchard	493–559	66	Dolomite: buff and brown, finely crystalline.	Bertie-Akron
	559–600	41	Dolomite: brown, dense; little grey shale; traces of gypsum.	Salina
	600–706	106	Limy shale: grey and greenish; trace gypsum.	
	706–729	23	Dolomite: brown, dense; little grey shale.	
	729–752	23	Limy shale: greenish grey; trace of gypsum.	
	752–804	52	Dolomite: brown, dense; trace of gypsum at 775 feet.	
	804–856	52	Limy shale: dark greenish grey.	
	856–997	141	Dolomite: buff, dense; traces gypsum.	
	997–1,152	155	Dolomite: buff and grey, cyrstalline.	Guelph
Nissouri West	585–615	30	Dolomite: brown and grey, finely crystalline; dark bituminous streaks at 615 feet.	Bertie-Akron
	615–621	6	Dolomite: brown, dense; little grey, limy shale; trace gypsum.	Salina
	621–650	29	Dolomitic shale: dark grey; trace of gypsum.	
	650–732	82	Limy shale: dark greenish grey; trace gypsum throughout; brown dolomite at 721 to 732 feet.	
	732–842	110	Dolomite: brown, dense; some grey, limy shale and trace of gypsum throughout.	
	842–893	51	Limy shale: grey and greenish; trace gypsum.	
	893–1,000	107	Dolomite: brown and buff, dense; much gypsum at 921 and 994 feet.	
	1,000–1,041	41	Dolomite: brown, finely crystalline and granular.	Guelph
Yarmouth	670–730	60	Dolomitic limestone: brownish grey, finely crystalline.	Bertie-Akron
	730–745	15	Shaly dolomite: grey; little brown, dense dolomite.	Salina
	745–755	10	Dolomite: brown, dense; trace of gypsum.	
	755–845	90	Dolomitic shale: dark grey; little gypsum throughout.	
	845–965	120	Dolomite: brown, dense; little dark grey, limy shale; trace gypsum throughout.	
	965–980	15	Limy shale: dark greenish grey; trace gypsum.	
	980–1,005	25	Dolomitic shale: dark grey; little brown, dense dolomite; trace gypsum.	
	1,005–1,125	120	Dolomite: brown, dense; little dark grey, limy shale at 1,010 and 1,125 feet; gypsum.	
	1,125–1,175	50	Dolomite: buff and brownish, finely crystalline to granular.	Guelph
Southwold	675–740	65	Dolomitic limestone: brownish grey, dense.	Bertie-Akron
	740–750	10	Shaly dolomite: dark grey; much gypsum at 750 feet.	Salina

Township	Depth	Thickness	Lithology	Formation
	Feet	Feet		
Southwold	750–765	15	Dolomite: brown, dense; little gypsum.	
	765–855	90	Dolomitic shale and shaly dolomite: grey; some brown dolomite; little gypsum throughout.	
	855–960	105	Dolomite: brown, dense; some dark grey, limy shale; traces gypsum throughout.	
	960–1,020	60	Dolomitic shale: grey and greenish; little gypsum throughout.	
	1,020–1,080	60	Dolomite: brown, dense; some grey and greenish, limy shale; traces gypsum from 1,020-1,055 feet.	
	1,080–1,130	50	Dolomite: grey and buff, crystalline; trace gypsum at 1,090 feet.	Guelph
London	718–754	36	Dolomitic limestone: brownish grey, dense; some black, bituminous streaks and traces of dark grey, argillaceous limestone.	Bertie-Akron
	754–766	12	Shaly dolomite: grey; trace gypsum.	Salina
	766–784	18	Dolomite: brown, dense; trace gypsum.	
	784–880	96	Dolomitic shale: grey; trace gypsum.	
	880–1,006	126	Dolomitic limestone; brown, dense; some dark grey, limy shale and trace of gypsum throughout.	
	1,006–1,078	72	Shaly dolomite and dolomitic shale: grey; trace red shale at 1,030 and green shale at 1,078 feet.	
	1,078–1,114	36	Dolomite: brownish grey, dense.	
	1,114–1,144	30	Shaly dolomite: grey.	
	1,144–1,150	6	Gypsum.	
	1,150–1,199	49	Dolomite: brown, dense; trace of gypsum.	
	1,199–1,227	28	Dolomite: grey to buff, crystalline.	Guelph
Hullett	780–795	15	Dolomite: brown.	Bertie-Akron
	795–880	85	No samples.	
	880–885	5	Dolomite: brown.	
	885–905	20	Dolomite: argillaceous; little gypsum.	Salina
	905–925	20	Dolomite: browh, dense.	
	925–1,035	110	Shaly dolomite: dark grey; little reddish shale at 965 to 980 feet; much gypsum at 980 to 1,005 feet.	
	1,035–1,115	80	Dolomite: brown, dense; some grey, dolomitic shale.	
	1,115–1,220	105	Shaly dolomite: dark grey; some brown dolomite; sand grains at 1,150–1,155 and 1,160 to 1,165 feet.	
	1,220–1,250	30	Salt; little brown dolomite at 1,235 to 1,240 feet.	
	1,250–1,465	215	Salt; little brown dolomite in many samples.	
	1,465–1,590	125	Dolomite: grey and brown.	
	1,590–1,625	35	Salt; little brown dolomite at 1,590 to 1,595 feet.	
	1,625–1,650	25	Limestone: brown and grey; little gypsum.	
	1,650–1,745	95	Dolomite: brown and grey.	
	1,745–1,760	15	Gypsum; much brown, dense dolomite.	
	1,760–1,805	45	Dolomite: brown and grey, finely crystalline.	Guelph

Township	Depth	Thickness	Lithology	Formation
	Feet	Feet		
McGillivray	636–690	54	Dolomite: bluish grey, dense; pyrite at 684 feet.	Bertie-Akron
	690–768	78	Dolomite: grey and brownish, dense; in places argillaceous; traces gypsum throughout.	Salina
	768–846	78	Dolomitic shale: grey; trace gypsum.	
	846–888	42	Dolomite: brown, dense; some grey, limy shale; trace gypsum.	
	888–906	18	Shaly dolomite: grey; some brown dolomite; traces gypsum.	
	906–917	11	Dolomite: brown, dense; trace gypsum.	
	917–929	12	Shaly dolomite: grey; some brown dolomite; trace gypsum.	
	929–966	37	Dolomite; brown, dense; some grey, shaly dolomite; trace gypsum.	
	966–979	13	Shaly dolomite: grey.	
	979–985	6	Dolomite: brown, dense; some greenish shale with rounded sand grains.	
	985–1,008	23	Shale: greenish and grey; traces red shale; few sand grains at 991 feet.	
	1,008–1,044	36	Dolomite: brown, dense; green shale at 1,026 feet; trace gypsum at 1,020 and 1,038 feet.	
	1,044–1,260	216	Salt.	
	1,260–1,374	114	Dolomite: brown, dense; gypsum from 1,296 to 1,320 feet.	
	1,374–1,386	12	Limy shale: grey.	
	1,386–1,416	30	No samples.	
	1,416–1,421	5	Dolomite: brown, dense; little gypsum.	
	1,421–1,445	24	Dolomite: brown and grey, finely crystalline to granular; trace gypsum at 1,440 feet.	Guelph
Caradoc	665–770	105	Dolomitic limestone: brown, finely crystalline.	Bertie-Akron
	770–820	50	Dolomitic limestone: grey, dense; trace of gypsum at 810 to 820 feet.	Salina
	820–1,030	210	No samples.	
	1,030–1,080	50	Dolomitic shale: grey; gypsum at 1,025 and 1,035 feet.	
	1,080–1,215	135	No samples.	
	1,215–1,230	15	Shaly dolomite: grey; trace gypsum.	
	1,230–1,300	70	Dolomite: buff and grey, crystalline.	Guelph
Delaware	544–662	118	Dolomitic limestone: buff-grey, dense.	Bertie-Akron
	662–725	63	Dolomite: brown and grey, dense; trace gypsum.	Salina
	725–737	12	No samples.	
	737–788	51	Dolomite: brown, dense; little gypsum at 763 to 788 feet.	
	788–907	119	Limy shale: grey and greenish; little brown dolomite and gypsum.	
	907–1,025	118	Dolomite: brown, dense; little grey, limy shale; trace gypsum throughout.	
	1,025–1,066	41	Limy shale: grey and greenish; trace gypsum.	
	1,066–1,072	6	Dolomite: brown, dense; trace gypsum.	
	1,072–1,114	42	Shaly dolomite: grey; some brown dolomite; trace gypsum throughout.	
	1,114–1,209	95	Dolomite: brown, dense; much gypsum at 1,203 feet.	
	1,209–1,230	21	Dolomite: buff, crystalline.	Guelph

Township	Depth	Thickness	Lithology	Formation
	Feet	Feet		
Dunwich	802–830	28	Dolomitic limestone: brownish grey, finely crystalline to dense.	Bertie-Akron
	830–845	15	Dolomite: brown, dense; trace gypsum.	Salina
	845–856	11	Shaly dolomite: grey; little gypsum.	
	856–874	18	Dolomite: brown, dense; little gypsum.	
	874–952	78	Shaly dolomite: grey, trace gypsum.	
	952–1,011	59	Dolomite: brown, dense; trace gypsum.	
	1,011–1,023	12	Shaly dolomite: grey, little gypsum.	
	1,023–1,083	60	Dolomite: brown, dense; trace gypsum.	
	1,083–1,155	72	Shaly dolomite: grey; some green and reddish shale at 1,107 to 1,119 feet; trace gypsum.	
	1,155–1,161	6	Dolomite: brown, dense.	
	1,161–1,246	85	Salt.	
	1,246–1,324	78	Dolomite: brown, dense; trace of gypsum.	
	1,324–1,330	6	Gypsum; little brown dolomite.	
	1,330–1,336	6	Dolomite: brown, dense; much gypsum.	
Euphemia	850–920	70	Magnesian limestone: brownish grey, finely crystalline to dense; dark, bituminous streaks 890 to 915 feet.	Bertie-Akron
	920–930	10	Dolomite: brown, dense; little gypsum.	Salina
	930–1,070	140	Limy shale: dark grey and greenish; little gypsum throughout.	
	1,070–1,210	140	Dolomite: brown, dense; some green shale at 1,130 to 1,140 feet; little gypsum throughout.	Salina
	1,210–1,250	40	Limy shale: grey and greenish; trace gypsum.	
	1,250–1,300	50	Dolomite: brownish grey, dense; much gypsum at 1,290 feet.	
	1,300–1,435	135	Salt.	
	1,435–1,440	5	Dolomite: brown, dense.	
	1,440–1,455	15	Salt.	
	1,455–1,705	250	Dolomite: brown, dense; trace gypsum at 1,480, 1,580, 1,700, and 1,705 feet.	
	1,705–1,730	25	Gypsum; little brown dolomite.	
	1,730–1,760	30	Dolomite: brown, dense; trace gypsum.	
	1,760–1,840	80	Dolomite: grey, crystalline.	Guelph
Brooke	1,000–1,080	80	Magnesian limestone: grey to brown, finely crystalline.	Bertie-Akron
	1,080–1,115	35	Dolomite: brownish grey, dense.	
	1,115–1,160	45	Dolomite: brownish grey, dense; trace gypsum.	Salina
	1,160–1,210	50	Limy shale: greenish grey; trace gypsum.	
	1,210–1,340	130	Dolomite: brown, dense; some grey, limy shale; little gypsum.	
	1,340–1,370	30	Salt.	
	1,370–1,440	70	Shale: grey; trace gypsum throughout, with much at 1,440 feet.	
	1,440–1,735	295	Salt.	
	1,735–1,830	95	Dolomite: brown, finely crystalline; trace gypsum at 1,760 and 1,790 feet.	
	1,830–1,880	50	Limestone: brownish grey, finely crystalline; little grey shale and gypsum at 1,800 feet.	
	1,880–1,905	25	Salt.	
	1,905–1,910	5	Gypsum; trace of grey, limy shale.	
	1,910–1,995	85	Dolomite: brownish grey, finely crystalline; traces gypsum at 1,920 and 1,950 feet.	
	1,995–2,060	65	Dolomite: grey and brown, finely granular.	Guelph

Township	Depth	Thickness	Lithology	Formation
	Feet	Feet		
Harwich	900–935	35	Dolomitic limestone: grey and brown, finely crystalline; trace gypsum at 915 feet; trace pyrite at 925 feet.	Bertie-Akron
	935–960	25	Shaly limestone: grey; much gypsum at 960 feet.	Salina
	960–970	10	Dolomite: brown, dense; much gypsum.	
	970–1,065	95	Limy shale: dark grey; brown dolomite at 1,060 feet; trace gypsum throughout.	
	1,065–1,145	80	Dolomite: brown, dense; little grey, shaly dolomite and trace of gypsum throughout.	
	1,145–1,150	5	No sample.	
	1,150–1,205	55	Dolomite: brownish grey, finely crystalline; trace gypsum throughout, with much at 1,195 feet.	
	1,205–1,260	55	Limy shale: dark grey; little brown dolomite at 1,245 to 1,260 feet; trace gypsum throughout.	
	1,260–1,280	20	Dolomite: buff, finely crystalline; trace gypsum.	
	1,280–1,440	160	Salt.	
	1,440–1,530	90	Dolomite: brown, finely crystalline; some dark grey shale; trace of gypsum.	
	1,530–1,535	5	Gypsum: little grey, limy shale.	
	1,535–1,540	5	Dolomite: grey; trace gypsum.	
	1,540–1,560	20	Dolomite: grey, crystalline; trace gypsum.	Guelph
	1,560–1,580	20	Dolomite: buff, crystalline.	
Bosanquet	885–1,025	140	Dolomite: buff, finely crystalline; shaly at 1,010-1,025 feet.	Bertie-Akron
	1,025–1,145	120	Dolomitic shale: grey; little gypsum.	Salina
	1,145–1,225	80	Shaly dolomite: buff and grey; little gypsum.	
	1,225–1,345	120	Dolomite: buff, dense; little gypsum throughout, 40 per cent at 1,275 to 1,285, and 60 per cent at 1,285 to 1,295 feet.	
	1,345–1,385	40	Salt.	
	1,385–1,465	80	Dolomite and shaly dolomite: brown and grey; some gypsum.	
	1,465–1,475	10	Salt.	
	1,475–1,525	50	Dolomite: buff, dense; some gypsum.	
	1,525–1,695	170	Salt.	
	1,695–1,795	100	Dolomite: buff, dense; trace gypsum.	
	1,795–1,875	80	Limestone: grey-buff, dense.	
	1,875–1,930	55	Salt.	
	1,930–1,945	15	Gypsum; some brown limestone.	
	1,945–2,035	90	Limestone: dark brown, dense.	
	2,035–2,045	10	Dolomite: buff, dense; 35 per cent gypsum.	
	2,045–2,065	20	Limestone: dark brown, dense.	Guelph
	2,065–2,075	10	Dolomite: brown.	

The Salina formation shows some variation in thickness both in wells from adjoining townships and in wells more widely separated throughout the area. It is suggested that part of the more local variation may be due to difficulty in placing the lower boundary in well samples, and the introduc-

tion of varying quantities of salt greatly increases the total thickness of the formation at several localities in the western part of the area. The following table illustrates the conditions as indicated by detailed examination of one well from each of the townships specified.

County	Township	Thickness	Thickness of salt	Thickness without salt
		Feet	Feet	Feet
Middlesex	Dorchester North	350	0	350
Perth	Blanchard	438	0	438
Middlesex	Nissouri West	385	0	385
Middlesex	London	451	0	451
Middlesex	London	780	180	600
Middlesex	Delaware	547	0	547
Elgin	Southwold	340	0	340
Elgin	Yarmouth	395	0	395
Elgin	Dunwich	400	85	315
Middlesex	Ekfrid	475	0	475
Middlesex	Caradoc	460	0	460
Middlesex	McGillivray	720	216	504
Huron	Hullett	875	280	595
Lambton	Bosanquet	1,020	275	745
Lambton	Brooke	880	350	530
Lambton	Euphemia	840	150	690
Kent	Harwich	605	160	445
Elgin	Aldborough	596	51	545

Notwithstanding the local variations indicated by the foregoing figures, and after deducting the total thickness of salt from each well, there does appear to be a general thickening of the formation northwestward across the area from a minimum of 315 feet in Dunwich to a maximum of 745 feet in Bosanquet township.

Correlation. Any correlation of the Salina formation in the London area must of necessity be based solely on lithology and stratigraphic position. The formation is known only from well samples and palæontological material is completly lacking.

The formation is continuous with the Salina of the adjoining area[1] to the east, and except that at some localities it contains varying quantities of salt, its lithology is essentially similar.

In the State of New York, "Camillus" shale is the term applied to the beds immediately below the Bertie waterlime and resting upon the rock salt. It has been pointed out by Alling[2] that although in a general stratigraphic sense the term "shale" is satisfactory, the Camillus at its type locality is really not a shale but a fine-grained, massive, ashen grey, magnesian-lime mud rock. The writer has decribed the Salina beds of the area as an alternating series of grey, argillocalcareous mud rock and brown, dense dolomite, the entire succession containing small though varying quantities of gypsum and, at some localities, thick beds of salt. It will be seen that the sediments of both the New York Camillus and the Salina of the London area represent essentially the same type of lithology. They both suggest special, and to some degree similar, conditions prevailing during the time of their accumulation. In view of the like stratigraphic

[1]Caley, J. F.: Geol. Surv., Canada, Mem. 226, 1941.
[2]Alling, H. L.: N.Y. State Mus. Bull 275, 1928, p. 24.

position and the similar lithology, the Salina of this area and the Camillus shale of New York State are considered equivalents.

In Michigan the Salina beds rest upon the upper Niagaran dolomites and are overlain by the Bass Island series. Cook[1] has described the Salina at the deepest part of the Michigan basin and states that it is in the main a dolomitic limestone formation, the rock being "grey, buff, or brown in colour and at times argillaceous". Admitting the possibility or even the probability of the Salina of the London area and of the Michigan basin having been formed in separate, partly or entirely disconnected basins, the two deposits are here considered as contemporaneous.

BERTIE-AKRON SERIES[2]

General Statement. All the Silurian strata above the Salina formation are here described under the term Bertie-Akron series. These rocks occupy the stratigraphic position of the Bertie-Akron formation as it is developed in both the Niagara Peninsula and the Brantford area[3]. It is not divisible in these two areas nor in the present area and, therefore, it has been mapped and logged as a single unit.

Distribution. The Bertie-Akron series has an areal extent of approximately 3 square miles: it forms the upper bed-rock only in the extreme northeastern part of the area, and it nowhere outcrops and, therefore, is known only from boring records; these indicate its presence beneath younger strata throughout the remainder of the area.

Lithology. As observed in borings samples, these youngest Silurian rocks are a lithologically uniform series of brown, brownish grey, and grey, finely crystalline to dense dolomite and dolomitic limestone, with, in some wells, black, bituminous partings, particularly in the lower part. Traces of gypsum or anhydrite have been observed in wells from Yarmouth, Dunwich, Brooke, and Harwick townships, and small specks of pyrite are not uncommon. The details of this lithology are shown in the following table, based on examinations of one well in each township.

Township	Depth	Thickness	Lithology
	Feet	Feet	
Blanchard	493–559	66	Dolomite: buff and brown, finely crystalline to dense.
Nissouri West	530–542	12	Dolomite: brown, finely crystalline.
	542–570	28	Limestone: cream coloured, finely crystalline; dark, bituminous partings at 563 feet.
	570–615	30	Dolomite: brown and grey, finely crystalline; dark grey, limy shale at 608 feet; dark, bituminous streaks at 615 feet.
Dorchester North	610–690	80	Dolomite: grey and brownish, finely crystalline; some dark, bituminous streaks.
Yarmouth	670–730	60	Dolomitic limestone: brownish grey, finely crystalline; trace gypsum at 695 feet.
Southwold	675–740	65	Dolomitic limestone; brownish grey, dense; black, bituminous films at 720 feet.

[1]Cook, C. W.: Mich. Geol. and Biol. Surv., Pub. 15, 1913, p. 86.
[2]The history of the name "Bertie-Akron" is given in Geol. Surv., Canada, Mem. 226, p. 43 (1941).
[3]Caley, J. F.: Geol. Surv., Canada, Mem. 226, 1941.

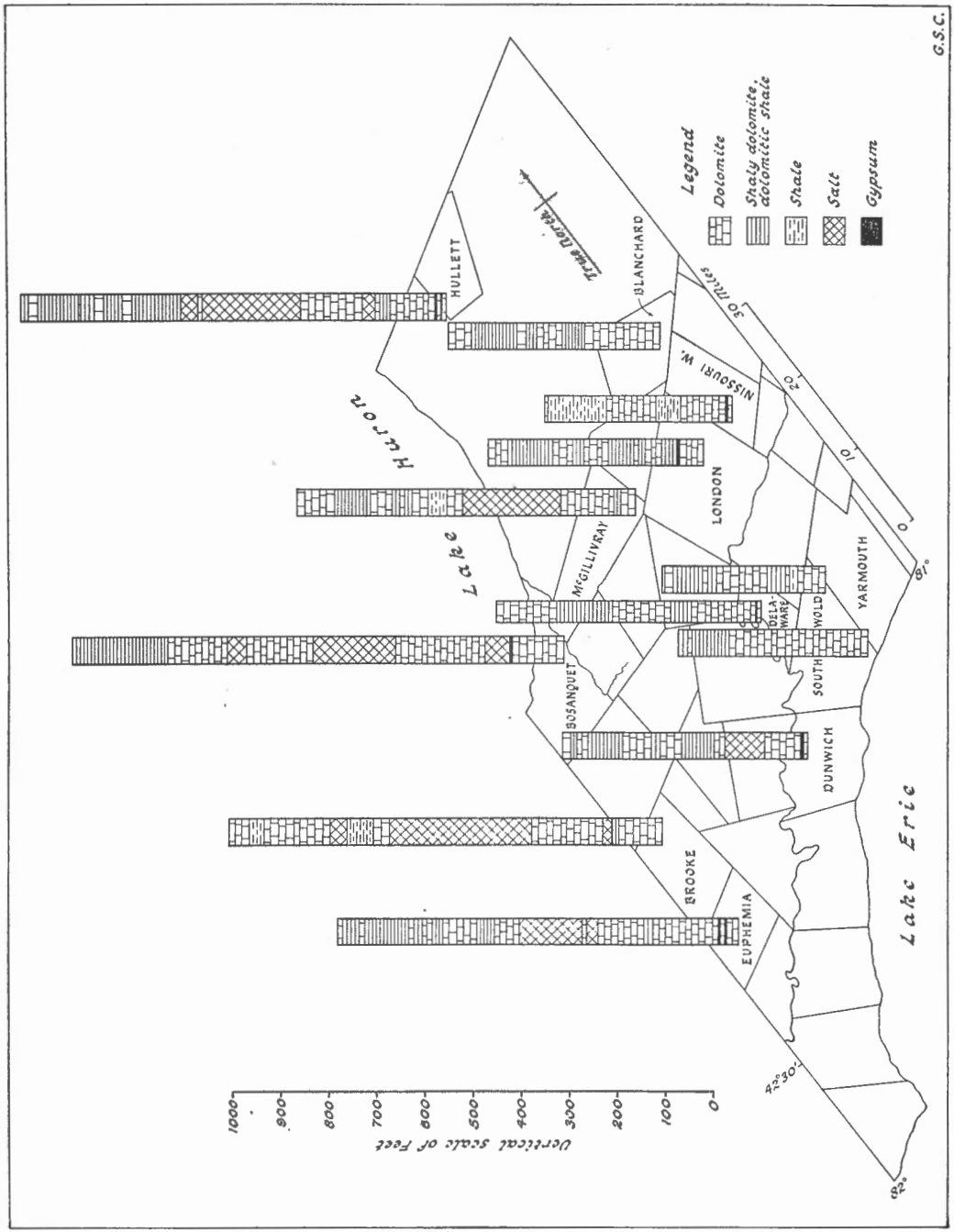

Figure 1. Columnar sections of the Salina formation, showing its total thickness and lithology, and the thickness of salt and gypsum in the townships specified. The formation is nearly everywhere overlain by younger Palæozoic rocks.

72996—3½

Township	Depth	Thickness	Lithology
	Feet	Feet	
London	6 82–712	30	Dolomite: brownish grey, dense.
	712–754	42	Dolomite: brownish grey, dense; black, bituminous streaks at 718 and 748 feet; trace dark grey, shaly limestone at 736 and 754 feet.
Hullett	780–795	15	Dolomite: brown, dense.
	795–880	85	No samples.
	880–885	5	Dolomite: brown, dense.
McGillivray	636–690	54	Dolomite: buff, brownish grey, and grey, finely crystalline to dense; little pyrite at 684 feet.
Caradoc	665–770	105	Dolomitic limestone: brownish grey, finely crystalline to dense.
Delaware	544–662	118	Dolomitic limestone: buff and brownish grey, dense; little pyrite at 562, 581, and 625 feet.
Dunwich	687–710	23	Dolomitic limestone: cream coloured, fine grained.
	710–738	28	Dolomitic limestone: brownish grey, dense.
	738–766	28	Dolomitic limestone: dark brownish grey, finely crystalline; trace gypsum at 748 to 754 feet.
	766–790	24	Dolomitic limestone: brownish grey, dense.
	790–796	6	No samples.
	796–830	34	Dolomitic limestone: grey and brownish grey, dense; traces selenite at 802–820 feet.
Euphemia	850–880	30	Dolomite: brownish grey, fine grained to dense.
	880–920	40	Dolomite: brownish grey, dense; dark, bituminous streaks 890 to 910 feet.
Brooke	1,000–1,070	70	Dolomitic limestone: grey to brown, finely crystalline to dense.
	1,070–1,115	45	Dolomite: brownish grey, dense; little gypsum 1,080 to 1,090 feet.
Harwich	790–810	20	Dolomitic limestone: brown, finely granular.
	810–835	25	Dolomitic limestone: brownish grey, finely crystalline; dark, bituminous streaks 815 to 820 feet.
	835–865	30	Dolomitic limestone: grey, finely crystalline.
	865–900	35	Dolomitic limestone: brownish grey, finely crystalline; black, bituminous streaks at 890 feet.
	900–935	35	Dolomitic limestone: grey and brownish grey, finely crystalline; trace gypsum at 915 feet; trace of pyrite at 825 feet.
Bosanquet	885–1,025	140	Dolomite: buff and brown, dense, shaly at 1,010 to 1,025 feet.
Ekfrid	755–835	80	Dolomitic limestone: brown and brownish grey, dense; dark, bituminous streaks at 790 feet; little pyrite at 800 feet.

Delimitation and Thickness. The lower boundary of the Bertie-Akron has been described in the discussion of the upper limit of the Salina formation. It is placed above the highest occurrence of anhydrite or gypsum usually associated with medium to dark grey, shaly dolomite or dolomitic shale of the Salina formation.

The upper limit of the Bertie-Akron is the Silurian-Devonian contact. In both the Niagara Peninsula[1] and the adjoining area[2] to the east, the contact is disconformable and has been described from exposures. In the London area, where the Bertie-Akron is everywhere concealed, the relationship of the Silurian to the Devonian is not observable. However, the appreciable local variation in thickness of the Bertie-Akron, together with the presence of sand grains and glauconite at the base of the overlying Norfolk formation point to the probability that the disconformity separating the two systems in areas to the east is present also throughout the London area.

In boring samples the actual position of the contact is generally not difficult to recognize. It is characterized by the abrupt disappearance of grey chert, and in many wells by the presence of rounded sand grains in the base of the Norfolk formation.

In all the wells examined the lower 50 to 200 feet of the Devonian (Norfolk formation) contains a varying though appreciable quantity of chert associated with brownish grey to cream-coloured, finely crystalline limestone or, more rarely, dolomite. The chert generally increases in quantity downward, and in most wells constitutes the dominant lithology at or within a few feet of the base of the formation where it completely disappears. In addition to the chert, the lower few feet of the Devonian commonly contains a small quantity of rounded sand, calcareous sandstone, and, rarely, glauconite. The sand grains may extend up to 150 feet above the base of the formation, and in a few wells they form the dominant lithology of the lower few feet. Below the abrupt disappearance of the chert and sand the Bertie-Akron formation is generally darker brown, finer grained to dense, and is a dolomite or dolomitic limestone.

As already intimated, the thickness of the Bertie-Akron beds shows considerable local variation. Some of this may be attributed to error in placing the lower boundary in well samples, but the greater part is doubtless the result of erosion prior to deposition of the overlying Devonian. Following are thicknesses as shown by well samples in the townships specified.

County	Township	Thickness
		Feet
Middlesex	Dorchester North	60–80
Perth	Blanchard	66–80
Middlesex	Nissouri West	85
Middlesex	London	60–72
Middlesex	Delaware	74–118
Elgin	Southwold	65–91
Elgin	Yarmouth	50–80
Elgin	Dunwich	90–143
Middlesex	Ekfrid	78–80
Middlesex	Caradoc	85–105
Middlesex	McGillivray	54
Huron	Hullett	105
Lambton	Bosanquet	125–140
Lambton	Brooke	115–125
Lambton	Euphemia	70–115
Kent	Harwich	145

Notwithstanding the local variations indicated by the foregoing figures, there is a general thickening westward across the area from a

[1]Caley, J. F.: Geol. Surv., Canada, Mem. 224, p. 81 (1940).
[2]Caley, J. F.: Geol. Surv., Canada, Mem. 226, 1941.

minimum of 50 feet in Yarmouth to a maximum of 145 feet in Harwich township.

Correlation. In view of the complete lack of palæontological material and the fact that in the London area the Bertie-Akron is known only from well samples, any correlation must be based entirely upon lithology and stratigraphic position. The beds are continuous with, and occupy the same stratigraphic position as, the beds described under the same name in both the Niagara Peninsula and the Brantford area. In these areas, as well as in the London area, it was generally found impossible, both in well cuttings and at the exposure, to separate the Bertie and overlying Akron dolomite. Tracing these youngest Silurian rocks westward across the Niagara Peninsula to the London area the general lithology in well cuttings is essentially the same except that the dark grey, shaly zones[1] seen in wells from the Niagara Peninsula are not recognized farther west, and in the London area traces of gypsum or anhydrite have been observed that are not present farther east.

In Michigan and Ohio the Silurian rocks above the Salina have been called the Bass Island series[2]. The term was proposed for the Lower Munroe division of Grabau's[3] restricted use of the original Munroe beds of Lane[4] and the name was taken from the group of islands of the same name in western Lake Erie. As thus defined, the Bass Island occupies a position between the Salina below and the Sylvania sandstone above. In Ohio the Sylvania is placed in the Devonian by Carman[5] and described by him as resting disconformably upon the Bass Island series. The Bass Island thus occupies a like stratigraphic position with the Bertie-Akron of the London area.

According to Williams[6] the only outcrops in Ontario that can be directly correlated with the Bass Island series are at an old quarry at Innerkip, and those forming the Canadian Islands and reefs west of Pelee Island and a short distance from the Bass Islands. Williams assigned the Innerkip rocks to the Akron and correlated them with the Raisin River dolomite (Bass Island) of Ohio and Michigan on the basis of the presence of two specimens of *Whitfieldella prosseri.* When visited by the writer the Innerkip quarry had caved in, was filled with water, and could not be examined in detail. These rocks were described under the name Bertie-Akron[7].

In view of the facts that in the area of this report the post-Salina Silurian is known only from drilling samples, that palæontological material is entirely lacking, and that the strata are a westward continuation, with an essentially similar lithology, of the Bertie-Akron of the Niagara Peninsula, the name Bertie-Akron is employed rather than Bass Island.

Chadwick's statement[8], when discussing the Cayugan Waterlimes of western New York, that "it is claimed that the name Bertie should either be retained in the primitive sense covering the entire series inclusive of the Akron, or else be restricted to the cement bed here called the Buffalo, a name said to be preoccupied", merits consideration. As the Akron dolomite

[1]Caley, J. F.: Geol. Surv., Canada, Mem. 224, 1940, p. 81.
[2]Grabau, A. W.: Geol. Soc. Am., vol. 19, 1908, p. 554.
[3]Grabau, A. W.: Science, n.s., vol. 27, 1908, p. 622.
[4]Lane, A. C.: Mich. Geol. Surv., vol. 5, pt. 2, pp. 26-28.
[5]Carman, J. E.: Geol. Soc. Am., vol. 47, 1936, pp. 253-266.
[6]Williams, M. Y.: Geol. Surv., Canada, Mem. 111, 1919, pp. 90-91.
[7]Caley, J. F.: Geol. Surv., Canada, Mem. 226, 1941.
[8]Chadwick, G. H.: Geol. Soc. Am., vol. 28, 1917, p. 173 (Abstract).

cannot be individually distinguished, and as Chapman's original use of the term Bertie[1] apparently included all the Silurian rocks above the Salina, it seems worth pointing out that the post-Salina Silurian strata of the London area might properly be designated by the term Bertie formation.

NORFOLK FORMATION

Definition. The term Norfolk formation was proposed by the writer when mapping the adjoining area[2] to the east. It was used to designate the rocks previously mapped as Delaware and Onondaga together with any underlying Devonian of the same general character that were conformable with them. The term was adopted because of the difficulty of separating the Delaware and Onondaga in well cuttings, as well as the failure to recognize with certainty the presence of Detroit River strata, either in well cuttings or at the outcrop, as separate from the Onondaga. The Norfolk formation as defined constitutes a lithological unit that is readily delimited and, therefore, suitable for mapping purposes. In the London area the same general conditions prevail and the pre-Hamilton Devonian rocks have been mapped as a single unit under the term Norfolk formation. As thus employed the formation may also include limestones thought by some to be of still earlier Devonian age.

Outside the present area, and typically exposed along Detroit River and at the Anderdon quarries near Amherstburg, is a series of rocks somewhat similar to the Onondaga and enclosing a fauna that "if considered by itself would probably be pronounced a Schoharie or Onondaga fauna without a moment's hesitation although there is considerable Siluric element."[3] These rocks were named the Detroit River series by Grabau[4] and are reported to underlie disconformably the Dundee[5] (Onondaga). This disconformable relation between the Detroit River series and the Onondaga is also reported to prevail on Maitland River at Goderich.[6]

In 1895 A. C. Lane[7] proposed the term Monroe beds for the rocks in southeastern Michigan included between the Dundee (Onondaga) above and the lowest gypsiferous beds below. This term then, embraced everything from the top of the Niagaran to the base of the Dundee (in ascending order the Salina, Bass Island, Sylvania, and Detroit River). Prosser[8] used the term Monroe for rocks occupying the same stratigraphic position in western Ohio, but divided them into a lower member, the Tymochtee, and an upper member, the Lucas limestone, separated by the Sylvania sandstone of Orton. In 1908, Grabau[9] removed the Salina rocks from the Monroe. In the same year a more detailed classification of the Monroe was proposed by Lane, Prosser, Sherzer, and Grabau[10]. This classification[11] has been in general use in Ohio and Michigan since that time. It is as follows:

---

[1]Chapman, E. J.: Minerals and Geology of Canada, 1864, p. 190.
[2]Caley, J. F.: Geol. Surv., Canada, Mem. 226, p. 49 (1941).
[3]Grabau, A. W., and Sherzer, W. H.: Mich. Geol. and Biol. Surv., Pub. 2, p. 217 (1909).
[4]Grabau, A. W.: Bull. Geol. Soc. Am., vol. 19, p. 555 (1908).
[5]Grabau, A. W , and Sherzer, W. H.: op. cit., p. 27.
[6]Stauffer, C. R.: Geol. Surv., Canada, Mem. 34, p. 133 (1915).
[7]Lane, A. C.: Geol. Surv., Mich., vol. 5, pt. 2, pp. 26-28.
[8]Prosser, C. S.: Jour. of Geol., vol. 9, pp. 538-541 (1903).
[9]Grabau, A. W.: Science, n.s., vol. 27, p. 622 (1908).
[10]Bull. Geol. Soc. Am., vol. 19, pp. 553-556 (1908).
[11]Grabau, A. W., and Sherzer, W. H.: Mich. Geol. and Biol. Surv., Pub. 2, p. 27 (1909).

		Feet
C. Upper Monroe	Lucas dolomite	200+
or	Amherstburg dolomite	20
Detroit River series	Anderdon limestone	35–50
	Flat Rock dolomite	40–100

Disconformity

B. Sylvania sandstone and dolomites.

Disconformity

A. Lower Monroe	Raisin River dolomite	200
or	Put-in-Bay dolomite	100
Bass Island series	Tymochtee shale	90
	Greenfield dolomite	100

For many years the Monroe was considered to be Silurian. Grabau and Sherzer[1], and later Sherzer[2], placed it in the Silurian, although the Devonian aspect of the faunas of the Anderdon and Amherstburg members of the Detroit River series was clearly emphasized. Grabau states that the fauna of the Lucas dolomite is "throughout a Siluric fauna".[3] He also states that the most characteristic feature of the fauna of the Flat Rock, Amherstburg, and Anderdon beds is its Devonic element. But, "the position of this fauna beneath 200 to 250 feet of the Lucus dolomite with a Siluric fauna forces us to consider this as Siluric."[4]

According to Stauffer,[5] some doubt exists as to the stratigraphic order of the subdivisions of the Detroit River series as well as to the age of the entire series. He states that all divisions of the Detroit River series contain Devonian faunal elements, and makes it clear that the fauna of the Amherstburg dolomite is a Devonian fauna closely related to that of the Onondaga. Williams[6] places the Detroit River series in the Devonian on faunal evidence, as also does Carman[7] in Ohio and Newcombe[8] in Michigan.

Within the London area and exposed chiefly on Maitland River at Goderich are limestones that have been considered[9] Detroit River in age and mapped as such. These limestones are reported to be overlain by grey to brown limestones, the lower 6 inches of which contains pebbles of the underlying limestone and quartz sand mingled with Onondaga fossils. This has been interpreted as a disconformity marking the Onondaga-Detroit River contact at that place. The writer has failed to find the pebbles referred to above, although evidence of quartz grains was observed. The same horizon is exposed at several places in the neighbourhood, but only at one place were the sand grains seen and nowhere were the pebbles found. There is, however, an abrupt thinning of the bedding below the horizon of the sand, and the "contact" is distinctly wavy and uneven. However, the writer is not satisfied that any considerable break is necessarily indicated, although a marked disturbance in deposition is admitted.

Nowhere else in the area is the same stratigraphic horizon exposed, and examination of cuttings from wells located in the southern part of the

[1]Grabau, A. W., and Sherzer, W. H.: Mich. Geol. and Biol. Surv., Pub. 2, 1909.
[2]Sherzer, W. H.: Mich. Geol. and Biol. Surv., Pub. 12, 1911.
[3]Grabau, A. W.: Mich. Geol. and Biol. Surv., Pub. 2, p. 221 (1909).
[4]Grabau, A. W.: op. cit., p. 217.
[5]Stauffer, C. R.: Bull. Geol. Soc. Am., vol. 27, pp. 72-77 (1916).
[6]Williams, M. Y.: Geol. Surv., Canada, Mem. 111, pp. 18-22 (1919).
[7]Carman, J. E.: Jour. of Geol., vol. 35, 1927.
[8]Newcombe, R. B.: Mich. Geol. and Biol. Surv., Pub. 38, 1933.
[9]Stauffer, C. R.: Geol. Surv., Canada, Mem. 34, p. 133 (1915).

area has failed to reveal reliable criteria upon which Detroit River rocks could be separated from the overlying Onondaga.

Several small outcrops on the shore of Lake Huron between Port Albert and Goderich, as well as outcrops on Middle Maitland River between Brussels and Wingham and on Maitland River between Fordwich and Gorrie, have been mapped[1] as Detroit River. Fossils obtained from the lake shore outcrops have been identified by Miss Alice E. Wilson of the Geological Survey, who considers them to be of undoubted Onondaga age. No fossils were found in the other small outcrops mentioned above.

In view of the foregoing considerations, all the pre-Hamilton Devonian rocks of the London area have been mapped as a single unit under the name Norfolk formation. It is emphasized that if the presence of Devonian rocks lying disconformably beneath the Onondaga can be proved, such strata, although here mapped with the Norfolk, would be pre-Norfolk.

Distribution. The Norfolk formation has an areal extent of about 2,700 square miles; it constitutes the uppermost bed-rock throughout the north and eastern part of the area and is overlain by younger rocks only in the southwest.

Outcrops of Norfolk strata are comparatively few and are practically confined to the extreme northern part of the area. Except on Maitland River near Goderich, they commonly show only a few feet of rock and occur chiefly along rivers and at various places along the Lake Huron shore, particularly at the mouths of small streams. Outcrops may be seen on the lake shore between Port Albert and Goderich; on Maitland River between Goderich and Benmiller, and between Fordwich and Gorrie; on Middle Maitland River between Brussels and Wingham; and on Thames River at Motherwell and just below the mouth of Avon River. In addition to the foregoing, Norfolk rocks have been exposed by quarrying at several localities, particularly at, and in the immediate vicinity of, St. Marys and at Tees-water.

Lithology. As seen at the outcrops and in the quarries, the Norfolk formation consists of grey, brownish grey, and brown, crystalline to fine-grained limestone, magnesian limestone, and dolomite in fairly even beds from a few inches to about 4 feet thick. The brownish rock commonly has dark brown to black, bituminous streaks parallel to the bedding planes and, as seen at the St. Mary's Cement Company quarries, the grey and thicker bedded strata may have thin, shaly partings along some of the bedding planes. These shaly zones are commonly fossiliferous. The following sections illustrate the lithology as it appears at the various localities.

I. Section at the St. Mary's Cement Company quarries. These quarries are about one mile south of the main highway passing through the town. There are two excavations, one situated only a few hundred feet south of the other and connected with it by a tunnel. When visited in 1939 the northern pit had been abandoned and was being filled with overburden stripped from the working quarry. A 45-foot face at the west end of the abandoned excavation shows grey to brownish, fine-grained, fossiliferous limestone with thin, shaly partings in the upper 30 feet, followed below by grey, semicrystalline limestone, the whole in even beds from a few inches to 2 feet thick. Toward the centre of the quarry is a lower face showing an additional 20 feet of essentially similar limestone. Stauffer[2] places the upper 30 feet of this section in the Delaware on faunal evidence, although admitting difficulty in separating it from the underlying

[1]Geol. Surv., Canada, Map No. 1715.
[2]Stauffer, C. R.: Geol. Surv., Canada, Mem. 34, p. 114 (1915).

Onondaga. After careful examination of the entire face, the writer was unable to find sufficient difference in lithology to make any division on that basis. In view of Stauffer's opinion[1] that the Delaware is transitional in character and fauna between Onondaga and Hamilton the section at this quarry is here placed in the Norfolk formation.

II. Section at the property of the Thames Quarry Company, St. Marys. These quarries consist of two openings, one on each side of the highway and on the east side of Thames River immediately south of St. Marys. When visited by the writer, both excavations were abandoned and practically full of water, leaving only a few feet of grey, fine-grained, even-bedded, fossiliferous limestone exposed. These pits were visited by Goudge, who gives the following section[2] at the pit east of the highway.

	Feet	Inches
Soil, increasing in depth to the southeast	10	
Delaware formation:		
Very thinly bedded, very fine-grained, brown limestone composed largely of shells	3	
Very fine-grained, brown limestone in beds 4 to 12 inches thick in which are many shells	11	
Layer of brown, calcareous shale		1
Hard, bluish grey, very fine-grained limestone	2½	
Layer of brown shale		½
Fine- to medium-grained, brownish grey, fossiliferous limestone in beds 6 to 14 inches thick	10	
Fine-grained, grey limestone in beds 6 to 16 inches thick	2½	
Onondaga formation:		
Bluish grey, fine-grained limestone in beds 9 to 14 inches thick with thin partings of black, bituminous shale	6	
Brownish grey, fine-grained limestone in beds 13 to 24 inches thick	6	

Stauffer[3] places the upper 29 feet 1½ inches of this section in the Delaware on faunal evidence.

III. Section at quarries formerly worked by the Standard White Line Company at St. Marys. These workings are located on the north side of Trout Creek immediately northeast of the town. The quarry was opened along the south side of a hill. When visited in 1939, the excavation was almost entirely slumped, filled in, and grown over, so that only one small exposure of a few feet of brown, fine, thin-bedded limestone with dark, bituminous streaks could be seen. According to Goudge[4], this quarry exposed 33 feet of light brown to buff, pure limestone in beds 3 to 6 inches thick toward the top and becoming thicker in the lower part. The lower 18 feet contains lenticular bands of magnesian limestone, but these are extremely difficult to distinguish from the high calcium rock above.

Stauffer[5] places this rock in the Silurian (Detroit River) and says it seems to form an inlier within the Devonian. Its present position, apparently above the Devonian exposed at the St. Mary's Cement Company quarries to the south, he explains on structural grounds. Consideration of this is deferred until the structure is discussed.

IV. Section on left bank of Maitland River on lot 4, Maitland con., Colborne tp., 1½ miles above highway bridge at Goderich.

Norfolk formation:

(Onondaga of Stauffer)	Feet
6. Grey weathered, grey to buff, crystalline limestone in massive and thinner irregular beds. *Cyathophyllum* sp., *Crania crenistriata, Rhipidomella* cf. *semele, Stropheodonta perplana, S. demissa, Spirifer* sp., *Atrypa reticularis,* A. sp.	18
5. Buff weathered, brownish, fine-grained, and jointed limestone with dark, bituminous streaks	6

[1]Stauffer, C. R.: op. cit., p. 214.
[2]Goudge, M. F.: Dept. Mines and Res., Bur. Mines, Pub. 781, p. 274.
[3]Stauffer, C. R.: Geol. Surv., Canada, Mem. 34, p. 117 (1915).
[4]Goudge, M. F.: Dept. Mines and Res., Bur. Mines, Pub. 781, p. 274.
[5]Stauffer, C. R.: Geol. Surv., Canada, Mem. 34, p. 113 (1915).

Feet

4. Rough, irregular bedded, vuggy, brownish, impure limestone..... 2
3. Brown, fine-grained, vertically jointed limestone in thin, even beds about 4 inches thick. Lower 6 inches with calcite stringers. Upper 2 inches soft and ochreous..... 2½
2. Buff weathered, grey to cream-coloured, medium-grained limestone with dark brown to black, bituminous streaks. Strata in heavy 3-foot beds. Traced laterally, this interval becomes a single 6-foot bed in which *Favosites* sp. was observed..... 6

(Detroit River series of Stauffer)

1. Buff and brown, fine-grained to dense limestone with dark, bituminous streaks and disposed in thin, even beds from 2 to 8 inches thick. Upper few inches is soft, yellowish, and rotten, and contact with overlying rock undulating..... 5

River level.

V. Section on left side Maitland River one-half mile below previous section.

Norfolk formation:

(Delaware of Stauffer)

3. Grey weathered, hard, grey, fine-grained limestone in beds up to 1 foot thick. Styliolitic surface at the base. *Cyrtina hamiltonensis, Spirifer varicosus, Atrypa spinosa, Martinia* sp., *Platyceras* cf. *carinatum*..... 8

(Onondaga of Stauffer)

2. Rough bedded to massive, brownish grey to cream-coloured, medium-grained and semicrystalline limestone. Some rounded sand grains in lower few inches. *Cyathophyllum* sp., *Stropheodonta* sp., *Productella* cf. *spinulicosta, Atrypa reticularis, A. spinosa, Prosserella* cf. *lucasi, Platyceras* sp. 18
1. Thin, even-bedded, brownish grey to brown, dense limestone with black, bituminous partings..... 2½

River level.

VI. Section on left side Maitland River immediately above highway bridge at Goderich.

Norfolk formation:

(Onondaga of Stauffer)	Feet	Inches
3. Grey to buff, medium-grained limestone in two 3-foot beds. Lower part of the lower bed is brown with dark, bituminous streaks.....	6	
2. Irregular parting of grey, crystalline limestone.....		3±
(Detroit River series of Stauffer)		
1. Brownish grey to brown, hard, fine-grained limestone with many black, bituminous streaks and partings along bedding planes and in even beds 2 to 4 inches thick. Upper surface undulating.....	3	

River level.

Stauffer[1] considers that the Delaware, Onondaga, and Detroit River series are all represented on Maitland River one-half mile above the Grand Trunk depot at Goderich. All the exposed rocks in that vicinity are represented in the foregoing sections (IV, V, VI). In these sections, it was found impossible, on a lithological basis, to draw a definite line above which the rocks could be called Delaware and below which they could be classed as Onondaga. Interval 3 of section V is classed as Delaware by Stauffer. This rock is separated from the underlying strata by a styliolitic surface. It is perhaps more grey in colour and finer textured than the underlying rock. However, were it not for the fact that interval 3 contains fossils considered by Stauffer to indicate a time later than typical Onondaga, no separation would be made. Interval 2 of section V and interval 6 of section IV occupy a like stratigraphic position and are lithologically and

[1]Stauffer, C. R.: Geol. Surv., Canada, Mem. 34, pp. 132, 133 (1915).

faunally similar. They enclose an Onondaga fauna and have been placed in that formation by previous workers.

Interval 2 of section IV and interval 3 of section VI occupy the same position and are lithologically similar. Both rest upon thin, even-bedded, brownish limestone, the contact plane being wavy and undulating. Stauffer places these rocks at the base of the Onondaga, interpreting the undulating surface as the disconformable Onondaga-Detroit River contact.

At all the foregoing sections the lowest exposed rock consists of brown or buff, fine-grained, thin, even-bedded limestone with black, bituminous streaks. The immediately overlying rock is invariably in heavy beds as much as 3 feet thick, the dividing line between the two being distinctly wavy. The decided and abrupt difference in thickness of bedding above and below the wavy contact is the dominant physical difference noted. The heavy beds, although commonly less dense in texture and possibly more buff than brown in colour, contain bituminous streaks and in general do not differ greatly from the thin beds below. Though it appears that normal conditions of deposition were considerably disturbed, the writer failed to find conclusive evidence of emergence. Pebbles of Detroit River rock in the base of the Onondaga as reported by Stauffer[1] were not found by the writer.

VII. Section on Maitland River at the cascade one mile west of Benmiller.

Norfolk formation:

	Feet
(Delaware of Stauffer)	
2. Grey weathered, buff-grey, hard, medium-grained limestone in vertical cliff. Appears massive, but is in beds up to 1 foot thick. Base is a styliolitic surface that appears as a dark line along cliff face. *Streptelasma* sp., *Fenestella* sp., *Craniella* sp., *Stropheodonta perplana, Rhipidomella vanuxemi, Leptaena rhomboidalis, Pholadostrophia iowaensis, Chonetes lineatus, Spirifer raricosus, Atrypa spinosa, Eunella harmonica, Proetus* sp.....	15
(Onondaga of Stauffer)	
1. Buff-grey to brownish, medium- to fine-grained limestone essentially similar to the above. *Stropheodonta* cf. *perplana, S.* sp., *Spirifer raricosus, Atrypa* sp.....	2
River level	

Rock specimens from interval 2 of this section are practically indistinguishable from specimens from interval 6 section IV, which is classed as Onondaga by Stauffer.

Limestones essentially similar to those in section VII outcrop as low cliffs up to 10 feet high at several places along Maitland River between Benmiller and a point 3 miles east of that place. These rocks are buff-grey and brownish, medium-grained limestones, all of which have been previously mapped as Delaware. The thin, even-bedded, brownish, fine-grained limestone with black streaks that appears at river level in sections IV, V, and VI, and which has previously been classed as Detroit River, is not seen either at the cascade or at any of the outcrops along the river above that point. Instead, the upper, thicker bedded "Onondaga "and "Delaware" limestones rise directly from river level as low, vertical cliffs.

[1]Stauffer, C. R.: Geol. Surv., Canada, Mem. 34, p. 133 (1915).

VIII. Section on Lake Huron at mouth of small creek west of Sheppardton.

Norfolk formation:	Feet
3. Brownish grey, hard, finely crystalline, porous limestone in beds 4 to 12 inches thick and vertically jointed. *Leptaena rhomboidalis, Stropheodonta* cf. *inaequiradiata, Schizophoria* cf. *impressa, S. propinqua, Spirifer lucasensis, S. varicosus, Atrypa spinosa, Nucleospira concinna, Meristella* sp., *Martinia* sp., *Paracyclas elliptica*	10
2. Buff-grey, fine-grained limestone in even beds up to 14 inches thick, the thinner beds below. *Cyathophyllum* sp., *Stropheodonta* sp., *Chonetes* cf. *lineatus, Spirifer lucasensis, S. varicosus, Atrypa spinosa, A. reticularis, Meristella nasuta*	9
1. Brownish grey, hard, crystalline limestone in beds 6 to 18 inches thick. The top bed is styliolitic with very fine, black, bituminous streaks. *Cyathophyllum* sp., *Stropheodonta demissa, Rhipidomella* cf. *semele, Atrypa reticularis, A. spinosa, A.* sp. (very fine)	10
0. Covered	2
Lake level	

This rock has previously been mapped[1] as Detroit River. However, it is lithologically very similar to strata along Maitland River that have been classed as Onondaga, and, moreover, it encloses an Onondaga fauna.

About ½ mile north of this section at the mouth of Boundary Creek there is an outcrop at lake level. This is brown, fine to dense, thin-bedded limestone with many black, bituminous streaks. This rock is thought to underlie section VIII. It closely resembles the limestone seen at water level on Maitland River between the highway bridge at Goderich and the cascade below Benmiller where it was classed as Detroit River by Stauffer.

About 3 miles south of section VIII, on the lake shore at water level is an outcrop of brownish grey, finely crystalline limestone. This rock is essentially similar to that of interval 1 section VIII and encloses the following fossils: *Zaphrentis* sp. *Stropheodonta* cf. *inaequiradiata, Schizophoria propinqua, Cyrtina* cf. *hamiltonensis, C. umbonata alpenensis,* cf. *Leiorhynchus* sp., *Spirifer* cf. *lucasensis,* cf. *Prosserella planisinosa, P. modestoides,* P. sp., *Atrypa spinosa, A.* sp. (very fine), *Proetus* cf. *crassimarginatus.*

This rock has been mapped[2] as Detroit River and also as Onondaga. Miss A. E. Wilson of the Geological Survey, who identified the fauna, states that it consists of a preponderance of Onondaga forms and yet carries the genus *Prosserella,* which is generally regarded as a typical Detroit River form. The large proportion of Onondaga species indicates that their introduction is to be expected in rocks at a considerably lower horizon than represented in this outcrop. The genus *Prosserella* was also found in interval 2 section V on Maitland River: this interval is above Stauffer's Onondaga-Detroit River contact. Miss Wilson concludes that the inference to be drawn from the intermingling of forms is that the transition from Detroit River to Onondaga was gradual and if there was any emergence it was of slight duration.

On Middle Maitland River, between the highway bridge and the mill dam in Brussels, a few feet of rock is exposed. This is brownish grey, finely crystalline limestone and contains the following fossils: *Stropheodonta demissa, S. inaequiradiata, Leptaena rhomboidalis,* cf. *Schizophoria propinqua, Pholadostrophia iowaensis, Spirifer lucasensis, S. macrus, S. varicosus,*

[1]Geol. Surv., Canada, Map 116A, 1914.
[2]Geol. Surv., Canada, Map No. 116A, 1914; Map No. 1715, 1918.

Atrypa reticularis, A. spinosa, A. sp. (very fine), *Eunella harmonica, Tentaculites scalariformis, Chonetes lineatus, Athyris vittata indianensis, Bellerophon* sp. The foregoing fauna places this rock in the Onondaga.

On the same river between Brussels and Wingham there are several small outcrops, commonly in the stream bed but reaching a thickness of 5 feet at one locality. This rock is cream-coloured to brownish, fine-grained limestone in even beds from 4 to 14 inches thick. Some of this rock gives off a petroliferous odour when struck. No fossils were found in any of these exposures and they have previously been mapped[1] as Detroit River.

IX. Section at quarry on south side of Teeswater River at Teeswater.

When visited in 1939, this quarry was being operated for production of lime for local use.

Norfolk formation:	Feet
3. Cream-coloured to brownish, fine-grained, pure dolomite with dark, bituminous streaks and in even beds from 1 to 2 feet thick	20
2. Hard, irregular, 12- to 18-inch bed of brownish crystalline dolomite with small vugs filled with calcite.	
1. Buff-coloured, dense dolomite in thin, even beds	8
Covered to river level	10

X. Section at abandoned quarry on lot 14, con. 6, Culross tp., at Teeswater.

This quarry was full of water when visited (1939). However, the rock has been examined by Goudge[2] upon whose work the following is based.

Norfolk formation:	Feet
1. Soft, finely granular, buff dolomite in beds up to 3 feet thick, but which split thinner. At intervals of 10, 23, and 45 feet from the top are bands of harder, browner, high calcium limestone of irregular thickness, but each averaging about 12 inches	45

The above rocks in sections IX and X at Teeswater have previously been mapped[3] as Detroit River.

Reviewing the foregoing discussion of the lithology of the Norfolk formation we see that outcrops have been variously identified by previous workers as Delaware, Onondaga, or Detroit River, and mapped accordingly. The Delaware and Onondaga have been separated primarily on faunal evidence, although some lithological difference has been reported. The Detroit River has been reported to be separated from the Onondaga by a disconformity said to be visible on Maitland River near Goderich.

In the London area the writer has been unable to fix definitely a line of separation between the Delaware and Onondaga on a lithological basis. However, at some localities where both formations are reported to occur some difference in colour and texture between them can be detected. But, in view of the general lithological similarity and the transitional character of the Delaware fauna, separate mapping is considered impracticable.

Physical conditions at the horizon dividing the Onondaga and Detroit River suggest a disturbance in deposition. The abrupt change from thick beds above to thin, even beds below separated by an undulating surface is conspicuous. The lower beds are commonly more dense in texture and brown or buff in colour, and sand grains have been observed at the base of

[1]Geol. Surv., Canada, Map No. 1715, 1918.
[2]Goudge, M. F.: Dept. Mines and Res., Bur. Mines, Pub. 781, p. 212.
[3]Geol. Surv., Canada, Map No. 1715, 1918.

the heavy beds. Also, there seems to be a conspicuous scarcity of fossils in the lower beds, whereas an Onondaga fauna has been identified from the upper, thick beds. Nevertheless, conclusive evidence of emergence has not as yet been found. At least one typical Detroit River genus has been found with a preponderance of Onondaga forms, and at one place at least rocks enclosing an Onondaga fauna have been mapped as Detroit River.

In view of the above observations and remembering that the rocks constitute a lithologically similar unit whose division is attended with difficulty and uncertainty, it is thought more practical to map them together.

Norfolk Formation in Well Cuttings. In boring samples the Norfolk formation appears as grey, light buff, and cream-coloured, fine-grained, and crystalline limestone changing to brownish grey and brown limestone, magnesian limestone, and, rarely, dolomite in the lower part. Grey chert is present in all wells examined: it is commonly most abundant at and near the base of the formation and in most wells is present in varying quantity throughout the lower 100 to 225 feet. In Yarmouth, Nissouri West, Hullett, Dunwich, and Bosanquet townships, chert also occurs in the upper part of the formation and is separated from the lower chert by at least 135 feet of limestone with no chert. Calcareous sandstone or arenaceous limestone is commonly present in the lower 30 feet, and in Dorchester North township a well shows rounded sand grains up to 150 feet above the base. In many wells rounded sand grains are found embedded in the limestone at horizons varying from 240 to 550 feet above the base. Above these sand horizons, small, circular, resinous appearing "spores" are common; they are extremely rare below. In Orford, Euphemia, and Caradoc townships, 26, 10, and 5 feet of pure, incoherent sand are present at 71, 440, and 435 feet respectively above the base. Black, bituminous streaks are common below the horizon of the embedded sand grains, but rarely do they occur above. In Bosanquet township, one well shows 20 feet composed chiefly of gypsum about 230 feet above the base of the formation, and in McGillivray township, traces and small quantities of that mineral occur at several horizons throughout a thickness of 278 feet.

Although all the above characters were not observed in every well examined, the formation as a unit seems to consist of an upper part composed of cream-coloured, fine-grained limestone, commonly with "spores" and with embedded sand grains and some chert at the base, and a lower part, usually buff or brownish in colour, which may be magnesian or dolomitic, containing black, bituminous streaks in the upper part and chert in the lower 100 to 225 feet. Calcareous sandstone is commonly present in the bottom 30 feet, although sand grains may extend to 150 feet from the base.

In seeking to correlate well sections with the outcrops already described, it seems possible that that part of the well sections above the embedded sand grains may correspond roughly to the outcrop above the so-called Detroit River-Onondaga boundary. The outcrops below that horizon may correspond to the part of the well sections immediately below the sand grains and above the lower chert horizon.

The following sections, compiled from examination of well cuttings, illustrate in condensed form the lithology of the Norfolk formation.

Section 1[1], *Kent County, Orford Township*

Feet	
77	Medium-grained, grey limestone, *Protosalvinia.*
54	Fine- and medium-grained, buff dolomite, some chert, *Protosalvinia.*
33	Medium-grained, granular limestone, *Protosalvinia.* Detroit River series phase.
52	Fine-grained, buff and grey, dolomitic limestone, dark streaks.
25	Fine-grained, light grey and buff, dolomitic limestone.
43	Fine- to medium-grained, buft, dolomitic limestone, dark streaks.
63	Fine-grained, buff and grey, dolomitic limestone, some chert.
68	Fine- to medium-grained, grey, dolomitic limestone, and chert.
26	Medium-grained quartz sand.
35	Medium-grained, grey, dolomitic limestone, 10 per cent sand.
29	Medium-grained, grey, dolomitic limestone, some chert.
7	As above with medium-grained sand.

Section 2, Lambton County, Euphemia Township

80	Limestone: creamy grey, fine-grained.
15	Limestone: cream-coloured, finely crystalline, some rounded sand.
10	Sand: rounded, medium-grained.
20	Sand; some grey limestone.
40	Limestone: buff-grey, crystalline.
150	Limestone: brownish grey and brown, fine-grained, black, bituminous streaks.
100	Limestone: brown, finely crystalline; small amount grey chert throughout.
100	Magnesian limestone: brownish grey, finely crystalline; grey chert throughout.
15	Chert; some limestone and rounded sand grains.
25	Magnesian limestone: grey, fine-grained; much grey chert.

Section 3, Elgin County, Southwold Township

15	Limestone: cream-coloured, finely crystalline; *Protosalvinia;* trace pyrite.
30	Limestone: cream-coloured, finely crystalline; little chert and pyrite.
170	Limestone: cream-coloured and brownish, fine-grained; black, bituminous streaks.
85	Limestone: brownish grey, finely crystalline; much grey chert.
15	Calcareous sandstone: grey; traces of chert.
15	Limestone: grey; some sandy limestone and chert.
15	Dolomite: grey; some sandy limestone and chert.
55	Chert; little grey dolomite and calcareous sandstone.

Section 4, Middlesex County, London Township

114	Limestone: creamy grey, fine grained; *Protosalvinia.*
66	Limestone: creamy grey, finely crystalline; few black, bituminous streaks.
188	Limestone: buff-grey, finely crystalline and dense; some black, bituminous streaks.
60	Limestone: grey, finely crystalline: little grey chert throughout.
4	Chert: light grey; little grey limestone.
88	Limestone; grey, finely crystalline; chert throughout.
30	Chert: light grey; little grey limestone.

Section 5, Middlesex County, McGillivray Township

34	Limestone: buff-grey, dense; trace pyrite at base.
41	Limestone: brownish grey, finely crystalline; some black, bituminous streaks.
5	Limestone: brownish grey; some rounded sand grains.
63	Limestone: buff and brown, finely crystalline; some black, bituminous streaks.
24	Magnesian limestone: brown, finely crystalline; little gypsum throughout.
61	Magnesian limestone; brown, finely crystalline.
10	Limestone: buff, finely crystalline; much gypsum.
152	Magnesian limestone: brown, finely crystalline; some fine porosity and black, bituminous streaks.

[1] Supplied by Dr. C. S. Evans, Union Gas Co., of Canada, Limited.

Section 5, Middlesex County, McGillivray Township—Concluded

Feet	
66	Magnesian limestone: brown, finely crystalline; little grey chert throughout; trace gypsum.
6	Magnesian limestone: brownish grey; some grey, sandy limestone.
107	Magnesian limestone: brownish grey, finely crystalline; little chert throughout; calcareous sandstone and glauconite in lower 6 feet.

Section 6, Middlesex County, Delaware Township

41	Limestone: creamy grey, dense; *Protosalvinia.*
6	Limestone: creamy grey, finely crystalline; rounded sand grains.
13	Samples missing.
18	Limestone: creamy grey, dense; many rounded sand grains.
157	Limestone: brownish grey, finely crystalline; black, bituminous streaks throughout.
101	Limestone: brownish grey, finely crystalline; little light grey chert throughout.

Section 7, Lambton County, Brooke Township

105	Limestone: grey, fine-grained, and dense.
5	Limestone: brownish grey, finely granular; few sand grains.
70	Limestone: somewhat magnesian, grey, finely crystalline.
70	Limestone: brownish grey, fine-grained; traces pyrite and black streaks.
10	Limestone: brownish grey, finely granular; few rounded sand grains.
110	Limestone: brownish grey, finely crystalline; traces of gypsum.
205	Limestone: brownish grey, finely crystalline; little chert throughout.
5	Chert: grey; little grey limestone.
20	Limestone: grey, fine-grained; much grey chert.

Section 8, Middlesex County, Caradoc Township

50	Limestone: creamy grey, finely crystalline.
5	Sand: incoherent, rounded grains.
265	Limestone: brownish grey, finely crystalline; few black, bituminous streaks.
135	Limestone: brownish grey, finely crystalline; grey chert throughout.
10	Chert: light grey; much grey, calcareous sandstone and traces of glauconite.

Section 9, Elgin County, Dunwich Township

22	Limestone: creamy grey, fine-grained; trace pyrite at base; *Protosalvinia.*
115	Limestone: creamy grey, finely crystalline; *Protosalvinia* in upper 40 feet; little chert throughout.
42	Limestone: grey, fine-grained; few sand grains scattered throughout; few black, bituminous streaks.
84	Limestone: creamy grey, finely crystalline; few black, bituminous streaks throughout.
24	Limestone: creamy grey, finely crystalline; sand grains in upper 6 feet; black films throughout.
66	Limestone: creamy grey, finely crystalline; much chert throughout.
6	Chert: little limestone.
90	Magnesian limestone: brownish grey, finely crystalline; much chert throughout.
18	Calcareous sandstone; much chert; some glauconite.
48	Chert; little calcareous sandstone and grey dolomite; traces of glauconite.

Section 10, Elgin County, Yarmouth Township

20	Limestone: brownish grey, fine-grained.
70	Limestone: creamy grey, finely crystalline; trace of pyrite; *Protosalvinia.*
40	Limestone: creamy grey, crystalline; little chert throughout.
5	Limestone: creamy grey, few embedded sand grains.
85	Limestone: brownish grey, finely crystalline; black, bituminous streaks throughout.
120	Limestone: brownish grey, finely crystalline; grey chert throughout.
30	Chert: light grey; some grey, calcareous sandstone; traces glauconite.
10	Calcareous sandstone; some grey limestone and chert; trace of glauconite.
10	Chert: light grey; some grey limestone; trace of glauconite.

Section 11, Kent County, Harwich Township

Feet	
75	Limestone: grey, crystalline; some crinoid columns; *Protosalvinia.*
55	Limestone: grey, dense; grey chert throughout; *Protosalvinia* in upper 10 feet.
50	Limestone: buff, finely crystalline; few black, bituminous streaks.
40	Limestone: buff, finely crystalline; finely porous; traces of gypsum throughout; few black films.
55	Limestone: buff, finely crystalline; porous; some black, bituminous films; trace of gypsum in lower 5 feet.
105	Limestone: magnesian, brownish grey, finely crystalline; light grey chert throughout; traces of gypsum in most samples.
5	Sample missing.
35	Limestone: cherty; traces of gypsum in lower 5 feet.
5	Sample missing.
15	Chert: light grey; some grey, crystalline limestone.
30	Limestone: grey, crystalline; much grey chert; traces of glauconite.
5	Chert: light grey; little grey limestone.
5	Limestone: grey, crystalline; equal amount of grey chert; trace glauconite.
35	Sand: rounded and semi-rounded grains; little grey limestone; trace of gypsum.

Section 12, Lambton County, Bosanquet Township

70	Limestone: light grey, medium-grained; *Protosalvinia.*
20	Limestone: buff, finely granular; little chert and sand.
210	Dolomite: grey-buff, finely granular; little gypsum.
40	Limestone: magnesian, light grey, fine-grained.
40	Dolomite: brownish grey, finely granular.
20	Chiefly gypsum.
50	Dolomite: brownish grey, finely granular; chert.
100	Dolomite: brown, granular, and crystalline.
80	Dolomite: brownish grey, granular; chert.

Section 13, Middlesex County, Nissouri West Township

40	Limestone: buff, finely granular; trace of chert at the top.
117	Limestone: cream-coloured, fine-grained; dark, bituminous films.
123	Limestone: grey, fine-grained; chert throughout.
22	Samples missing.
6	Chert; little, grey, sandy limestone.
14	Limestone: sandy, cream-coloured; much chert.
7	Chert; some cream-coloured, sandy limestone.
6	Limestone: sandy, grey; little chert.

Section 14, Huron County, Colborne Township

40	Limestone: cream-coloured, fine-grained.
95	Limestone: dolomitic, brownish grey, fine-grained; few black films.
50	Limestone: light buff, fine-grained.
75	Limestone: dolomitic, brownish grey, finely granular; black films in upper part.
40	Limestone: grey, fine-grained; porous.
30	Limestone: dolomitic, dark brown, finely granular; porous.
190	Limestone; brownish grey, fine-grained; chert throughout.
10	Chert; little grey limestone.

Section 15, Huron County, Hullett Township

65	Limestone: brownish grey; little chert in lower part.
5	Limestone: brownish grey; some rounded sand grains.
25	Mixture surface material and limestone.
25	Limestone: magnesian, brown, finely crystalline.
30	Dolomite: brownish grey, finely crystalline.
145	Dolomite: greyish brown and brown, finely crystalline; some porosity.
10	Dolomite: brown, finely crystalline.
125	Dolomite: brown, finely crystalline; some porosity; trace of chert at base.
170	Dolomite: brownish grey; light grey chert throughout.
35	Chert: light grey, some brown dolomite.

Reef Formation in the Norfolk. On Maitland River near Wingham and on Teeswater River east of Teeswater are outcrops of grey, massive limestone quite unlike any other Devonian rocks seen in the area. Similar rocks also occur elsewhere, as at Formosa and Chepstowe about 4 and 10 miles respectively north of the London area. These rocks were apparently considered as Onondaga by Logan as he writes that "escarpments of twenty to thirty feet of the limestone (Corniferous) run through the west part of Carrick (township) and are said to extend into Howick (township); while, to the north, the outcrop of the formation crosses the southwest corner of Brant (township), and is seen upon the Teeswater near the east line of Greenoch".[1]

Stauffer[2] states that the fauna of this limestone contains a preponderance of Hamilton forms and that the same massive, grey limestone, often in great stromatoporoid reefs with essentially the same fauna, occurs in the middle of the Hamilton beds (Traverse group) at Alpena, Michigan. This was named the Alpena limestone by Grabau[3] and Stauffer[4] has mapped the Ontario rocks under the same name.

The best outcrops of the "Alpena" within the London area are on Teeswater River about 3 miles east of the town of Teeswater. They are distributed along the river for a distance of 3 miles. They form irregular hummocks in the valley and rise from the water in vertical cliffs up to 30 feet high. The rock is grey to bluish and brownish, fine-grained and crystalline limestone, commonly massive with no definite bedding visible although vertical jointing is not uncommon. In places, the rock is composed chiefly of stromatoporoids and corals and everywhere a reef-like character is conspicuous. At Teeswater Falls on lot 4, con. 3, Culross tp., the following fossils were collected: *Amplexus* sp., *Favosites* cf. *basalticus*, cf. *Heliophyllum halli*, *Syringopora hisingeri*, *Fenestella* sp., *Spirifer* cf. *divaricatus*, *S.* sp. (*S. duodenaria* group), *S.* nr. *S. Maia*, *S.* sp., *Stropheodonta* sp., *Diaphorostoma lineatum*, *Proetus verneuili*.

About one mile east of Teeswater, the same rock is exposed on both sides of the river. It forms low, irregular knolls in the valley and an isolated outcrop rises 13 feet from the water. This is dark grey weathered, light grey and brownish grey, crystalline limestone showing no sign of bedding. The following fossils were collected: cf. *Cyathophyllum* sp., *Favosites alpenensis*, *F.* cf. *basalticus*, *F.* cf. *limitaris*, *F.* cf. *radiciformis*, *Synaptophyllum* sp., *Cryptopora mirabilis*, *Atrypa reticularis*, *Cyrtina hamiltonensis*, *Delthyris consobrina*, *Meristella* cf. *nasuta*, *M.* sp., *Pugnax kernahani*, *Spirifer* cf. *divaricatus*, *Conocardium* cf. *trigonale*, *C.* sp., *Diaphorostoma lineatum*, *Platyceras erectum*, *Dalmanites* sp.

Outside the London area the same rock outcrops on each side of the small stream at the village of Formosa. It occurs as low, detached, vertical cliffs and rounded knolls exposing up to 18 feet of massive, reef-like, pale buff coloured, semicrystalline limestone that is locally somewhat cavernous. The following fossils were obtained: *Amplexus* cf. *yandelli*, *Cyathophyllum* sp., *Cryptopora mirabilis*, *Fenestella* sp., *Ambocoelia umbonata*, *Atrypa reticularis*, *Leiorhynchus* sp., *Pentamerella arata*, *Spirifer* cf. *divaricatus*, *S.* sp. (*S. duodenaria* group), *S.* cf. *fimbriata*, *S. gregaria*, *S.* n. sp., nr. *S. maia*, *Actinopteria* cf. *boydi* var., *Conocardium* cf. *normale*, *C.* cf. *trigonale*, *Callo-*

[1]Logan, Sir W. E.: Geol. Surv., Canada, 1863, p. 371.
[2]Stauffer, C. R.: Geol. Surv., Canada, Mem. 34, p. 148 (1913).
[3]Grabau, A. W.: Ann. Rept., Geol. Surv., Mich., 1901.
[4]Geol. Surv., Canada, Map 116A, 1914.

nema cf. *bellatulum, Clathrospira filitexta, Euryzone* cf. *lucina, Hormotoma* sp., *Macrochilina* cf. *hebe, Pleurotomaria* sp., *Spyroceras* sp., *Proetus crassimarginatus, P. verneuili, P.* sp.

About 2¼ miles north of Formosa, where Beaver creek crosses the town line road, the limestone has been quarried. In the road cut, from 20 to 25 feet of grey, massive, reef-like, semicrystalline limestone with a profusion of stromatoporoids and corals is exposed. The following fossils were obtained here: *Amplexus* cf. *yandelli, Aulopora tubaeformis, Favosites alpenensis, F. cervicornis, F. goldfussi, F.* cf. *limitaris, F.* cf. *reticulatus, F.* sp., *Heliophyllum halli, Synaptophyllum* sp., *Stromatoporella mammillata, S. tuberculata, Cryptopora mirabilis, Fenestella* sp. A, *Ambocoelia umbonata, Camarotoechia* sp. between *C. billingsi* and *C. tethys, Delthyris consobrina, Meristella* cf. *nasuta, M.* sp. A, *Pentamerella arata, Rhipidomella* cf. *livia, Schizophoria* cf. *propinqua, Spirifer* cf. *divaricatus, S. sulcatus submersus, Stropheodonta* sp., *Conocardium* sp. A, cf. *Macrodon* sp., *Pterinopecten* cf. *indosus, Bellerophon* cf. *pelops, Cyclonema* sp., *Euryzone* cf. *lucina, Phanerotinus* cf. *planodiscus, Gomphoceras* sp., *Spyroceras nuntium, Proetus crassimarginatus.*

On Teeswater River, ⅓ mile west of the village of Chepstowe, rock has been dredged from the stream bed and dumped along each side for a distance of over 1,000 feet. Above the highway bridge about 3 feet of grey weathered, grey to brownish grey, semicrystalline and dense limestone in beds from 1 to 2 feet thick is exposed. This rock is fossiliferous with a profusion of large corals, stromatoporoids, and crinoid stems. It is very similar to the foregoing limestones in both fauna and lithology, differing only in being bedded. About 800 feet above the bridge this rock is underlain, at the water's edge, by 3 feet of fine-grained, brown, soft limestone in beds from a few inches to 1 foot thick. This brown rock, dredged from the stream, is seen on the dump overlying blocks of the grey limestone. Fossils are not common in the brown rock, but the following were observed: *Favosites* sp., *Cystiphyllum* sp., *Cladopora* sp., *Stromatoporoids.* The following fauna was collected from the upper, grey, reef-like beds: *Cystiphyllum* cf. *varians, C. vesiculosum, Diphyphyllum arundinaceum, Favosites alpenensis, F.* cf. *radiciformis, F.* sp., *Fenestella* sp. A, *Meristella* cf. *nasuta, Pentamerella arata, Prosserella* cf. *planodiscus, P.* cf. *subtransversa, Spirifer* cf. *divaricatus, S.* nr. *S. maia, Conocardium* sp., *Euryzone* cf. *lucina, Spyroceras nuntium.*

The fossils collected from the above outcrops have been identified by Miss A. E. Wilson of the Geological Survey.

Of those specifically identified, about 30 per cent occur in both the Hamilton and Onondaga and cannot, therefore, be used in determining the age of the enclosing rocks. Of the remainder, 80 per cent are of undoubted Onondaga age; 12 per cent are hydrozoans, which might be expected to be present in reef formations and may have made their first appearance in the "Alpena"; and 8 per cent are of doubtful stratigraphic range.

The stratigraphic relations of the "Alpena" are difficult to establish. Nowhere within the London area have overlying rocks been seen in contact, and wherever "Alpena" limestone has been seen outside the area it forms the uppermost bed-rock. There is some evidence that the immediately underlying rock is brownish grey Norfolk limestone similar to that seen on the lake shore north of Goderich. About 300 feet below Teeswater Falls the river flows over bed-rock that forms an isolated outcrop about 6 feet thick on the right bank. This is brownish grey, fine-grained limestone

in irregular, jointed beds 6 inches to 1 foot thick. One specimen of ? *Stropheodonta inaequiradiata* was observed. The top of the outcrop is a few feet higher in elevation than the base of the "Alpena" below the falls, but there seems little doubt that the brown limestone is stratigraphically lower.

At the road cut 2¼ miles north of Formosa, the rough 25-foot mass of reef-like limestone is seen to rest, with uneven contact, on brown, fine-grained dolomite in uneven beds 2 to 8 inches thick. About 3 feet of this rock is visible; it is easily distinguishable from the overlying "Alpena" and is lithologically similar to the brown rock below Teeswater falls. About ¼ mile east is an abandoned quarry. The workings show a 30-foot face of "Alpena". In the floor of this quarry is a hole about 4 feet in diameter and approximately 15 feet deep. This hole, at least in its upper few feet, exposes buff to brown, fine-grained dolomite in beds 5 to 8 inches thick. No actual contact was seen, but it underlies the face of the quarry and is lithologically similar to the rock beneath the reef at the road cut and below Teeswater Falls.

In view of the foregoing considerations, viz., the massive, structureless, reef-like character, the limited areal extent, the close association with Norfolk limestone, and the Onondaga aspect of its fauna, the so-called "Alpena" limestone of the London area is interpreted as a reef within the Norfolk and has been mapped with that formation. As previously mapped[1] the situation depicted, although not impossible, seems highly improbable. The "Alpena" beds are represented as occupying an area 20 miles long and as being bordered on their eastern side by Onondaga strata and on the western side by "Detroit River" beds, which in turn are bordered on the west by Onondaga measures. Such an arrangement implies that in pre-Onondaga time, the "Detroit River" beds were carved into a hill and that in Onondaga time this hill either was completely or only partly submerged by the Onondaga sea. If completely submerged, an interval of vigorous erosion must have preceded "Alpena" time in order that the Onondaga cover might be partly removed and thus permit the beds of the "Alpena" sea to overlap from Onondaga to "Detroit River" strata.

Delimitation and Thickness. Having defined the Norfolk formation to include all pre-Hamilton Devonian rocks above the base of the Onondaga, plus any underlying Devonian rocks that are conformable with them, and having failed to find conclusive evidence of emergence at the Onondaga-Detroit River boundary as interpreted by Stauffer[2], the lower limit of the Norfolk formation in the London area is the Silurian-Devonian contact. This contact is disconformable. It is nowhere exposed and can, therefore, be studied only in well cuttings. It is easily identified and is placed at the point of abrupt disappearance of chert and sandy limestone with sand grains below which the Bertie-Akron (Silurian) appears as a lithological unit from 60 to 145 feet thick and composed of brownish grey, fine-grained, crystalline dolomite.

In the southwest part of the area where the Norfolk formation is overlain by younger rocks, the upper limit of the Norfolk is the soft, grey Hamilton shale. This contact is also not exposed, but is easily recognized in well samples. It is placed at the horizon at which soft, grey shale dis-

[1]Geol. Surv., Canada, Map. 116A, 1914; 1715, 1918.
[2]Stauffer, C. R.: Geol. Surv., Canada, Mem. 34, p. 133 (1915).

appears and below which the cuttings are grey to cream-coloured, fine-grained limestone. There is commonly no transition, although in some wells the lower few feet of the shale is very dark and the samples may contain some calcareous rock.

The total thickness of the Norfolk formation is nowhere exposed and only in the southwestern part of the area can it be obtained from boring samples. The following table gives the thickness present in the townships specified: those marked with an asterisk represent complete sections of the formation; elsewhere the formation is overlain by glacial till.

County	Township	Thickness
		Feet
Perth	Blanchard	568
Huron	Hullett	630
Elgin	Yarmouth	390
Elgin	Southwold	400
Elgin	Dunwich	515
Elgin	Aldborough	527*
Middlesex	London	550
Middlesex	Nissouri West	435
Middlesex	Dorchester North	440
Middlesex	Delaware	346*
Middlesex	Caradoc	520
Middlesex	McGillivray	586
Lambton	Euphemia	555*
Lambton	Euphemia	618*
Lambton	Euphemia	559*
Lambton	Brooke	600*
Lambton	Bosanquet	630*
Lambton	Warwick	545*
Middlesex	Adelaide	515*
Middlesex	Ekfrid	437*
Kent	Orford	524*
Kent	Harwich	505

Fauna and Correlation. The fauna of the Norfolk is the combined faunas of the Delaware, Onondage, "Alpena", and Detroit River series. Stauffer[1] has reported on the fossils from each of the above named rock assemblages in Ontario and a check-list appears in the above cited work. In addition, fossils have been collected by the writer, particularly from outcrops of the "Alpena", "Detroit River", and Onondaga rocks: these have been identified by Miss A. E. Wilson, and appear with the descriptions of the outcrops concerned.

Grabau[2] states that the fauna of the Detroit River if considered by itself would probably be pronounced a Schoharie or Onondaga fauna. Stauffer[3] concludes that the fauna of the Ontario Delaware is transitional between that of the Onondaga and Hamilton. From an analysis of the Onondaga fauna of the Toronto-Hamilton area[4] the writer placed the enclosing rocks as about the time of the Onondaga of New York, the Columbus of Ohio, and the Dundee of Michigan. As the Norfolk formation may include strata somewhat earlier than the Onondaga of the Toronto-Hamilton region, and as its upper limit is the base of the Hamilton, it is considered to be about the time of the Schoharie, Onondaga, and Marcellus of New York;

[1]Stauffer, C. R.: Geol. Surv., Canada, Mem. 34, 1915.
[2]Grabau, A. W., and Sherzer, W. H.: Mich., Geol. and Biol. Surv., Pub. 2, 1909, p. 217.
[3]Stauffer, C. R.: Geol. Surv., Canada, Mem. 34, p. 214 (1915).
[4]Caley, J. F.: Geol. Surv., Canada, Mem. 224, 1940.

the Detroit River, Dundee, and perhaps part of the Traverse of Michigan; and the Detroit River, Columbus, and Delaware of Ohio.

HAMILTON FORMATION

Definition. The term, Hamilton group, was introduced by Vanuxem[1] and included shales and sandstones typically exposed at Hamilton, Madison county, New York. In 1842 the same author defined the Hamilton group as including "all the masses between the upper shales of Marcellus and the Tully limestone," and stated that "it consists of shale, slate and sandstone, with endless mixtures of these materials. It commences near the Hudson and extends to Lake Erie"[2]. In Ontario, Logan[3] was unable to distinguish either the Marcellus shales or the Tully limestones and so included all the strata between the Corniferous (Onondaga) limestone and the Genesee shale (Huron) in the Hamilton formation. Stauffer[4] used the term Hamilton in Ontario for the rocks between the Delaware below and the Genesee above. This usage corresponds to that of Logan as the Delaware was included in the Corniferous by that author. In the present report the term Hamilton formation includes the same strata as the Hamilton of both Logan and Stauffer: it occupies a position between the Norfolk formation below and the Kettle Point formation above.

Distribution. The Hamilton formation has an areal extent of about 1,200 square miles. The outcrop area forms a northwest trending belt with somewhat irregular margins, crossing the area near the southwest boundary. The formation is overlain by younger Palæozoic rocks in the extreme southwest part of the region.

Outcrops of Hamilton strata are rare and widely scattered. Except on Ausable River near Arkona, they exhibit only a few feet of rock and occur chiefly along streams and on the shore of Lake Huron. Outcrops may be seen on the lake shore at Stoney Point; on Ausable River, both above and below the village of Arkona; in the Canadian National Railway cut one mile northeast of Thedford; and on Sydenham River at Smiths Falls. The latter exposure is within the outcrop area of the next overlying formation and represents a local structural high. In addition, shales of this formation have been exposed at the Thedford brick yards.

Lithology. As seen at the outcrop the Hamilton formation consists of thick zones of grey and bluish, soft shale with much thinner zones of brownish and grey weathered, grey and bluish, semicrystalline limestone in rough and even beds from 6 to 24 inches thick. Only about 71 feet of the formation is exposed, and of this approximately 59 feet is shale.

Stauffer[5] has described the Hamilton formation in four divisions, although he states that these are probably not of great importance. They are, in ascending order: the Olentangy shale 60 to 70 feet; the Widder beds 50 feet; the Petrolia shale 100 to 130 feet; and the Ipperwash limestone 40 feet.

The following sections will serve to illustrate the lithology as it is exposed.

---

[1]Vanuxem, L.: Geol. Surv., N.Y., 4th Ann. Rept., 1840, p. 380.
[2]Vanuxem, L.: Geol. of N.Y., vol. 3, 1842, p. 150.
[3]Logan, Sir Wm. E.: Geology of Canada, 1863, p. 382.
[4]Stauffer, C. R.: Geol. Surv., Canada, Mem. 34, p. 7 (1915).
[5]Stauffer, C. R.: Geol. Surv., Canada, Mem. 34, pp. 9–11, 214 (1915).

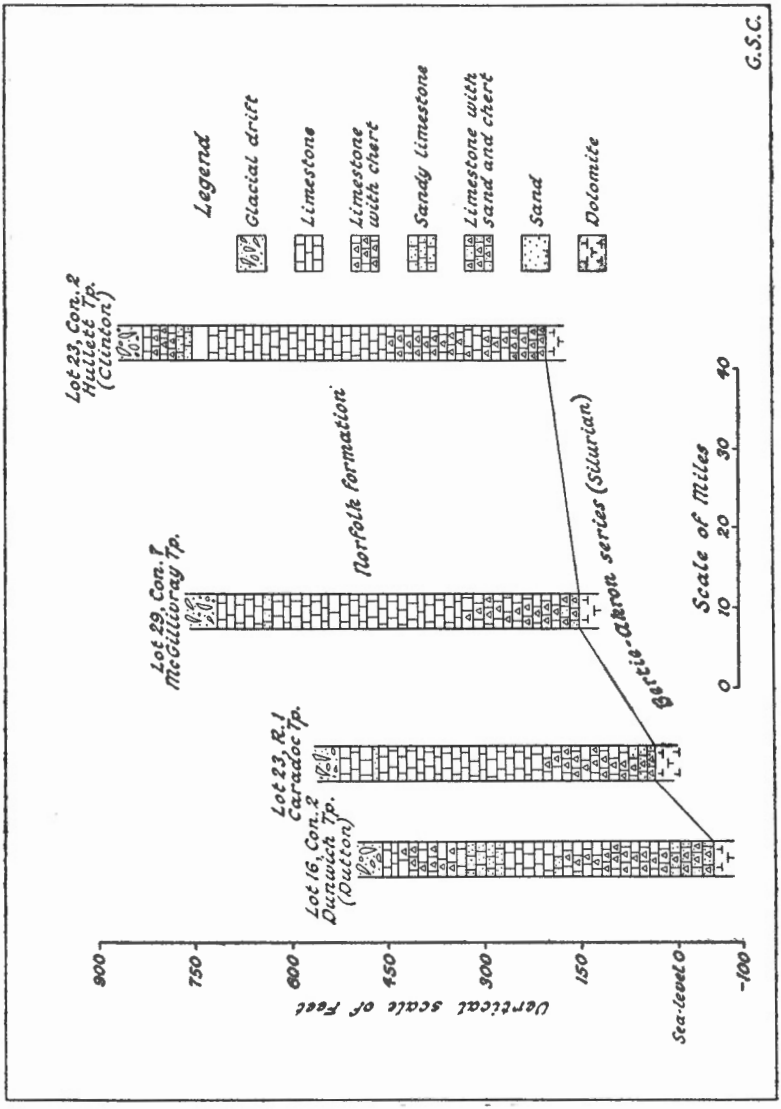

Figure 2. Devonian sections (Norfolk formation) between Dutton and Clinton.

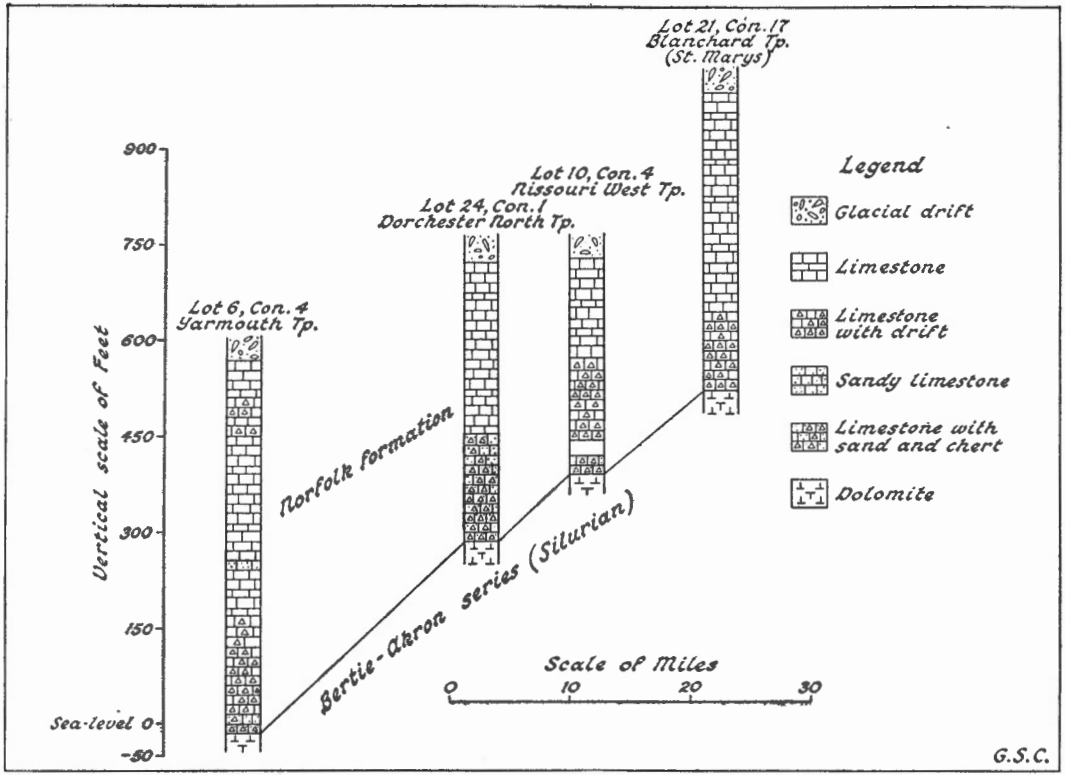

Figure 3. Devonian sections (Norfolk formation) between Port Stanley and St. Marys.

I. Section at Stoney Point on Lake Huron.

Hamilton formation:

(Ipperwash of Stauffer)	Feet
2. Grey and brownish weathered, bluish grey, coarsely crystalline, fossiliferous limestone in rough beds 6 to 14 inches thick	4
1. Soft, blue, clay shale at and beneath water level	0·5

II. Section in the brick yard at Thedford.

Hamilton formation:

Petrolia(?) (Olentangy of Stauffer)

1. Soft, blue shale that weathers into a hard, clayey mass	20

Decker Creek passes through the above pit; a few hundred feet north and overlying the shale is 2½ feet of hard, bluish limestone in 16-inch beds exposed near the top of the bank. This rock has many crinoid stems and has been called Encrinal limestone by Stauffer.

III. Section in C.N.R. cut one mile northeast of Thedford.

When visited the lower part of this section was partly concealed by vegetation.

Hamilton formation:

Petrolia (?) or Ipperwash (?) (Widder beds of Stauffer)	Feet
2. Brown weathered, grey to bluish, crystalline limestone in fairly massive beds	7
1. Grey and bluish shale under grassy slope down to track level	20

IV. Section at mouth of small tributary of Ausable River on lot 4, con. 1, Bosanquet tp., 2 miles north of Arkona.

Hamilton formation:

Ipperwash (?) (Widder beds of Stauffer)	Feet
9. Grey weathered, hard, grey, fine-grained, and semi-crystalline limestone. Lower 2½ feet massive; upper 1 foot bluish weathered and argillaceous	3·5
8. Single bed of compact, bluish weathered, grey, argillaceous limestone or limy shale enclosing a profusion of *Spirifer mucronatus*	1·5
7. Soft, bluish weathered, fairly dark bluish grey shale in thin, even beds with a profusion of *Spirifer mucronatus*	33·5
6. Blue weathered, hard, dark grey, fine-grained, argillaceous limestone	1·5
5. Bluish weathered, grey, impure, calcareous and shaly rock weathering into thin, irregular beds. Contains profusion of simple corals and Favositoids	3·5
4. Dark grey, semicrystalline to coarse limestone in a lower 6-inch and an upper 12-inch bed. Both beds have a profusion of crinoid stems	1·5
3. Dark grey to nearly black, carbonaceous, shaly rock weathered into thin laminæ. Much pyrite	0·5
2. Hard, compact, grey, fine-grained, argillaceous limestone in a single bed that breaks into thin slabs	1·0
Petrolia (?) (Olentangy of Stauffer)	
1. Soft, blue weathering, bluish grey, clay shale in thin, even beds	25

Similar rocks are also exposed at the mouth of the small creek that flows through the village of Arkona, and on Ausable River 2 miles east of Arkona.

Interval 1 of section IV was placed by Stauffer[1] in the Olentangy division, and the overlying beds, intervals 2 to 9, he placed in the Widder division. However, a well drilled in 1939, on lot 3, con. 4, Bosanquet tp., 2 miles west of the outcrop, passed through 241 feet of Hamilton beds before reaching the Olentangy. The uppermost rock was Ipperwash limestone at an elevation only 10 feet lower than the top of section IV. There is thus a suggestion that the shale of interval 1 of section IV may be in the upper part of the Petrolia and that overlying beds may be Ipperwash and not Widder as proposed by Stauffer.

The Widder as defined by Stauffer at the outcrop is very difficult to identify in well samples. He placed intervals 2 to 9 of section IV in the Widder division[2]. This represents 46·5 feet of strata, of which only the lower 8 feet (intervals 2 to 6) and the upper 5 feet (intervals 8 and 9) are limestone. These calcareous beds are so thin that their recognition in well samples is difficult and may easily be overlooked, and, as already stated, the measures in section IV may be Ipperwash, not Widder. However, in seven wells within 6 miles of Arkona there is a recognizable limestone horizon from 6 to 14 feet thick located 51 to 67 feet above the base of the Hamilton formation. This limestone, though much thinner than the Widder beds as defined by Stauffer at the outcrop, is the only differentiation that can be made in well samples; it is, therefore, considered as representing that division. This limestone as represented in samples from elsewhere in Lambton and Kent counties was classed by Stauffer[3] as belonging to the Widder division. The Olentangy or basal division of the Hamilton comprises the shale between the foregoing limestone and the top of the Norfolk formation. It varies from 51 to 67 feet thick in the seven wells referred to above.

In wells near Arkona the Petrolia division is dominantly shale, although some limestone may occur in the upper part. The division averages 172 feet in seven wells located within 6 miles of Arkona. In wells, the Ipperwash limestone is an alternation of limestone and soft shale; the thickness varies somewhat, but in Bosanquet township is is about 64 feet.

It thus appears that in the general vicinity of Arkona where the thickest and best outcrop of Hamilton rocks occurs, the formation as seen in well cuttings consists of:

	Feet
Ipperwash limestone: thin, alternating zones of grey, crystalline limestone and soft, grey shale	64
Petrolia shale: soft, grey shale with small amount of grey, crystalline limestone in the upper part	172
Widder beds: grey, crystalline limestone	14
Olentangy shale: soft, grey shale with some grey limestone in the lower part	67

A well drilled in 1905 at Thedford passed through about 210 feet of Hamilton shale and limestone before encountering the Olentangy at an elevation of about 471 feet. According to available records bed-rock was struck an an elevation of about 636 feet. In the brick yard (section II), ¾ mile north, the exposed shale is reported[4] as Olentangy: the top of this shale is approximately 650 feet in elevation, which is 179 feet higher than in the well. It seems probable again that the shale in the brick yard belongs near the top of the Petrolia shale rather than in the Olentangy division.

[1]Stauffer, C. R.: op. cit., p. 169.
[2]Stauffer, C. R.: Geol. Surv., Canada, Mem. 34, p. 169 (1915).
[3]Stauffer, C. R.: op. cit., pp. 190-198.
[4]Stauffer, C. R.: op. cit., p. 173.

A well drilled in 1922 on lot 3, South Boundary, Bosanquet township, near Arkona, struck the Olentangy shale at an elevation of about 497 feet after passing through 210 feet of overlying Hamilton rock. The first bedrock struck was Ipperwash limestone. Close by, on Rock Glen Creek, Olentangy shale is reported[1] to outcrop. The top of this shale is approximately 655 feet in elevation or 158 feet above its elevation in the well. It again appears that the outcrop may not be Olentangy, but occupies a position at or near the top of the Petrolia division.

It follows that if the above mentioned shale outcrops previously called Olentangy are really near the top of the Petrolia division, the outcropping overlying beds do not hold the stratigraphic position (Widder) assigned to them by Stauffer, but must occupy a position either at the top of the Petrolia shale or at the base of the Ipperwash division.

Hamilton Formation in Boring Samples. In well cuttings the Hamilton formation appears as a thick series of dominantly grey, fossilferous shale with minor amounts of grey, crystalline limestone, indicating the presence of thin limestone beds at several horizons. In general, the limestone is most conspicuous at the top and throughout the upper 40 feet; about 60 or 70 feet from the base; and again in the lower few feet of the formation. In addition, there may be much limestone in the upper part of the Petrolia shale division. In some wells subdivision is not possible owing to frequent limestone intercalations, but in other wells the subdivisions erected by Stauffer are generally recognizable. The following table illustrates the subsurface lithology where the entire formation is present; where the subdivisions are recognizable, the respective names are inserted.

County	Township	Depth	Thickness	Lithology
		Feet	Feet	
Lambton	Euphemia	55–70	15	Limestone: grey, crystalline; pyrite; brachiopod fragments.
		70–95	25	Shale: grey; little grey limestone.
		95–105	10	Limestone: grey, crystalline; little pyrite.
		105–140	35	Shale: grey; traces of grey limestone; little pyrite.
		140–180	40	Limestone: grey, crystalline; little grey shale; crinoid columns; pyrite throughout.
		180–255	75	Shale: grey; traces of grey limestone; ostracods; bryozoa; brachiopod fragments.
		255–260	5	Limestone: grey, crystalline; ostracods.
		260–285	25	Shale: grey: ostracods; bryozoa; brachiopod fragments; pyrite.
		285–295	10	Mixture grey shale and limestone.
	Brooke			*Ipperwash:*
		140–155	15	Limestone: grey, crystalline; some grey shale; little pyrite.
		155–160	5	Shale: grey, much limestone.
		160–170	10	Limestone: grey, crystalline; some grey shale; bryozoa.
				Petrolia:
		170–190	20	Shale: grey; much limestone; bryozoa; crinoid columns.

[1]Stauffer, C. R.: op. cit., p. 163.

County	Township	Depth	Thickness	Lithology
		Feet	Feet	
Lambton	Brooke			*Petrolia:*
		190–220	30	Limestone: grey, crystalline; some grey shale; ostracods; pyrite.
		220–290	70	Shale: grey; traces grey limestone; tentaculites; pyrite.
		290–300	10	Unreliable samples.
		300–350	50	Shale: grey; ostracods; brachiopods.
		350–360	10	*Widder:* Limestone: grey, crystalline; some shale.
		360–400	40	*Olentangy:* Shale: grey; some limestone at 395 feet; bryozoa; brachiopods.
	Bosanquet	94–105	11	*Ipperwash:* Shale: grey; some limestone; trace pyrite; bryozoa.
		105–140	35	Limestone: grey, crystalline; some grey shale in lower 10 feet; bryozoa; ostracods.
		140–195	55	*Petrolia:* Shale: grey; traces limestone; little pyrite; bryozoa; crinoid columns.
		195–200	5	Unreliable sample.
		200–334	134	Shale: grey; little limestone at 240 to 260 feet; ostracods; tentaculites; brachiopods.
		334–341	7	*Widder:* Limestone: grey, crystalline; trace of grey shale.
		341–393	52	*Olentangy:* Shale: grey; ostracods; bryozoa; brachiopods; tentaculites; some pyrite at 393 feet.
		393–405	12	Limestone: grey, crystalline; much grey shale; little pyrite; tentaculites; ostracods.
		405–408	3	Shale: grey.
	Bosanquet	105–135	30	*Ipperwash:* Limestone: grey, fossiliferous.
		135–140	5	Limestone: brownish.
		140–142	2	Limestone: dark grey, argillaceous.
		142–180	38	*Petrolia:* Shale: grey; crinoid columns at 160–170 feet.
		180–195	15	Limestone: grey, crystalline; some shale and pyrite.
		195–315	120	Shale: grey; tentaculites at 205–225 feet; bryozoa at 295–315 feet.
		315–328	13	*Widder:* Limestone: grey; crystalline calcite at 325 to 328 feet; some grey shale.
		328–390	62	*Olentangy:* Shale: grey; much pyrite and brownish limestone at 385 to 390 feet.

Delimitation and Thickness. The Hamilton beds everywhere rest upon the Norfolk formation. The actual contact is nowhere exposed and can, therefore, be studied only in well cuttings. As thus seen it is commonly fairly sharp and easily recognizable. It is placed where the soft grey shale completely disappears and the underlying samples are grey to cream-coloured, crystalline limestone for at least 150 feet. In some wells the lower few feet of the shale contain much limestone, but this is commonly very dark and readily distinguishable from the underlying typical Norfolk limestone.

The upper limit of the Hamilton is likewise not exposed in the London area. In well cuttings, the formation is readily separated from the overlying Kettle Point beds on a lithological basis, as the latter formation is commonly dark brown to black, bituminous shale with a profusion of "spores", whereas the upper Hamilton is grey limestone and shale. A well in Orford township has about 10 feet of distinctly green shale immediately overlying the Hamilton and a well in Euphemia township has some green sandy shale in the lower 30 feet of the Kettle Point beds. This, together with a local variation in the thickness of the formation, suggests that disconformable relations may exist at the top of the Hamilton formation.

The thickest exposed section of Hamilton rocks measures about 71·5 feet. This represents slightly less than one-quarter of the total thickness as seen in cuttings from a well located less than 6 miles from the outcrop. Only where it is overlain by younger rocks is the entire formation present and only from drilling records can the thickness be obtained. The following table compiled from boring samples gives the thickness in the townships specified.

County	Township	Thickness
		Feet
Kent	Orford	240
Lambton	Euphemia	240
Lambton	Euphemia	277
Lambton	Brooke	260
Lambton	Warwick	269
Lambton	Warwick	277
Lambton	Warwick	260
Lambton	Warwick	236
Lambton	Warwick	273
Lambton	Warwick	270
Middlesex	Adelaide	290*
Middlesex	Metcalfe	183*
Lambton	Bosanquet	314

* Partial sections.

Although the foregoing figures show some local variation in thickness of the formation they also indicate a thickening northward across the area from Orford to Bosanquet townships.

Fauna and Correlation. The fauna of the Hamilton outcrops in the present area has been studied by various workers, such as Whiteaves[1], Grabau[2], Stauffer[3], and Parks[4], and fossil lists may be found in their works.

[1]Whiteaves, J. F.: Contributions to Canadian Palaeontology; vol. 1, pt. 5, pp. 412-418 (1885-89).
[2]Grabau, A. W., and Shimer, W. H.: Geol. Soc., Am., vol. 13, pp. 180-185 (1902).
[3]Stauffer, C. R.: Geol. Surv., Canada, Mem. 34, pp. 229-237 (1915).
[4]Parks, W. A.: Univ. of Toronto Studies, Geol. ser. 39, pt. 1, 1936.

In addition, Fritz[1] and Turner[2] have recently studied and described a number of ostracoda from well cuttings of Hamilton rocks in Lambton and Kent counties.

The fauna is typically a Hamilton fauna and the enclosing rocks are, therefore, contemporaneous with the Hamilton of New York State. The Ontario Hamilton is also correlated with at least part of the Traverse group of Michigan. According to Stauffer[3], it is more closely related to the Michigan deposits than to those of New York. Many of the ostracodes recently described by Turner[4] from well cuttings of the Ontario Hamilton are known also from the Silica shale of Ohio, and from both the Bell shale and Traverse group of Michigan. Most of these ostracodes are typical Middle Devonian forms and their presence indicates equivalency of the enclosing beds.

KETTLE POINT BEDS

Definition. The term Kettle Point beds is here proposed for the black, fissile shales that overlie the Hamilton formation and that are the youngest Palæozoic rocks exposed in the area. The name is taken from Kettle Point on Lake Huron where the shales are well exposed.

The Kettle Point beds were previously called Huron[5] and mapped[6] under that name.

The term Huron shale was introduced by Newberry for the "great mass of black bituminous shale designated by the former Geological Board as the Black Slate."[7] The beds rested on the Hamilton formation. The type locality was on Huron River 40 miles west of Cleveland and the shale extended from the mouth of that river southward to the mouth of the Scioto. This original Huron was the lowest of a threefold division of Andrews' Ohio Black Slate[8], the other members being, in ascending order, the Erie shale and Cleveland shale respectively. In 1903, the name Chagrin formation[9] was proposed for the Erie as the latter term was preoccupied.

The Huron and Cleveland were black shales, the former with spherical concretions near the base, whereas the Chagrin formation, named from Chagrin River east of Cleveland, was typically bluish clay shale but very variable, with grey arenaceous shale and thin layers of sandstone irregularly distributed.

Kindle argued that on Huron River it was impossible to distinguish lithologically the exact limits of the Chagrin formation so that it seemed "better from a taxonomic viewpoint not to attempt to apply the term Chagrin to any part of the Huron River section but to assign the whole of it to the two divisions which are pre-eminently black shales . . . ."[10]. He, therefore, proposed to "limit the true Huron shale to those beds of the Ohio shale exposed on Huron River, at Rye Beach, and elsewhere, in which spherical concretions occur and the Cleveland shale to the higher beds in which they do not occur and in which the cone-in-cone-structure does occur".[11]

[1]Fritz, M. A.: Geol. Soc. Am., vol. 50, pp. 79-88 (1939).
[2]Turner, M. C.: Bull. of Am. Pal., vol. 25, No. 88, p. 7 (1939).
[3]Stauffer, C. R.: Geol. Surv., Canada, Mem. 34, p. 214 (1915).
[4]Turner, Mary C.: op. cit., p. 7.
[5]Kindle, E. M.: Geol. Surv., Canada, Sum. Rept. 1912, p. 287.
[6]Geol. Surv., Canada, Map No. 1715, 1918.
[7]Newberry, J. S.: Ohio Geol. Surv., Rept. of Prog. 1869, p. 19.
[8]Andrews, E. B.: Ohio Geol. Surv., Rept. of Prog. 1869, p. 64.
[9]Prosser, C. S.: Jour. Geol., vol. 11, p. 533 (1903).
[10]Kindle, E. M.: Am. Jour. Sci., vol. 34, 1912, p. 201.
[11]Kindle, E. M.: op. cit., p. 199.

Ulrich places the Huron above the Chagrin and argues that the "Chagrin is late Devonian and older than the Huron member of the Ohio shale."[1]

In the Cleveland region Cushing[2] calls the black shales overlying the Hamilton formation in well logs the "Shales of Portage age". These shales were called the Huron shales by Newberry, who correlated them with the Huron shale along Huron River. Cushing believes that the shales of the Cleveland section pinch out before Huron River is reached and that the true Huron is a much higher formation and is not represented at Cleveland. Cushing's section is as follows:

Dovonian or Carboniferous.....	Cleveland shale
	(disconformity)
Devonian.....	Chagrin shale
	Shales of Portage age
	Shales of Hamilton age

The foregoing names are in current use by the United States Geological Survey.

In view of the above uncertainty as to exactly what constitutes the true Huron shale and as the relation of the Huron shale to the Cleveland and Chagrin shales is still under investigation, it is thought best to describe the comparable rocks of the present area under the local term Kettle Point beds.

Distribution. The Kettle Point beds have an areal distribution of about 450 square miles and occupy the extreme southwest part of the area, where they immediately underlie the drift.

Outcrops are very scarce and in general show only a few feet of rock. They occur along Sydenham River and may be seen immediately above the town of Alvinston and where the road crosses the river one-half mile above the village of Shetland. Two "kettles", indicating the presence of these beds, were seen in the valley of Bear Creek near the Warwick Pure Salt Company plant, but no actual outcrop was found. Stauffer[3] reports the occurrence of Upper Devonian shales in this vicinity. The best and thickest outcrop, showing about 12 feet of rock, is at Kettle Point, approximately 1 mile outside the west boundary of the London area.

Lithology. As seen at the type locality the Kettle Point beds consist of about 12 feet of thin-bedded to laminated, paper-thin weathered, dark grey to black shale that is rusty coloured and even greenish along some of the bedding planes. A profusion of small, amber-coloured spore cases *(Protosalvinia huronensis)* are present, and small pyrite concretions and crystals are not uncommon. The entire outcrop is characterized by spherical concretions (kettles) from 8 inches to several feet in diameter. The "kettles" are composed of radiating fibres of impure carbonate of lime extending from an amorphous shaly centre and occurring in zones divided by concentric amorphous intervals. The shale bedding curves both above and below the concretions, indicating that they "grew" after deposition of the sediments. Daly[4] has discussed in some detail the probable mode of formation of the "kettles".

---

[1]Ulrich, E. O.: Am. Jour. Sci., vol. 34, 1912, p. 171.
[2]Cushing, H. P.: U.S.G.S., Bull. 818, 1931, pp. 28, 32.
[3]Stauffer, C. R.: Geol. Surv., Canada, Mem. 34, p. 185 (1915).
[4]Daly, R. A.: Jour. Geol., vol. 8, pp. 135-150 (1900).

The following flora and fauna[1] are listed from these black beds:

Plantae

Knorria sp.
[2]*Lepidodendron primaevum* Rodgers
Protosalvinia huronensis (Dawson)
Pseudobornia inornatus (Dawson)

Brachiopoda

Lingula ligea Hall
Lingula spatulata Vanuxem

Vermes

[2]*Polygnathus coronatus* Hinde
[2]*P. dubius* Hinde
[2]*P. immersus* Hinde
P. palmatus Hinde
[2]*P.* (?) *serratus* Hinde
[2]*P. prioniodus panderi* Hinde

Pisces

Dinichthys sp.
Rhadinichthys sp.
Stenosteus sp.

On the left side of Sydenham River ¼ mile below the first road crossing north of Alvinston the Kettle Point beds consist of 6 feet of thin-bedded to laminated, rusty weathered, dark grey to black, fine shale. Spherical and flattened, pyritiferous concretions up to 3 inches in diameter are common. *Protosalvinia huronensis* is prolific in some beds and a single annelid jaw was observed. "Kettles" are apparently absent.

Above the road bridge at Shetland the beds consist of about 7 feet of thin-bedded, rusty weathered, black shale similar to the foregoing. These beds enclose the following fossils[3].

Plantae

Protosalvinia huronensis (Dawson)

Brachiopoda

Lingula spatulata Hall

Vermes

Polygnathus dubius Hinde
P. palmatus Hinde

Pisces

Rhadinichthys sp.

Kindle states that the black shales near Alvinston agree in the lack of spherical concretions and in "other respects with the Cleveland member of the Ohio shale and doubtless represent the Cleveland shale of the Ohio section"[4]. In like manner, Williams refers to the shale exposed near Shetland as the "Cleveland or upper division of the Ohio shales".[5]

The black shales at both Alvinston and Shetland are lithologically and faunally similar to the Kettle Point beds at the type locality, the only apparent difference being the absence of the characteristic "kettles".

[1]Stauffer, C. R.: op. cit., p. 184.
[2]Collected by G. J. Hinde.
[3]Stauffer, C. R.: op. cit., p. 185.
[4]Kindle, E. M.: Geol. Surv., Canada, Sum. Rept. 1912, p. 288.
[5]Williams, M. Y.: Geol. Surv., Canada, Sum. Rept. 1917, pt. E, p. 26.

In well cuttings the Kettle Point beds are typically dark brownish to black, bituminous shale with many amber-coloured spore cases *(Protosalvinia)* in most samples. In Orford and Euphemia townships, however, some wells exhibit soft, greenish grey shale and green, sandy shale interbedded with the typical black shale. The following table illustrates this lithology.

County	Township	Depth	Thickness	Lithology
		Feet	Feet	
Kent	Orford	220–235	15	Shale: black, bituminous; some greenish grey shale.
		235–240	5	Shale: greenish grey.
		240–245	5	Shale: greenish grey and black, bituminous.
		245–307	62	Shale: black, bituminous.
		307–317	10	Shale: greenish grey.
Lambton	Euphemia	52–57	5	Shale: dark brown, bituminous.
		57–67	10	Shale: soft, greenish grey.
		67–105	38	Shale: dark brown, bituminous; some green, sandy shale.
Lambton	Brooke	55–60	5	Shale: black; spores.
		60–140	80	Shale: dark brownish black; many spores.
Lambton	Bosanquet	90–94	4	Shale: black; some pyrite; few spores.
Lambton	Warwick	25–74	49	Shale: brownish black, bituminous.
		74–85	11	Shale: black, many spores.

Delimitation and Thickness. The Kettle Point beds constitute the youngest bed-rock in the area and are everywhere overlain by glacial till. The lower contact is nowhere exposed and is, therefore, available for study only in well cuttings. As thus seen, the contact is fairly sharp, the change from black or brownish bituminous shale to the grey limestone and shale of the Hamilton occurring without gradation. As already noted, wells in Orford and Euphemia townships have some green shale and sandy shale interbedded with the typical black shale. In one well, greenish grey shale rests on the Hamilton formation. It is not known whether these greenish intercalations are lenticular or not. They do not appear to always be at the same horizon in the different wells. Sedimentation may have been continuous across this contact. However, attention is drawn to the presence of the sandy shale and to the local variation in thickness of the Hamilton formation. These conditions may be taken as some indication of a possible disconformity at the top of the Hamilton beds.

The thickest exposed section of Kettle Point beds within the area is on Sydenham River above Shetland, where about 7 feet is present. The following table gives the thickness in well cuttings from the townships specified.

County	Township	Thickness
		Feet
Kent	Orford	97
Lambton	Euphemia	53
Lambton	Brooke	85
Lambton	Warwick	60
Lambton	Warwick	50

Age and Correlation. The Kettle Point beds occupy the same general position as the Antrim shale of Michigan. The two deposits, in their typical development, are essentially similar lithologically, and both contain spherical concretions (kettles) and an abundance of spore cases. Newcombe states that "a concretionary zone near the base of the Antrim is probably nearly equivalent to a like zone observed at Kettle Point, Ontario"[1]. The Antrim shale is generally considered as Upper Devonian in age.

According to Stauffer[2], *Lingula spatulata* (found at both Kettle Point and at Shetland) occurs in the Genesee and Portage of New York. *Polygnathus dubius* and *Polygnathus palmatus* occur in the Genesee of New York and *Polygnathus truncatus* and *Prioniodes panderi* occur in the Hamilton of New York.

[1]Newcombe, R. B.: A. A. P. G., vol. 16, 1932, p. 156.
[2]Stauffer, C. R.: Geol. Surv., Canada, Mem. 34, p. 227 (1915)

72996—5½

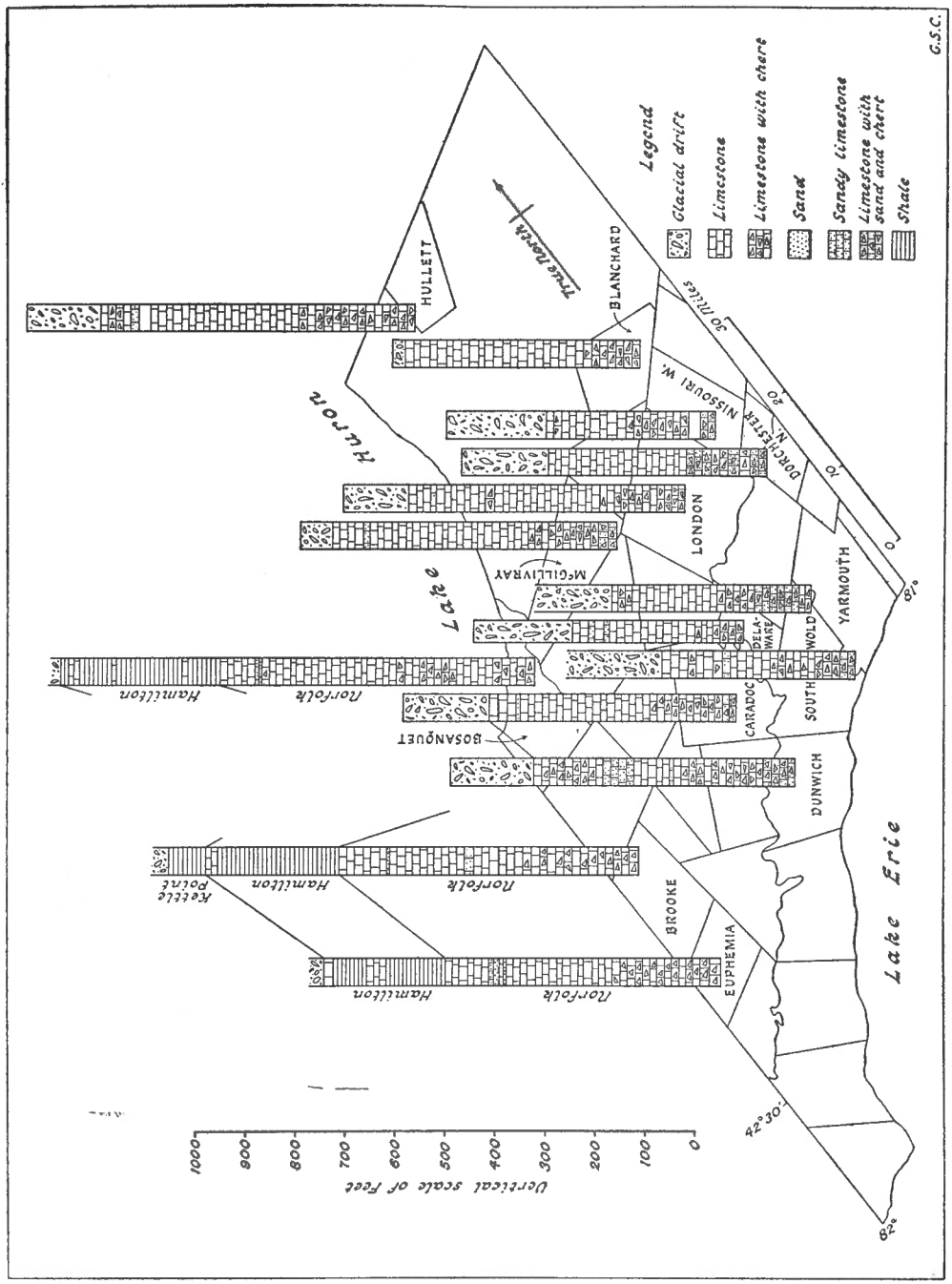

Figure 4. Columnar sections of the Devonian, showing lithology of the Norfolk, Hamilton, and Kettle Point formations in the townships specified.

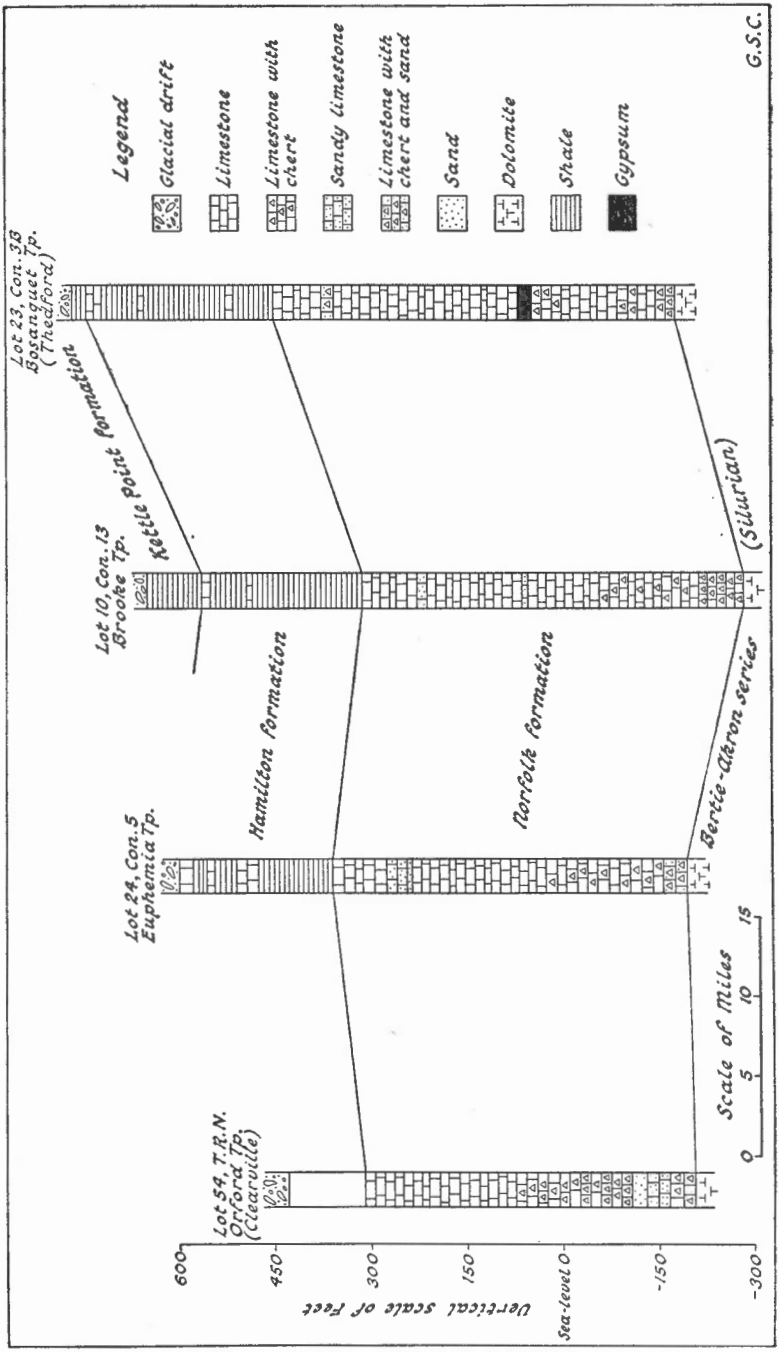

Figure 5. Columnar sections between Clearville and Thedford.

CHAPTER IV

STRUCTURAL GEOLOGY

Only a most general treatment of the geological structure of the London area as a whole is possible. The bedrock is everywhere overlain by a mantle of glacial till, which results in a scarcity of outcrops and produces topography that in no way reflects the attitude of the underlying strata. Outcrops are generally small and scattered and practically confined to the northern one-third of the area: only there, therefore, is it possible to make any direct observations regarding rock structure. The strata are locally almost flat-lying and, with the absence of exposed key horizons that might be used for structural determinations, it will be clear that only a small amount of structural data is available from surface mapping alone. Drilling records provide the most reliable structural data and constitute practically the sole source of information on local and detailed structures.

Very little information is available regarding the topography of the Precambrian surface upon which the Palæozoic sediments rest. Only a few wells penetrate the entire sedimentary succession and these are so widely separated that at best they indicate only the general regional character of the Precambrian surface. So far as known the surface is undulating, with a regional southerly dip averaging about 8 feet a mile over the 65-mile distance between Hullett and Mosa townships. Considerable local relief is indicated. In Logan township the elevation of the Precambrian is about 533 feet higher than in Hullett township and about 163 feet higher than in Blanchard township: a Precambrian knoll is, therefore, indicated in this region. The Palæozoic sediments are about 3,350 feet thick in the north (Hullett township) and at least 3,850 feet in the south (Zone township). The table of deep wells on page 67, some of which penetrate the Precambrian, summarizes our present reliable information on deep drilling in the London area.

The Palæozoic sediments have been so little deformed that they appear to be horizontal or nearly so. However, the strata do exhibit a regional inclination, averaging perhaps 14 feet a mile (based on the top of the Trenton) in a direction about southwest. Local variations in both direction and magnitude of dip are known. Some of these are shown by two small areas of Hamilton formation within the outcrop area of the overlying Kettle Point beds in Euphemia township, and by direct observation elsewhere in the area. As already intimated, in the general absence of exposed key beds, well cuttings, or a combination of these with outcropping beds, must be relied upon in obtaining the amount and direction of dip at any locality. The following structural data have thus been obtained.

At the mouth of a small creek 2 miles north of Arkona the contact of Hamilton shale and overlying crinoidal and coral limestone is exposed at an elevation of 648 feet. About 71 feet of rock is exposed there. The same contact is recognized in cuttings from a well on lot 3, con. 4, Bosanquet tp., at an elevation of 588 feet. This well is 2 miles west of the outcrop, indic-

Lot	Concession	Township	County	Surface elevation	Depth of well	Thickness of drift	Thickness of sediments	Elevation of Precambrian surface (datum: sea-level)	Remarks
				Feet	Feet	Feet	Feet		
23	2	Hullett	Huron	980	3,531	150	3,350	−2,520	Drilled 31 feet into Precambrian.
20	2	Logan	Perth	1,153	3,188	140	3,000	−1,987	Drilled 48 feet into Precambrian.
21	17	Blanchard	Perth	1,015	3,174	18	3,147	−2,150	Drilled 9 feet into Precambrian.
4	D	Delaware	Middlesex	?	3,406	?	?	.....	Drilled 16 feet into Precambrian.
7	R5S	Ekfrid	Middlesex	670	3,582	195	3,360	− 2,885	Drilled 27 feet into Precambrian.
23	10	Dunwich	Elgin	597	3,580	187	3,393	.....	Precambrian not reached. Drilled 20 feet into basal sand.
6	6	Mosa	Middlesex	706	3,755	82	3,668	− 3,044	Drilled 5 feet into Precambrian.
12	R.R.	Zone	Kent	668	3,998	148	3,850	.....	Precambrian not reached.
2	4	Harwich	Kent	595	3,789	68?	3,721?	.....	Precambrian not reached. Drilled 16 feet into basal sand.
3	S.B.	Bosanquet	Lambton	707	3,725	18	3,707	.....	Precambrian apparently not reached.

ating a west dip of about 30 feet a mile at this locality. The same contact occurs at an elevation of 579 feet in a well on lot 4, con. 6, Bosanquet tp., 3 miles west of the outcrop. This gives a dip of 24 feet a mile in the same direction. The contact is at an elevation of 527 feet in a well on lot 7, con. 9, Bosanquet tp., about 5·5 miles west of the outcrop; this indicates a dip of about 22 feet a mile in a westerly direction. The crinoidal limestone bed is recognized at Rock Glen, ½ mile north of Arkona; at the outcrop 2 miles north of Arkona; and at the brick yard at Thedford, at elevations of 658, 651, and 653 feet respectively. These data indicate the strike to be approximately north 15 degrees west. The foregoing dips are, therefore, very near the maximum in this locality.

In the vicinity of St. Marys, where bed-rock outcrops along Thames River and is visible in several quarries, dips in several directions are directly observable. On the river one-eighth mile south of highway number 7 the crest of a low anticline with an east-west trend is exposed; the limbs dip up and down stream at angles of 2 to 3 degrees. However, about ½ mile farther down stream the rock in the stream bed dips approximately 2 degrees north 30 degrees east. A shallow syncline is thus indicated south of the foregoing anticline.

In the southern excavation of the St. Marys cement quarries, the rock rises from the east end of the quarry to a point almost midway of its length, after which it flattens to nearly horizontal; the maximum dip is about 3 degrees north 70 degrees east. In the northern excavation a low dip in a direction south 30 degrees west is visible near the west end of the pit. A low anticlinal fold trending a few degrees west of north is, therefore, indicated at these quarries. This fold was referred to by Stauffer[1]. It is not definitely known whether a fault is associated with the fold or not. When visited, overburden from the working quarry had been dumped into the southern pit, concealing much of the face. Goudge[2] states that some indication of vertical dislocation is shown by the presence, in the east end of the quarry, of two dolomite bands that do not occur in the quarry west of the fold, and which have been found at a depth of 69 feet in drill holes west of the fold.

At the abandoned quarry of the Standard White Lime Company on the north side of Trout Creek, 1½ miles north of the foregoing quarries, the strata appear to dip northwest at a very low angle. The top of the exposure is at an approximate elevation of 1,050 feet; in the St. Mary's Cement Company well on lot 21, con. 17, Blanchard tp., 1½ miles to the south, this rock is thought to be present at about 78 feet from the surface, or at an elevation of about 937 feet. Assuming this to be approximately correct, a dip of about 75 feet a mile in a direction south 25 degrees west is indicated between these two points.

It appears, then, that in the vicinity of St. Marys slight anticlinal rolls trending east-west and generally north-south seem to be present. Also, there is some possibility of faulting, although this has not been definitely proved. However, no definite major structure could be mapped. The small irregularities noted are superimposed on the regional southwest dipping structure. It is thought that as the regional and local dips are so low, there is more chance for local irregularities to vary greatly in trend

[1]Stauffer, C. R.: Geol. Surv., Canada, Mem. 34, p. 113 (1915).
[2]Goudge, M. F.: Dept. Mines and Res., Bur. Mines, Pub. 781, p. 269.

than if the strata had been thrown into folds by forces acting along definite lines.

In a well on lot 20, con. 2, Logan tp., near the village of Mitchell, the top of the Trenton is 1,242 feet below sea-level. The same horizon 17 miles to the south in the St. Mary's well on lot 21, con. 17, Blanchard tp., is at −1,350 feet; this gives a south dip on top of the Trenton of 6 feet a mile. In the Trewartha well on lot 23, con. 2, Hullett tp., near the town of Clinton, the Trenton was encountered at 1,755 feet below sea-level. This is lower than in the Mitchell well and indicates a drop of 28 feet a mile in a direction of north 60 degrees west over the 18½ mile distance between the two wells. Using the top of the Trenton in the three foregoing wells, a regional strike approximately north 12 degrees west is indicated.

In the St. Mary's well the top of the Guelph formation is 18 feet above sea-level, whereas in a well on lot 10, con. 10, London tp., about 12 miles southwest, the same horizon is 262 feet below sea-level. This gives a dip of 24 feet a mile in a direction south 32 degrees west between these two points.

Direct observation on outcrops along Maitland River between Goderich and the village of Auburn indicate the presence of a series of low parallel rolls or corrugations trending approximately northeast. At least three shallow synclinals flanked by equally low anticlinals are present. Dips are low, from 2 to 5 degrees, but no definite structures that might be expected to continue to depth and to form places for the accumulation of oil and gas could be mapped. Another such trough is suggested on Middle Maitland River about 3 miles west of Ethel. This is probably flanked on the west by a roll indicated by outcrops on the same river about 2 and 3 miles respectively south of Wingham. Dips there are very low, probably not over 1 degree.

It thus appears that in the Goderich-Ethel-Wingham region the minor rolls indicate a northeast strike for the exposed rocks rather than a strike somewhat west of north, as shown by elevations on the Trenton in the Clinton-St. Marys region and by Devonian outcrops in the Arkona-Thedford district.

Detailed study and correlation of well samples, particularly from Middlesex and Elgin counties and parts of Lambton and Kent counties, show that the regional southwesterly dip is there interrupted by slight reversals and by variations in magnitude. These variations are small, but are apparently sufficient to play an important part in the accumulation of natural gas and oil in commercial quantity. Structure contours have been drawn on the top of the Norfolk formation in this part of the area and are shown on the structure diagram accompanying this report: this will be discussed in a subsequent chapter on economic geology.

There are some time breaks in the sedimentary succession of the London area. No Cambrian rocks are known in the area, so that a long period elapsed between Precambrian and Ordovician time, during part of which at least deposition occurred elsewhere. The entire period may not be one of erosion, as some part of Cambrian time may have been represented by sedimentation, the products of which were eroded before deposition of the existing strata.

In the area[1] to the east, the Ordovician-Silurian contact is disconformable. Nowhere within the London area is this horizon exposed. However,

[1]Caley, J. F.: Geol. Surv., Canada, Mem. 226, p. 61 (1941).

there is no reason to suppose that the break is not present here; in fact, it would seem more reasonable to extend the break from the adjoining region than to assume conformable relations beneath the London area. The few wells that penetrate the Ordovician in this area do show considerable variation in thickness of the Queenston shale. This could reasonably be attributed to erosion of the Queenston before the overlying Medina formation was deposited.

The Silurian-Devonian contact is also interpretated as being disconformable. A break is present at this contact in areas[1] to the east and, although the contact is nowhere exposed in the London area, the considerable local variation in thickness of the Bertie-Akron formation and the presence of sand and glauconite at the base of the Norfolk formation as seen in well cuttings, point to an erosional interval between the Silurian and Devonion systems.

The possibility of a break at the top of the Hamilton formation was mentioned when discussing the delimitation of the Kettle Point beds. Attention was drawn to the local variation in thickness of the Hamilton beds and to the presence in some wells of green, sandy shale at the base of the Kettle Point beds.

[1]Caley, J. F.: Geol. Surv., Canada, Mem. 224, p. 81 (1940); Mem. 226, pp. 47, 62 (1941).

CHAPTER V

ECONOMIC GEOLOGY

The economic products derived from the Palæozoic formations of the London area are all of the non-metallic type. The more important of these are building stone and crushed stone from the limestone formations; lime, Portland cement, chemical lime, flux, etc., from the dolomite, magnesian limestone, and high calcium limestone; brick and tile from the shales; salt; and natural gas and oil.

STRUCTURALS MATERIALS

LIMESTONE

Although at the present time the limestones of the Norfolk formation are not being utilized as building stone, they have been used extensively for this purpose. The producing locality was at St. Marys, and stone from the St. Mary's Cement Company quarries and from the pits of the Thames Quarry Company was widely used through southern Ontario for building. For detailed treatment of limestone for building purposes, the reader is referred to Mines Branch Publication No. 733, 1933, by M. F. Goudge.

CRUSHED STONE

Although crushed stone, used for highway construction, railway ballast, concrete aggregate, etc., comprises the greatest tonnage[1] of limestone produced in Ontario, it is not at present the major product of quarrying within the London area. However, limestone of the Norfolk formation is suitable for these uses and stone from any of the outcrops of this rock could be so utilized. Crushed stone was produced from this formation some years ago by the Thames Quarry Company at St. Marys.

LIME

The Devonian limestones of southwestern Ontario are extensively used for production of lime. Within the London area commercial production is at present entirely from the quarries of the St. Mary's Cement Company at St. Marys. The upper part of the Norfolk formation (Onondaga and Delaware) is here quarried chiefly for manufacture of Portland cement, although until a few years ago considerable quantities of the stone were used for building, flux, and chemical purposes.

Quarrying of these Devonian rocks for lime has also been carried on by the Standard White Lime Company, both at the northern limits of St. Marys and on lot 6, con. 14, Downie tp., about 2½ miles northeast of that city. Operations were discontinued some years ago at each of these plants.

Prior to 1928 lime was produced from the lower part of the Norfolk formation on lot 14, con. 6, Culross tp., near Teeswater, by the Gypsum, Lime and Alabastine, Canada, Limited.

[1]Goudge, M. F.: Dept. Mines and Res., Bur. Mines, Pub. 781, 1933, p. 33.

72996—6½

In addition, remains of small kilns at several other localities testify to the same limestone having been burnt, probably by farmers for their individual and local use. For chemical analyses and detailed descriptions of the foregoing workings, the reader is referred to Bureau of Mines Publication No. 781, 1933, by M. F. Goudge.

BRICK AND TILE

Brick and tile are the chief economic products, manufactured from the shales of the Ontario Peninsula.

In the London area only the Hamilton shales are thus utilized, and only at Thedford is the industry at present carried on. The raw material is blue-grey, soft shale that is smooth and plastic when wet. Keele states that "owing to its smoothness, high plasticity, and tensile strength in the raw state, and its density in the burned state, it is one of the best drain-tile clays in the province".[1] At the present time (1940) the brick yard at Thedford produces brick, hollow building blocks, and drainage tile from these Hamilton shales.

When visited by the writer there was roughly 20 feet of shale exposed in the brick yard. A similar thickness is present in the railway cut 1 mile northeast of Thedford. The shale also outcrops at several places on Ausable River in the vicinity of Arkona: an aggregate thickness of about 58 feet is exposed in one section located 2 miles north of that village.

Working of these Hamilton shales is made more or less difficult by the fact that they are everywhere covered either by glacial till or by overlying limestone beds. This is an important consideration in view of the fact that many of the surface clays in the region are also suitable for the manufacture of brick and tile.

SALT

Salt is one of the most important and valuable economic products of the Palæozoic rocks of southwestern Ontario. During 1940 about 412,401 tons, valued at $2,371,780, was recovered from brine wells in Ontario[2]. This constituted about 89 per cent of the total Canadian output.

Salt was discovered in Ontario in 1866 when a company was formed at Goderich for the purpose of drilling for oil. The first well was drilled on the north side of Maitland River, a short distance above the bridge at Goderich, but instead of striking oil a bed of rock salt was encountered at a depth of 964 feet: the salt was interstratified with rock, but aggregated 30 feet in thickness. This initial discovery was immediately followed by further drilling in the valley near the town, and by 1872 several producing plants were in operation. At the same time, salt was found at both Clinton and Seaforth.

Since its discovery in 1866, salt has been produced at other localities such as Kincardine, Wingham, Brussels, Hensall, Exeter, Courtright, Sarnia, Windsor, Park Hill, Sandwich, Elarton, and Amherstburg. However, in 1939, operations were carried on only at Goderich, Windsor, Sarnia, Amherstburg, and Elarton: only Goderich and Elarton are within the area of this report.

Within the London area very little exploration for salt has been carried on outside the general region of Goderich. However, a considerable number

[1] Keele, J.: Geol. Surv., Canada, Mem. 142, p. 27 (1924).
[2] Dominion Bureau of Statistics, Census of Industry, 1941, p. 2.

of the wells drilled for petroleum and natural gas have passed through the salt-bearing formation, thereby furnishing data on the approximate area underlain by salt. On this basis, the salt appears to be confined to that part of the area west of a line joining Teeswater, Brussels, Seaforth, Denfield, Crumlin, Mount Bridges, Ekfrid, and Aldborough. This includes most of Huron and Middlesex counties, together with the west part of Elgin and that part of Lambton and Kent counties that is within the London area.

The salt does not form a continuous sheet throughout the foregoing counties. A well on lot 24, con. 5, Euphemia tp., has 150 feet of salt, whereas in the same township a well on lot 22, con. 1, passed completely through the salt-bearing formation without encountering any salt. In like manner, two wells in Orford township show no salt, although 51 feet of salt was struck a few miles east in Aldborough township, and 160 feet of salt was penetrated in Harwich township to the south and west. However, available drilling records point to considerable continuity of the salt beds and suggest that within the above defined limit only a few small areas are present where wells penetrating the salt-bearing formation have not encountered salt.

The salt is everywhere associated with the Salina formation. It commonly occurs in several beds separated by variable thicknesses of dolomite or limy shale. From one to six separate beds are known. Single beds range from about 6 feet to 295 feet thick, with an aggregate maximum thickness of 350 feet known to be present in Bosanquet township. The beds are apparently lenticular in form, the thickness of single beds varying greatly from well to well. Also, an horizon, that in one well may be occupied by a thick salt zone may in another well be represented by several salt beds interstratified with rock.

In drilling, the first salt is commonly encountered between 320 and 420 feet below the top of the Salina formation, although salt is known as close to the top as 205 feet in a few localities. It is rarely found closer than 100 feet to the base of the formation. Small though variable quantities of gypsum are commonly present both above and below the salt, and in several wells gypsum may constitute up to 50 per cent of one or more of the 5-foot drill samples near the base of the formation.

The following table summarizes the geological characteristics of the salt deposits, indicating depth below the surface, relation to the Salina formation, and number and thickness of the beds, etc.

Lot	Concession	Township	County	Depth of salt	Depth of salt below top of Salina	Thickness of Salina	Thickness of salt	Remarks
				Feet Ins.	Feet	Feet	Feet Ins.	
16	12	Dunwich	Elgin	1,167	337	506	79	
23	5	Dunwich	Elgin	.....	.....	400	.....	No salt.
13	3	Ekfrid	Middlesex	1,205	340	635+	155	
29	7	McGillivray	Middlesex	1,044	354	720	216	
23	2	Hullett	Huron	1,220	335	875	245	Two salt horizons.
				1,590	703	.....	35	
[1]Town of Clinton		Goderich	Huron	1,151	.....	.....	15	
23	3 B	Bosanquet	Lambton	1,345	320	1,020	40	
				1,465	440	.....	10	
				1,525	500	.....	170	Four salt horizons.
				1,875	800	.....	55	
[1]Port Franks		Bosanquet	Lambton	1,245	.....	.....	110	With shale.
3	S.Bdry.	Bosanquet	Lambton	1,355	420	1,000+	30	Much dolomite.
				1,475	540	.....	10	
				1,485	550	.....	50	Much dolomite.
				1,535	600	.....	160	
				1,875	940		50	
10	13	Brooke	Lambton	1,340	225	880	30	
				1,440	325	.....	295	Three salt horizons.
				1,885	765	.....	25	
24	5	Euphemia	Lambton	1,300	380	840	150	Dolomite at 1,435 to 1,440 feet.
22	1	Euphemia	Lambton	.....	.....	585	.....	No salt.
2	4	Harwich	Kent	1,280	345	605	160	
Randeau Park		Harwich	Kent	1,660	.....	.....	165	
A	12	Aldborough	Elgin	1,395	373	596	11	
				1,443	421	.....	49	

12	R.R.	Zone	Kent	1,555	.....	.....	155	
[1]5	3	Zone	Kent	1,485	.....	.....	200	
10	10	London	Middlesex	.....	.....	451	.....	No salt.
30	6	London	Middlesex	1,080	300	780	180	
[1]City of London		London	Middlesex	1,400	.....	.....	200	With shale.
6	6	Mosa	Middlesex	1,285	342	746	59	Two horizons of salt.
				1,356	413	.....	84	
13	2	Mosa	Middlesex	1,225	350	728	160	
[2]Attrill's well at Goderich		.....	Huron	997	.....	.....	30 11	
				1,060	.....	.....	25 4	
				1,092	.....	.....	34 10	
				1,207	7	.....	15 5	
				1,230	.....	.....	13 6	
				1,379	.....	.....	6 0	
[1]Town of Wingham		Turnberry	Huron	1,090	.....	.....	30	
Goderich (Western Canada Flour Co.)			Huron	1,020	205	243+	20	Base of Salina formation not reached.
				1,045	230	.....	13	
[1]Brussels		.....	Huron	970	.....	.....	?	
[1]Blyth		Morris	Huron	1,125	.....	.....	90	
[1]Seaforth		McKillop	Huron	1,035	.....	.....	110	
[1]Hensall		Hay	Huron	1,090	.....	.....	116	With shale.
16	2	Metcalfe	Middlesex	1,180	310	635	207	
26	10	Euphemia	Lambton	1,245	345	760	195	
[3]3	d.r.e.	Nissouri West	Middlesex	938	.....	.....	35	
3	3	Williams East	Middlesex	1,142	.....	.....	271	From driller's log.

[1] Geol. Surv., Canada, Ann. Rept., 1903, p. 226 S.
[2] Hunt, T. Sterry: Geol. Surv., Canada, Rept. of Prog. 1876–77, pp. 226–227.
[3] Cole, L. H.: Mines Branch, Dept. Mines, Pub. No. 716, 1930, p. 31.

It will be seen that a vast quantity of salt underlies the western part of the London area. Using a specific gravity figure of 2·125 as determined by Hunt[1] for specimens of rock salt from Goderich, a bed of salt 1 foot thick will contain about 1,850,880 tons (2,000 pounds) for each square mile. The average thickness of salt shown in the foregoing table is almost 200 feet. It seems, therefore, that there is little danger of the supply of salt being exhausted.

The salt is produced by evaporation of artificial brine. The brine from the first well drilled in 1866 at Goderich was analysed by Hunt, who reported[2] the following results.

	In 1,000 parts by weight	In 100 parts of solid residue
Chloride of sodium	259·000	99·018
Chloride of calcium	0·432	0·165
Chloride of magnesium	0·254	0·097
Sulphate of lime	1·882	0·720
	261·568	100·000

An analysis, by the same author, of rock salt taken from the core of the Attrill well at Goderich gave the following results[3].

Chloride of sodium	99·687
Chloride of calcium	0·032
Chloride of magnesium	0·095
Sulphate of lime	0·090
Insoluble in water	0·017
Moisture	0·079
	100·000

For a detailed account of salt recovery, methods of manufacture, uses, etc., the reader is referred to Mines Branch, Department of Mines, Publication No. 716, 1930, by L. H. Cole.

PETROLEUM

GENERAL STATEMENT

Petroleum is a complex mixture of hydrocarbons, chief among which are the paraffins and naphthenes. A small amount of inorganic material is also present: this may or may not be in combination with the hydrocarbon molecule. Natural gas is nearly always associated with oil, and the two together form a continuous series of hydrocarbons ranging from solids to light gases. The chief constituent hydrocarbons in natural gas are methane (CH_4) and ethane (C_2H_6), although varying quantities of propane (C_3H_8) and butane (C_4H_{10}) may be present as gases. In addition, there may be certain gaseous impurities such as nitrogen (N), carbon dioxide (CO_2), and hydrogen sulphide (H_2S), as well as traces of oxygen (O), hydrogen (H), and carbon monoxide (CO).

In oil and gas fields, natural gas is classified as "dry" or "wet" according to the quantity of gasoline vapours present, and "sweet" or "sour" according

[1]Hunt, T. Sterry: Geol. Surv., Canada, Rept. of Prog. 1876-77, p. 236.
[2]Hunt, T. Sterry: Geol. Surv., Canada, Rept. of Prog. 1863-66, p. 269.
[3]Hunt, T. Sterry: Geol. Surv., Canada, Rept. of Prog. 1876-77, p. 233.

to the absence or presence of hydrogen sulphide. If much hydrogen sulphide is present, it must be removed before the gas is used commercially. The "dry" gas is the usual natural gas of commerce and it commonly occurs in reservoirs separate from oil reservoirs.

There are no commercial gas fields in the London area, but there are several widely scattered localities where individual wells have enountered gas in considerable quantity. As this gas is not generally associated with the oil but is obtained from reservoirs at different horizons, its occurrence will be discussed separately.

The London area embraces several oil fields, among which are both the earliest and most recent discoveries made in Ontario. During 1939, about 59,891 barrels, valued at about $116,790, was produced: this constituted about 29 per cent of the total Ontario production for that year. Commercial production is at present confined to that part of the area lying south of the latitude of Arkona, where the southwest part of Middlesex county, together with Warwick, Brooke, and Euphemia townships, Lambton county, and Zone township, Kent county, constitute the general producing region. Although widely scattered drilling has been done north of this region and shows of both oil and gas have been obtained at several localities, no commercial production has been attained.

PRODUCING HORIZONS

Commercial production of oil comes entirely from rocks of Devonian age, the Norfolk formation (Big Lime of drillers) holding the producing reservoir. The actual producing horizon is everywhere within the upper 150 feet of the formation, and several individual pay streaks may be present. The reservoir is fine-grained to crystalline, buff and brownish grey limestone, in places somewhat dolomitic. No data are available on the porosity of this rock, but there is evidence of fracturing at several localities.

SUBSURFACE STRUCTURE

The top of the Norfolk formation is the only horizon upon which subsurface structure contours can be drawn. This is so, because only a few of the wells penetrate the underlying formations. As samples for a great number of the older wells are not available, drillers' logs of these wells had to be relied upon in computing elevations of the Hamilton-Norfolk contact. However, as this is a shale-limestone contact, it is readily recognized by the drillers and, therefore, reasonable assurance may be placed on their recordings of its depth.

The accompanying diagram shows structure contours drawn on top of the Norfolk horizon with a contour interval of 20 feet. The major structure on this horizon is a gentle, southwest-dipping, regional monocline. Local increases and reversals in dip on this regional structure form several low anticlinal rolls and domes. Most of these local structures have a general northwest trend, although in Euphemia and Zone townships the trend is more nearly west. Closures vary from less than 20 feet to about 80 feet. Dips on the flanks are gentle, varying from about 20 to 100 feet a mile and flattening to the regional average, which is less than 20 feet a mile, within 2 or 3 miles of the crests of the various folds.

Several of the foregoing structures have formed points of accumulation for oil, and fields have, therefore, been developed on them. These fields, with the exception of the recent discovery in Warwick township, are among

the oldest developed oil fields in Ontario. They contain a great number of wells too closely spaced to be individually represented on the accompanying diagram: their structure has, therefore, been generalized and the limits of the fields outlined as shown.

There is strong subsurface evidence of vertical dislocation near the lake shore in Orford township and a high-angle fault has been mapped to explain the conditions prevailing there. In the extreme southeast part of the township three wells within 2 miles of the lake shore show the top of the Norfolk formation to be 275 to 309 feet above sea-level. About 1¼ miles west, three wells on a general north-south line show the same horizon to have dropped to a level varying from 154 to 175 feet above sea-level. These last wells are so located as to necessitate either a breaking of the structure contour lines as shown on the diagram, or a squeezing together parallel to a line joining the wells: this last condition would also suggest vertical dislocation of the horizon contoured.

If faulting, rather than the presence of a steep terrace, is the correct interpretation, and vertical dislocation has taken place, the upper 154 feet or so of the Norfolk formation on the east side of the plane would come against the Hamilton shale on the west side. This upper part of the Norfolk holds the oil producing reservoir in fields to the north. However, drilling on both sides of the fault area has so far shown this horizon to be non-productive, so that no economic importance can definitely be attached to the presence of the fault.

Evidence of faulting does not show at the surface. Several wells show over 200 feet of glacial drift in the southeast part of Orford township and the position of geological contacts is, therefore, based chiefly on subsurface information. However, in accordance with the subsurface diagram, the assumed fault has been placed on the geological map.

OIL FIELDS

As already intimated, several oil fields have been developed in the southern part of the London area. Most of these are very old and are now drilled up. They are past their peak in production, although in 1939 the old fields supplied 56 per cent of the total production from the London area.

Lambton County

Warwick Township. The Warwick oil field is about 4 miles long by 1¼ miles wide. It occupies most of lots 21 to 30, con. 5S, together with a small part of the adjoining lots in con. 4S, and part of lots 25 to 30, con. 6S, Warwick tp., and extends east into lot 1, con. 5, Adelaide tp., Middlesex co. There is also a smaller concentration of wells, chiefly on lot 4, con. 1, and lots 3 and 4, cons. 2 and 3, Metcalfe tp., Middlesex co. These wells are separated from those in Warwick township by several dry holes, but are here described with the Warwick field.

The Warwick field was discovered in 1938. The west end was quickly delimited by dry wells and drilling rapidly spread east into Adelaide and southeast into Metcalfe township. By the spring of 1941 at least 175 wells had been drilled.

Most of the wells are shallow, between 328 and 604 feet deep. Production is from the upper part of the Norfolk formation (Big Lime). The most continuous pay seems to be about 60 feet below the top of the forma-

tion, although there may be as many as four pay streaks within the upper 90 feet. The individual pay horizons are somewhat disconnected, a condition suggestive of fracturing in the reservoir rock. About 72 per cent of the 175 wells were initially non-productive. A few wells had a reported initial yield of 100, 150, and 200 barrels a day, but most of the producers came in with less than 20 barrels. Total production in 1939 was 41,478 barrels[1] from less than fifty wells, which averages roughly 2 barrels a day for each well.

The structure is a west plunging nose that broadens and flattens toward the east boundary of Warwick township. It is more in the nature of a gentle warping on the southwest dipping regional monocline than the result of any definite diastrophic movement. Northwest and southwest dips average about 20 feet a mile and two small domes seem to be present on the higher, flattened part of the nose. Closure is roughly 20 feet on each dome.

Accumulation is practically confined to the crest of the nose and to the domes. A number of dry wells are present on what appears to be the highest parts of the structure. This condition may result from a fracturing of the reservoir rock allowing the production of some wells to rapidly drain the pay streak in a sporadic manner.

The following log illustrates the detailed stratigraphy in Warwick township.

Log of T. Dolan No. 1 Well

Location: lot 10, con. 2, Warwick tp.

Formation	Depth	Thickness	Lithology
	Feet	Feet	
	0–50	50	No samples. Probably glacial till.
Kettle Point	50–100	50	Shale: dark brownish grey; little grey shale at 80 to 85 feet.
Hamilton	100–120	20	Limestone: grey, fossiliferous; little grey shale.
	120–160	40	Limestone: grey, argillaceous; little grey shale at 120 to 125 feet.
	160–305	145	Shale: grey, fossiliferous limestone with pyrite at 165 to 170 feet; some limestone at 195 to 210 feet.
	305–320	15	Limestone: grey, crystalline; some grey shale; pyrite at 305 to 310 feet.
	320–345	25	Limestone: grey, crystalline, argillaceous; grey shale at 320 to 325 feet.
	345–385	40	Shale: grey.
	385–395	10	Limestone: grey, argillaceous; some grey shale.
Norfolk	395–450	55	Limestone: light brownish grey, fine-grained, magnesian; pyrite at 430 to 435 feet; dark films at 445 to 450 feet.
	450–495	45	Limestone: light brownish grey, fine-grained, slightly magnesian.
	495–520	25	Limestone: brownish grey, finely crystalline; some chert at 495 to 500 feet; little rounded sand at 500 to 510 feet.
	520–530	10	Dolomite: brownish grey, finely crystalline; some bituminous streaks.
	530–550	20	Limestone: magnesian, brown.

[1]Ontario Dept. Mines, vol. 49, pt. 5, 1940, p. 75.

Log of T. Dolan No. 1 Well—Concluded

Formation	Depth	Thicknes	Lithology
	Feet	Feet	
	550–660	110	Dolomite: brown, finely crystalline; trace gypsum at 580 to 585 feet; fine porosity 590 to 595 and 605 to 610 feet; little gypsum at 625 to 630 feet.
	660–670	10	Dolomite: brown; about 40 per cent white gypsum.
	670–850	180	Dolomite: brown, fine-grained; little chert 835 to 850 feet.
	850–955	105	Dolomite: brown, finely crystalline; little chert throughout.
	955–990	35	Dolomite: brownish grey; much chert.
Bertie-Akron	990–1,090	100	Dolomite: brownish grey, fine-grained; partly oolitic 1,045 to 1,050 feet; slightly argillaceous 1,060 to 1,065 feet.
Salina	1,090–1,105	15	Dolomite: brown, dense; much gypsum 1,090 to 1,095 feet.
	1,105–1,110	5	Dolomite: grey, argillaceous.

A number of wells are located throughout much of Warwick, Adelaide, and Metcalfe townships outside the Warwick field, but all are dry. Evidence drawn from these wells has failed to show the presence of any favourable points of accumulation, but the wells are so widely scattered that the possibility of there being other structures such as the Warwick field that might be favourable to accumulation cannot be entirely dismissed.

Brooke Township. A low, west-trending, elongated dome is present near the south boundary of Brooke township. It is about 4 miles long and 1 mile wide, occupying the north part of lots 3 to 14, con. 2, and the southern part of the adjoining lots in concession 3. Closure is between 20 and 40 feet. The structure is isolated and the rate of dip on the flanks is unknown.

According to Williams[1], two or three wells on this structure were producing oil in 1918. In 1934 and 1935, eight or nine more wells were drilled, but available records indicate that only two produced any oil. All the wells are shallow, from 350 to 456 feet deep. Yield was very small and from near the top of the Norfolk formation.

In the northeast part of Brooke township about forty wells were drilled during the years 1934 and 1937. These are on lots 21 to 30, cons. 11 to 14. They range in depth from 392 to 510 feet. Only about ten of these wells struck oil and the initial yields varied from 2 to 25 barrels a day. Several other wells are reported to have encountered small shows of oil. Production is from the upper part of the Norfolk formation where one to three pay streaks are indicated. One well encountered 50 M cubic feet of natural gas in the black shales at a depth of about 160 feet from the surface. Peak production from Brooke township was in 1934 with 1,941 barrels. Production fell to 52 barrels in 1939.

There is no well-defined structure to account for the small accumulation in this field. Most of the wells are near the 400-foot structure contour. This contour does, however, suggest very small and local increases in the regional inclination in the vicinity of those wells that found oil.

[1]Williams, M. Y.: Geol. Surv., Canada, Sum. Rept. 1918, pt. E, p. 35.

The following log shows the stratigraphy in this township.

Log of Michigan Pacific Gas and Oil Company Well

Location: lot 10, con. 13, Brooke tp.

Formation	Depth	Thickness	Lithology
	Feet	Feet	
	0–55	55	Mixture of surface sand, clay, etc., and black shale.
Kettle Point	55–140	85	Shale: black and dark brownish; many spores throughout.
Hamilton	140–155	15	Limestone: grey, crystalline; little pyrite; some grey shale.
	155–160	5	Shale: grey; much limestone.
	160–170	10	Limestone: grey, crystalline; some grey shale; bryozoa.
	170–190	20	Shale: grey; much limestone; bryozoa; crinoid columns.
	190–220	30	Limestone: grey, crystalline; some grey shale; ostracods; pyrite.
	220–290	70	Shale: grey; traces grey limestone; Tentaculites; pyrite.
	290–300	10	Unreliable samples.
	300–350	50	Shale: grey; ostracods; brachiopods.
	350–360	10	Limestone: grey, crystalline; some shale.
	360–400	40	Shale: grey; some limestone at 395 feet; Bryozoa; brachiopods.
Norfolk	400–505	105	Limestone: grey, fine-grained, and dense.
	505–510	5	Limestone: brownish grey, finely granular, few sand grains.
	510–580	70	Limestone: magnesian, grey, finely granular.
	580–650	70	Limestone: brownish grey; fine-grained; traces pyrite and black films.
	650–660	10	Limestone: brownish grey, finely granular; few rounded sand grains.
	660–770	110	Limestone: brownish grey, finely crystalline; traces of gypsum.
	770–975	205	Limestone: brownish grey, finely crystalline; little chert throughout.
	975–980	5	Chert: grey; little grey limestone.
	980–1,000	20	Limestone: grey, fine-grained; much grey chert.
Bertie-Akron	1,000–1,070	70	Limestone: magnesian, grey to brown, finely crystalline to dense.
	1,070–1,115	45	Dolomite: brownish grey, dense; little gypsum 1,080 to 1,090 feet.
Salina	1,115–1,160	45	Dolomite: brown, dense; trace of gypsum throughout.
	1,160–1,210	50	Shale: calcareous, greenish grey; traces of gypsum.
	1,210–1,220	10	Dolomite: brownish grey, dense; traces of gypsum.
	1,220–1,240	20	Unreliable mixed samples.
	1,240–1,330	90	Dolomite: brownish grey, dense; grey and shaly at 1,270 and 1,300 feet; much gypsum at 1,280 feet.
	1,330–1,345	15	Mixture brown dolomite and grey, limy shale; traces gypsum.
	1,345–1,370	25	Salt.
	1,370–1,420	50	Shale: grey; trace of gypsum throughout.
	1,420–1,430	10	Dolomite: brown, dense; trace gypsum.
	1,430–1,440	10	Shale: grey; much gypsum.
	1,440–1,735	295	Salt.

Log of Michigan Pacific Gas and Oil Company Well—Concluded

Formation	Depth	Thickness	Lithology
	Feet	Feet	
Salina	1,735–1,840	105	Dolomite: brown, finely crystalline; traces gypsum at 1,760 and 1,790 feet.
	1,840–1,850	10	Shale: grey; little gypsum.
	1,850–1,880	30	Limestone: brownish grey, finely crystalline.
	1,880–1,905	25	Salt.
	1,905–1,910	5	Gypsum: trace of grey, limy shale.
	1,910–1,995	85	Dolomite: grey and brown, finely crystalline; trace gypsum at 1,920 and 1,950 feet.
Guelph-Lockport	1,995–2,010	15	Dolomite: grey, granular.
	2,010–2,120	110	Dolomite: grey and brown, finely crystalline.
	2,120–2,160	40	Dolomite: grey, finely crystalline.
Rochester	2,160–2,210	50	Shale: dark grey; traces grey dolomite at 2,180 feet.
Clinton(?)	2,210–2,215	5	Dolomite: grey, finely crystalline.
Medina	2,215–2,220	5	Shale: reddish, limy; little grey dolomite.
	2,220–2,260	40	Shale: greenish grey, little reddish, shaly dolomite at 2,260 feet.
	2,260–2,290	30	Shale: grey; little grey dolomite at 2,265 to 2,270 and 2,280 feet.
	2,290–2,295	5	Dolomite: grey, crystalline; much grey shale.
	2,295–2,305	10	Shale: grey; much grey dolomite; bryozoa.
	2,305–2,325	20	Limestone: grey, crystalline; much greenish grey shale; pyrite at 2,320 feet.
	2,325–2,335	10	Shale: grey, limy.
	2,335–2,340	5	Limestone: grey, fine-grained.
	2,340–2,345	5	Shale: greenish grey; little red, shaly limestone.
Queenston	2,345–2,637	292	Shale: red; some greenish shale; calcareous at some horizons.

Elsewhere in Brooke township a few widely scattered dry wells have penetrated the Norfolk formation without success. However, approximately one-half of the towsnhip still remains untested.

Euphemia Township. A west-trending, irregular-shaped anticline occupies most of the north half of Euphemia township and extends eastward into Mosa township a distance of about 3 miles. It is about 10 miles long and 2 to 3 miles wide. Dips on the flanks average between 15 and 20 feet a mile and show a reversal on the north within 4 miles of the crest.

At the west end of the structure and occupying lots 24 to 28, con. 4, is a small dome with approximately 40 feet of closure. Dips here are steeper than on the main structure, averaging 35 to 40 feet a mile. The old Shetland oil field was located on the north part of this dome, occupying lots 26, 27, and 28, con. 4, Euphemia tp.[1] By 1896, about thirty wells had been drilled in this field: most of these had apparently been completed 10 years previously. In 1896 the average yield of six producing wells was ⅛ barrel a day, although some yielded 20 to 30 barrels a day for a short time.[2] The exact location of most of these early wells is not known. In 1939, two wells were drilled within the area of the old field: one was dry and the other

[1] Williams, M. Y.: Geol. Surv., Canada, Sum. Rept. 1918, pt. E, p. 36.
[2] Ont. Bur. Mines, vol. 5, 1895, p. 25.

obtained small production from about 85 feet below the top of the Norfolk formation.

In 1932 several wells were drilled on lots 27 and 28, cons. 8 and 9. These are apparently on a "high" on the Norfolk formation, but only one well is reported to have produced oil.

A low, elongated dome with between 20 and 40 feet of closure occupies lots 18 to 20, cons. 7 and 8. Several shallow wells are located on the flanks of this structure, but apparently all were dry. Small shows of oil high in the Norfolk formation were reported.

Total production from Euphemia township in 1939 was 385 barrels.

The following log shows the stratigraphy in this township.

Log of Union Gas Company Well No. 42

Location: lot 24, con. 5, Euphemia tp.

Formation	Depth	Thickness	Lithology
	Feet	Feet	
	0–50	50	No samples. Probably glacial drift.
Kettle Point	50–55	5	Shale: black, bituminous; many spores.
Hamilton	55–70	15	Limestone: grey, crystalline; pryite; brachiopod fragments.
	70–95	25	Shale: grey; little grey limestone.
	95–105	10	Limestone: grey, crystalline; little pyrite.
	105–140	35	Shale: grey; traces of grey limestone; little pyrite.
	140–180	40	Limestone: grey, crystalline; little grey shale; crinoid columns; pyrite throughout.
	180–255	75	Shale: grey; traces grey limestone; ostracods; bryozoa; brachiopoda.
	255–260	5	Limestone: grey, crystalline; ostracods.
	260–285	25	Shale: grey; ostracods; bryozoa; pyrite.
	285–295	10	Mixture grey shale and limestone.
Norfolk	295–375	80	Limestone: creamy grey, fine-grained.
	375–390	15	Limestone: cream-coloured, finely crystalline; some rounded sand.
	390–400	10	Sand: rounded, medium-grained.
	400–420	20	Sand; some grey limestone.
	420–460	40	Limestone: buff-grey, crystalline.
	460–610	150	Limestone: brownish grey and brown, fine-grained; black, bituminous films.
	610–710	100	Limestone: brown, finely crystalline; little grey chert throughout.
	710–810	100	Limestone: magnesian, brownish grey, finely crystalline; grey chert throughout.
	810–825	15	Chert: some limestone and rounded sand grains.
	825–850	25	Limestone: magnesian, grey, fine-grained; much grey chert.
Bertie-Akron	850–880	30	Limestone: magnesian, brownish grey, fine grained.
	880–920	40	Limestone: magnesian, brownish grey, fine to dense; some black, bituminous films.
Salina	920–930	10	Dolomite: brown, dense; little gypsum.
	930–935	5	Shale: grey to greenish; little gypsum.
	935–970	35	Shale: limy, grey; little brown dolomite.
	970–980	10	Dolomite: brownish grey, dense; much gypsum.
	980–1,070	90	Shale: limy, dark grey and greenish; little gypsum throughout.

Log of Union Gas Company Well No. 42—Concluded

Formation	Depth	Thickness	Lithology
	Feet	Feet	
Salina	1,070–1,120	50	Dolomite: brownish grey, dense; little grey shale at 1,090 feet; traces of gypsum.
	1,120–1,140	20	Shale: limy, dark greenish grey; little brown, dense dolomite; trace of gypsum.
	1,140–1,210	70	Dolomite: brownish grey, dense; little grey, limy shale 1,190 to 1,210 feet; trace gypsum.
	1,210–1,250	40	Shale: limy, grey; trace of gypsum.
	1,250–1,300	50	Dolomite: brownish grey, dense; little gypsum; some grey shale at 1,270 feet.
	1,300–1,435	135	Salt.
	1,435–1,440	5	Dolomite: brownish grey, dense.
	1,440–1,455	15	Salt.
	1,455–,7051	250	Dolomite: brown and brownish grey, dense; some dark grey, limy shale at 1,570 feet; traces gypsum at 1,480, 1,580, and 1,700 to 1,705 feet.
	1,705–1,730	25	Gypsum: little brown dolomite throughout.
	1,730–1,760	30	Dolomite: brownish grey, dense; trace gypsum.
Guelph-Lockport	1,760–1,790	30	Dolomite: grey, dense.
	1,790–1,840	50	Dolomite: grey, crystalline.
Rochester	1,840–1,880	40	Shale: grey; little pyrite at 1,845 feet.
Medina	1,880–1,895	15	Shale: red; some green shale and traces of grey limestone.
	1,895–1,900	5	Shale: green, grey, and red.
	1,900–1,910	10	Shale: grey and green; little grey sandstone and red shale.
	1,910–1,940	30	Shale: greenish grey; traces of red shale and grey and reddish limestone.
	1,940–1,970	30	Shale: grey; traces grey limestone.
	1,970–2,010	40	Dolomite: grey, crystalline; much greenish grey shale throughout.
	2,010–2,030	20	Shaly limestone: grey.
Queenston	2,030–2,046	16	Shale: red; little green shale.

Middlesex County

Mosa Township. A northwest-trending anticline or elongated dome occupies lots 3 to 10, cons. 3 to 7, Mosa tp. It is about 4 miles long and 2 miles wide, with a maximum closure of approximately 80 feet. Dips average about 60 feet a mile, but are somewhat steeper at the northwest end of the structure. Two very small domes are located on the crest in concessions 5 and 6.

The Mosa oil field occupies the northern two-thirds of this structure. This field was reopened in 1917 after having been partly drilled and abandoned many years before[1]. Its limits are fairly well defined by dry wells as indicated on the structure diagram. Wells are shallow, between 300 and 400 feet deep. According to Williams[2], most of the production in the older wells is from the upper 20 feet of the Delaware limestone (Norfolk formation), although a few wells yielded from the "middle lime" of the Hamilton formation. During the years 1937 to 1940, at least thirty-five

[1]Harkness, R. B.: Ont. Bur. Mines, 37 Ann. Rept., pt. 5, 1928, p. 58.
[2]Williams, M. Y.: Geol. Surv., Canada, Sum. Rept. 1918, pt. E, p. 37.

wells were drilled on lots 6 and 7, con. 6. Available records indicate that most of these wells produced from a zone 70 to 85 feet below the top of the Norfolk formation, although some got oil at shallower depths and a few from a depth of about 100 feet below the top of the formation. There would thus appear to be two main pays, as well as one or two additional horizons at which shows and smaller quantities of oil are present. Initial yields range from 2 to 8 barrels a day, with one well reported to have come in with 250 barrels.

Accumulation is apparently confined to the highest part of the structure and only a few wells got production from the flanks.

From 1917 to 1939 inclusive, Mosa township produced about 373,800 barrels of oil. Peak production was in 1918 with 108,988 barrels. In 1939 production had declined to 12,857 barrels from about 114 wells, and the average daily yield was about $\frac{1}{3}$ barrel a well.

Outside the Mosa field a considerable number of wells penetrate the Norfolk formation at widely separated localities, but no commercial production has so far been obtained. The relation of many of these wells to structure is not known. However, several wells, located on lots 13 to 15, con. 3, are at or near the crest of the same anticline that occupies much of Euphemia township on the east. Some of these wells had small shows of oil high in the Norfolk formation and also encountered considerable quantities of gas at much lower horizons (Silurian), but oil in commercial quantity was not obtained. In addition, several wells near the Mosa-Ekfrid township boundary on ranges 1S and 1N and 2N, and concessions 1 and 2, are also on a low anticlinal roll, but these too are non-productive.

Ekfrid Township. No oil fields have so far been discovered in Ekfrid township.

About fifty wells are known to have been drilled, only three of which penetrated formations below the Norfolk. Many were test wells that reached only into the upper part of the formation. The wells are widely separated and cover all but a few square miles in the northwest part of the township.

A few wells encountered small shows of oil in the upper part of the Norfolk and in the overlying Hamilton formation. A deep well got a show of oil in the Trenton formation at a depth of 3,535 feet.

A northwest-trending anticline in Dunwich township extends about 3 miles into the southern part of Ekfrid. Dips average about 30 feet a mile and the structure has 25 to 30 feet of closure. Several of the wells are located on the crest and flanks of this structure, but no production has been obtained.

Elsewhere in the township contours on the Norfolk show no well defined structures that might be favourable points for accumulation. Local increases in magnitude of dip are indicated, but if oil is present, these changes are apparently not sufficient to cause accumulation. However, wells are widely scattered and structures not yet indicated may still be present.

The log of Union Gas Company of Canada, Limited, Well No. 1, page 13 of this report, shows the entire sedimentary succession in this township.

Caradoc Township. Oil in commercial quantity has not been found in this township.

Only about twenty-five wells are known and of these only three penetrate beneath the Norfolk formation. In 1918, about nine wells were drilled on lots 21 to 23, rges. 1N and 1S, near the village of Delaware. Several of these encountered shows of both oil and gas near the top of the Norfolk and in the "middle lime" beds of the Hamilton formation.

No definite structure seems to be present on the Norfolk, although as pointed out by Williams[1] records of oil and gas showings indicate the possible presence of a dome. However, control for mapping such a structure is insufficient in view of the lack of wells to the east. Williams also states that flooding of the wells with water has prevented possible production in this region.

In 1931 about twelve wells were drilled at widely separated localities in concessions 2, 4, 6, and 7. Structure contours based on these wells show only the gentle, southwest-dipping, regional monocline with no indication of either reversal in dip or terrace structure. However, little of Caradoc township has been drilled and a considerable area is, therefore, present within which favourable structures may occur.

The log of a well on lot 23, rge. 1, North Longwood road, page 12 of this report, will illustrate the stratigraphy in Caradoc township.

Elgin County

Dunwich Township. A northwest-trending anticline occupies the northeast part of Dunwich and extends about 3 miles into Ekfrid township. The structure is 10 miles long with a maximum width of 4 miles at Thames River. Closure is 25 to 30 feet. Dips on the southwest side average 10 to 15 feet a mile, but on the northeast flank the maximum is probably about 25 feet a mile.

In 1922[2] a small oil field was discovered on lot 24, con. 5, north of A. It is on the crest of the foregoing structure near its south end. By 1924, at least twelve wells had been drilled on lots 23 and 24, con. 5, only one of which penetrated formations deeper than the Norfolk.

Available information on these early wells is incomplete, but production was from the upper part of the Norfolk formation at depths between 300 and 340 feet. Figures for initial yields of individual wells are not available, but the peak production was in 1924 with 1,351 barrels of oil from eight wells, or a daily average production of less than ½ barrel a well. In 1939, production was only 210 barrels from three wells, which is a daily average of only a few gallons a well.

At least twelve other shallow wells, on lots 18 to 24, cons. 2, 3, and 4, are located either on the crest or high on the flanks of the same structure, but only small shows of oil and gas were obtained.

The Dutton oil field is located in the southern part of Dunwich, as outlined on the structure diagram. This field was discovered about 1898[3], the first well being drilled on lot 15, con. 10, Dunwich tp. The field was described by Williams[4], who also made a structure map[5] with contours on the Delaware limestone. It occupies lots 13 to 15, con. 10. Much of the detail regarding location and results of individual wells is not available.

---

[1]Williams, M. Y.: Geol. Surv., Canada, Sum. Rept. 1918, pt. E, p. 39.
[2]Harkness, R. B.: Ont. Dept. Mines, Bull. 49, 1923, p. 5.
[3]Ont. Bur. Mines, vol. 8, 1899, p. 15.
[4]Williams, M. Y.: Geol. Surv., Canada, Sum. Rept. 1919, pt. E, p. 10.
[5]Geol. Surv., Canada, Map 1827.

However, about one hundred and fifty wells have been drilled in the field and most of these were completed early in the present century.

Production is from the Norfolk formation at depths around 400 feet. Initial yields are not generally known, but wells were reported to have started with 15 to 20 barrels a day and soon declined to 4 barrels[1]. According to Williams[2], maximum production was in 1906 with 19,376 barrels, although Clapp[3] records 21,483 barrels for the 1903 production. However, it seems certain that peak production occurred shortly after the turn of the present century. According to Harkness[4], the field produced 186,651 barrels of oil from 1898 to 1927. In 1923, production was only 315 barrels from ninety wells, which were only bailed out periodically.

The Dutton field is developed on the top and down the west side of a small dome: wells on the east side were failures. Closure is not over 25 feet and dips average about 90 feet a mile on the west side of the structure.

Elsewhere in Dunwich township a very few wells have been drilled and practically the entire west half of the township is as yet untested. There is thus a considerable area in which structures may occur, and in view of production already obtained, this untested part of the township must be considered as potential.

The following log is typical of the stratigraphy in this township.

Log of A. J. Halpin No. 1 Well

Location: lot 16, con. 12, Dunwich tp.

Formation	Depth	Thickness	Lithology
	Feet	Feet	
	0–172	172	Surface clay, sand, and gravel.
Norfolk	172–194	22	Limestone: creamy grey, fine-grained; trace of pyrite at base; *Protosalvinia*.
	194–309	115	Limestone: cream-coloured, finely crystalline; *Protosalvinia* in upper 40 feet; little chert throughout.
	309–351	42	Limestone: grey, fine-grained; few sand grains scattered throughout; some black, bituminous films.
	351–435	84	Limestone: cream-coloured, finely crystalline; few black films throughout.
	435–459	24	Limestone: cream-coloured, finely crystalline; sand grains in upper 6 feet; black films throughout.
	459–525	66	Limestone: cream-coloured, finely crystalline; much chert throughout.
	525–531	6	Chert; little limestone.
	531–621	90	Magnesian limestone: brownish grey, finely crystalline; much chert throughout.
	621–639	18	Calcareous sandstone; much chert; some glauconite.
	639–687	48	Chert; little calcareous sandstone and grey dolomite; trace of glauconite.
Bertie-Akron	687–710	23	Limestone: Dolomitic, cream-coloured, fine-grained.
	710–738	28	Limestone: dolomitic, brownish grey, dense.
	738–766	28	Limestone: dolomitic, dark brownish grey, finely crystalline; trace of gypsum at 748 to 754 feet.

[1]Ont. Bur. Mines, vol. 8, 1899, p. 16.
[2]Williams, M. Y.: op. cit.
[3]Clapp F. G.: Dept. Mines, Canada, Mines Branch, vol. 2, 1915, p. 127.
[4]Harkness, R. B.: Ont. Dept. Mines, vol. 37, pt. 5, 1928, p. 59.

Log of A. J. Halpin No. 1 Well—Concluded

Formation	Depth	Thickness	Lithology
Bertie-Akron	Feet	Feet	
	766–790	24	Limestone: dolomitic, brownish grey, dense.
	790–796	6	No sample.
	796–830	34	Limestone: dolomitic, grey and brownish, dense; traces of selenite at 802 to 820 feet.
Salina	830–845	15	Dolomite: brown, dense; trace of gypsum.
	845–856	11	Shaly dolomite: grey; little gypsum.
	856–874	18	Dolomite: brown, dense; little gypsum.
	874–952	78	Shaly dolomite: grey; some grey shale; little gypsum.
	952–1,011	59	Dolomite: brown, dense; some grey, limy shale; trace of gypsum.
	1,011–1.023	12	Shaly dolomite: grey; little gypsum.
	1,023–1,083	60	Dolomite: brown, dense; little grey, shaly dolomite; trace of gypsum.
	1,083–1,155	72	Shaly dolomite: grey; some green and reddish shale at 1,107 to 1,119 feet; trace of gypsum.throughout.
	1,155–1,161	6	Dolomite: brown, dense.
	1,161–1,246	85	Salt.
	1,246–1,324	78	Dolomite: brown, dense; trace of gypsum.
	1,324–1,330	6	Gypsum; little brown dolomite.
	1,330–1,336	6	Dolomite: brown, dense; much gypsum.
Guelph-Lockport	1,336–1,360	24	Dolomite: brownish grey, dense.
	1,360–1,402	42	Dolomite: brownish grey, finely crystalline; trace of pyrite at 1,378 feet.
	1,402–1,414	12	Dolomite: brownish grey, granular.
	1,414–1,597	183	Dolomite: brown, dense.
	1,597–1,621	24	Dolomite: light grey, crystalline; little pyrite at 1,615 feet.
Rochester	1,621–1,663	42	Shale: limy, dark grey; little grey limestone at 1,657 to 1,663 feet.
Medina	1,663–1,687	24	Sandstone: grey, fine-grained; much red and green shale.
	1,687–1,735	48	Shale: greenish grey; trace of red, impure dolomite at 1,699 feet.
	1,735–1,759	24	Shale: greenish grey; little grey, crystalline limestone.
	1,759–1,793	34	Limestone: grey, crystalline; some grey shale throughout.
Queenston	1,793–1,805	12	Shale: red; some green shale.

Aldborough Township. No oil or gas of commercial importance has been found in Aldborough township.

About twenty-five wells are known to have been sunk and most of them are in the northwest and southwest parts of the township. Only two of the wells penetrate below the Norfolk formation. Most are dry wells, but several struck small shows of both oil and gas in the Norfolk, and one deep well had a show of gas in the Guelph formation.

Very little is known regarding structure. A small dome on the Norfolk is indicated in the southwest part of the township, but lack of control on the east side prohibits complete mapping of this structure.

A large part of central and eastern Aldborough is still untested. There is thus a considerable area in which structures may be present. As the Norfolk formation is present throughout the entire township and as shows

of oil are known at several localities, the untested part cannot be dismissed as offering no prospects of production. On the other hand, lack of information on the structure and the failure of the formation to produce where tested so far, makes it impossible to say what results might fairly be expected from the untested area.

Kent County

Zone Township. The southern half of Zone township is occupied by an east-west trending anticlinal structure on the Norfolk formation, which extends east into Mosa township a distance of 1 mile and also includes a narrow strip in Orford township immediately south of Thames River. The entire structure is about 10 miles long and 1 to 2 miles wide. It is divided diagonally, about midway of its length, into two parts by a low trough or depression trending approximately north 60 degrees west. This trough is suggestive of a fault, but conclusive evidence of this is not available. Examination of records of recent wells shows no evidence of vertical dislocation of the contoured horizon, but available records are insufficient to entirely rule out the possibility of faulting. There seems a possibility that the depression may be related to the assumed fault previously described in Orford township.

Several small domes are present along the crest of the main structure and have formed the points for accumulation of the oil. Closure is from 40 to 80 or 90 feet, with dips on the flanks ranging from 40 to about 100 feet a mile.

The Bothwell-Thamesville oil fields are developed on this structure, the several pools being associated particularly with the small domes. This oil region has been described by Williams[1], Clapp[2], Harkness[3], Hume[4], and others. The general producing region is outlined on Maps 693A and 694A.

The Bothwell field dates back to about 1862, the first wells being drilled in the extreme southwest part of Mosa township. These early wells were apparently drilled by contact, a certain depth being specified. This specified depth was in many instances somewhat deeper than the oil horizon and the drillers, in fulfilling their contracts, penetrated a water horizon below the pay. In 1866, at the time of the Fenian raid, many wells were abandoned and part of the field was flooded with water and ruined.

The field was reopened in 1895. By this time the anticlinal theory of accumulation had gained credence and a search for "highs" on top of the Norfolk formation was made. This resulted in discovery of the Bothwell-Thamesville oil area consisting of several small domes in Zone township extending along the crest of the anticlinal structure from the Zone-Mosa township boundary on the east to about lot 5, con. 1, Zone tp., on the west.

A large number of wells have been drilled in this region, but reliable records are not available for many of those completed during the early years of development. In 1901 there was upward of two hundred producing wells, and by 1915 the number had increased to at least three hundred and seventy[5]. Production was from the Norfolk formation at depths of 300 to 400 feet from the surface. Thickness of the oil-bearing zone is probably

[1]Williams, M. Y.: Geol. Surv., Canada, Sum. Rept. 1917, pt. E, p. 24.
[2]Clapp, F. G.: Dept. of Mines, Canada, Mines Branch, Pub. 291, vol. 2, 1915, p. 167.
[3]Harkness, R. B.: Ont. Dept. Mines, vol. 37, pt. 5, 1928, p. 57.
[4]Hume, G. S.: Geol. Surv., Canada, Ec. Geol. Ser. No. 9, 1932, p. 47.
[5]Clapp, G. F.: op. cit., p. 168.

about 8 feet, and in general the oil extends not more than 40 feet down the dip from the crest of the structures. Individual initial yields of these early wells is not available. According to Harkness[1], production of the Bothwell field was not recorded separately from other fields until 1898, and from 1885 to 1898 it is, therefore, an estimated amount of the total. The estimated and recorded production from 1885 to 1927 totals 2,213,876 barrels.

During the years 1935 to 1940 considerable drilling was done in the Bothwell-Thamesville region and a number of producing wells were brought in. Out of eleven wells drilled on lots 5 and 6, con. 5, Zone tp., four got production. Several of the dry wells encountered small shows of oil. The wells are on the side of a small dome the top of which is at about 402 feet above sea-level. The pay is in the Norfolk formation at about 325 feet below the surface. Initial yield varied from 3 to 30 barrels a day.

About eight producing wells have been drilled recently on lot 19, con. 8, Zone tp. Six of these are practically at the highest part of a small dome that has a maximum elevation of about 470 feet above sea-level: the remaining two are down the dip at about 450 feet. Production is from the Norfolk, with recorded initial yields of 1 to 3 barrels a day.

From 1935 to 1937, at least fifteen wells, ten of which got production, were drilled on lots 15, 16, 19, and 20, River Range, Zone township. These wells are near the crest and a short distance down the flank of a small dome. The top of this structure is about 450 feet above sea-level and the lowest producing well is within 25 feet of the crest. Initial yields varied between 1 and 10 barrels a day. Production is from the Norfolk formation at 360 to 400 feet from the surface.

About sixteen wells, ten of which got oil, have recently been drilled in Orford township immediately south of Thames River. These wells are in two groups, the first on lots 22 to 25, con. 15, and the second on lot 26, con. 14. The first group of wells is situated down the flank of the last mentioned dome and structurally about 40 feet below its crest. The second group is situated 10 or 15 feet higher on the same structure. Initial recorded yields here are 2 to 3 barrels a day.

It will be seen that accumulation is directly related to structural "highs" and most of the producing wells are within 40 feet of the crests of the several local structures.

Peak production in the Bothwell-Thamesville oil region since its reopening in 1895 was probably in 1901 when between 60,000 and 72,000 barrels of oil were recovered. In 1939, production was 40,909 barrels from two hundred and thirty wells. In recent years, production has been kept up partly by a cleaning out of old wells that have been idle for many years. Oil seems to accumulate in the old wells, and after many years of abandonment cleaning out has resulted in sufficient production to make them profitable.

Howard and Orford Townships. Except at the extreme northeast part of Orford, where a few of the wells within the Bothwell-Thamesville oil region are located, no oil of commercial importance has been discovered in Howard and Orford townships. Reference to Maps 693A and 694A will show that only a relatively small amount of testing has been done in these two townships. In Howard, available records show one well to have en-

[1]Harkness, R. B.: op. cit., p. 58.

countered gas in the Norfolk formation. In Orford, the Norfolk where tested was barren, but small quantities of gas were encountered in the Guelph formation in two wells.

Large undrilled areas in the central part of both townships reduce structural information to a minimum. So far as can be determined, the surface of the Norfolk formation is gently monoclinal with a south dip averaging perhaps 20 feet a mile. As already stated, there is some evidence of faulting at the southeast part of Orford where some vertical dislocation of the contoured horizon seems to have taken place. The vertical dislocation seems to decrease in amount northward from the lake and reaches a minimum in the vicinity of Thames River where the depression dividing the east-west structural ridge in Zone township is located.

There is considerable space for favourable structures to be present, and, as the Norfolk formation is known to be present throughout, the entire untested area of the two townships must be considered as potential. Testing so far has been discouraging, but as structure is a leading factor in causing accumulation and most of the wells so far drilled do not seem to be on any well-defined structure, further prospecting would appear warranted.

The following log is typical of the stratigraphy in these townships.

Log of Union Gas Company Well No. 2

Location: lot 54, Talbot Road North, Orford tp.

Formation	Depth	Thickness	Lithology
	Feet	Feet	
	0–230	230	Surface drift.
Hamilton	230–351	121	No samples kept.
Norfolk	351–428	77	Limestone: grey, medium-grained; *Protosalvinia.*
	428–482	54	Magnesian limestone: buff, medium-grained; some chert.
	482–515	33	Limestone: grey, finely granular; *Protosalvinia.*
	515–592	77	Magnesian limestone: brownish grey, finely crystalline; some black films in upper 50 feet.
	592–635	43	Magnesian limestone: brownish grey, finely crystalline; black films.
	635–766	131	Magnesian limestone: brownish grey, finely crystalline; chert throughout.
	766–792	26	Sand: medium-grained.
	792–827	35	Magnesian limestone: grey, fine-grained; some rounded sand.
	827–863	36	Magnesian limestone: grey, fine-grained; little chert; some sand in lower 10 feet.
Bertie-Akron	863–1,056	193	Dolomite: buff and brown, fine-grained.
	1,056–1,126	70	Dolomite: buff and brown, granular.
	1,126–1,133	7	Dolomite; grey, fine-grained; little shaly dolomite; trace of gypsum.
	1,133–1,160	27	Dolomite: buff, fine-grained.
Salina	1,160–1,224	64	Dolomite: brown, dense; little gypsum.
	1,224–1,320	96	Shaly dolomite: grey, dense; some gypsum throughout.
	1,320–1,372	52	Dolomite: brown, dense; some shaly dolomite; traces of gypsum.
	1,372–1,390	18	Dolomite: brown, dense; much gypsum.

Log of Union Gas Company Well No. 2—Concluded

Formation	Depth	Thickness	Lithology
	Feet	Feet	
Salina	1,390–1,440	50	Dolomite: brown, dense; some grey, shaly dolomite; some gypsum.
	1,440–1,470	30	Shale: dolomitic, grey.
	1,470–1,525	55	Mixture brown dolomite, grey, dolomitic shale, and some green shale; traces gypsum.
	1,525–1,536	11	Dolomite: brown, dense; much brown anhydrite.
	1,536–1,618	82	Dolomite: brown, dense; little, grey, shaly dolomite; little gypsum throughout.
	1,618–1,623	5	Gypsum; little dolomite.
	1,623–1,637	14	Dolomite: brown, dense; much gypsum.
Guelph-Lockport	1,637–1,740	103	Dolomite: buff, crystalline.
	1,740–1,752	12	Dolomite: grey, medium-grained.
	1,752–1,840	88	Dolomite: brownish grey, medium-grained.
	1,840–1,878	38	No samples.
	1,878–1,890	12	Dolomite: buff, medium-grained.
	1,890–1,919	29	Dolomite: light grey and bluish, coarsely crystalline.
	1,919–1,930	11	Dolomite: shaly, grey; some grey dolomite.
Rochester Clinton (?)	1,930–1,956	26	Grey, shaly dolomite and limy shale; some grey dolomite.
Medina	1,956–1,966	10	Shale: red, green, and grey; some shaly dolomite.
	1,966–1,989	23	Shale: reddish and grey; some grey dolomite.
	1,989–1,996	7	Shale: grey; some dolomitic shale.

FUTURE POSSIBILITIES

All commercial oil production in the London area is from the upper part of the Norfolk formation. Oil in this formation was discovered as early as 1862. Since that time most of the drilling has been only to this horizon, very few wells penetrating the deeper formations. With one exception the oil fields were discovered long ago. Most of them are practically drilled up; all are well past their peak in production; and some have already been abandoned. Recent drilling within the limits of some of the old fields has yielded some further production, and cleaning out of old wells after many years of idleness has added to the recovery from parts of the Bothwell-Thamesville region. Outside these old pools, the Warwick field is the only recent discovery of commercial importance.

Commercial fields are almost everywhere associated with local, definite structural "highs"; structure is, therefore, the chief controlling factor in accumulation. In most producing localities, the oil has collected at the highest part of the structure, and it does not, in general, appear to be present at any appreciable distance down the dip from the crests of the structures. This is not everywhere true, as in the Warwick field where many of the producing wells are below the crest, and where some dry wells are situated at almost the highest part of the structure. Also a number of initially productive wells in the northeast part of Brooke township are situated where structure contours show no definite "high". These wells are some distance down dip from the main part of the Warwick field and are separated from it by a number of dry wells.

Reference to Maps 693A and 694A will show that not all "highs" have been productive, but, on the other hand, very few commercial wells are situated where structure contours do not at least suggest the presence of a reversal or an appreciable variation in magnitude of the regional dip.

A considerable number of dry wells are present in the areas between the productive and past productive fields. In many places, these tests are so widely separated that subsurface contours show only the most general structural features. Areas of considerable extent are, therefore, present in which favourable structures might be found in the future.

In view of the widespread occurrence of oil in the Norfolk formation, its general association with structural "highs", and the considerable area still remaining that has not been tested and in which structures may occur, the untested areas cannot be looked upon as offering no prospects of production.

It must be remembered, that average yields of wells are small; also that in many of the more recent wells production has lasted for only a short time. However, these factors are to some extent offset by the shallow depth to the producing zone and consequent low cost of drilling.

NATURAL GAS

There are several widely separated localities where individual wells have encountered natural gas in considerable volume, although no gas fields of commercial importance have so far been found. This gas is not associated with the oil, but is found in much deeper formations belonging to the Silurian system.

PRODUCING HORIZONS

There are three stratigraphic levels at which appreciable volumes of gas have been found, they are: (1) near the base of the Salina formation; (2) near the top of the Guelph formation; and (3) in the upper part of the Medina formation.

The Salina and Guelph are not everywhere easily separated and in some cases it is difficult, particularly from drillers' logs, to determine with certainty whether the gas is in the Salina or the Guelph formation.

The Salina gas-bearing zone is a brown, fine-grained dolomite, commonly with small quantities of white gypsum or anhydrite. The Guelph is also a dolomite, commonly brownish grey to grey, and usually not so densely textured as the overlying Salina. Both these formations, so far as known, retain their respective lithological characters throughout their distribution.

The reservoir rock of the Medina formation consists of sandy beds within the shale of the upper part of the formation. This sandstone horizon is subject to some lateral change, being in places occupied by sandy shale, shale, or grey limestone.

The detailed lithology of these formations is dealt with in Chapter III.

OCCURRENCES OF GAS

Euphemia Township. Two wells on lot 26, con. 4, and one on lot 24, con. 5, Euphemia tp., had initial gas yields ranging from 118 to 325 M cubic feet a day. The first two yielded from the Salina at depths of 1,560 and 1,582 feet respectively, and the last one from the Guelph at a depth of 1,580 feet. Only a small volume of gas was taken from these wells, but

some was supplied to the village of Shetland and some used by the owners of the farms on which the wells were drilled. The wells are now abandoned.

Mosa Township. During the years 1930 and 1931, five wells on lots 13 to 15, con. 3, Mosa tp., obtained volumes of gas ranging from 24 to 1,770 M cubic feet a day. Some production was from the Salina and Guelph formations, but most was from the Medina, with one well having an initial yield of over 1,000 M cubic feet from this horizon. It is not known whether these wells were ever connected with the gas mains, and no information is, therefore, available regarding pressure and production decline. At least four other wells in this locality have penetrated these horizons, but with no results.

Orford Township. Two wells drilled near the lake shore in the south-east part of Orford during 1933 obtained initial yields of 10 and 15 M cubic feet a day respectively. The gas was found near the top of the Guelph formation at depths of 1,605 and 1,610 feet. Several other more recent wells in the same general locality have failed to find gas at this horizon.

Dorchester North Township. A well drilled in 1915 on lot 4, con. 1, Dorchester North tp., obtained an initial yield of about 290 M cubic feet a day from near the top of the Guelph formation at a depth of 930 feet. Between 1915 and 1921, six additional wells were drilled on the same lot, three of which obtained 250 to 500 M cubic feet from the same stratigraphic horizon. These wells constituted a small field that produced a small quantity of gas until about 1931, after which no records are available.

STRUCTURE

All the foregoing occurrences of natural gas, except that in Dorchester North township, are situated west of the outcrop area of the Norfolk formation. Only a very few wells in this region penetrate below the Norfolk formation and, therefore, no detailed information is available regarding the structure of the gas-bearing horizons. The most that may be said is that these lower formations, in common with all the sedimentary rocks of the London area, have a gentle regional dip in a general southwest direction.

The gas wells in both Euphemia and Mosa townships are high on the flanks of small anticlinal structures on the Norfolk formation. It is not known whether these structures are reflected downward to the Guelph and Medina formations. There are considerable thicknesses of salt in the Salina formation in this region. Elsewhere, where thick beds of salt are present, it is known that structures on the Norfolk are not reflected below the Salina. In the region here considered, it, therefore, would not be safe to assume the presence of anticlinal structures on either the Guelph or Medina formations.

In the southeast part of Orford township, a south dip is indicated on the Norfolk formation. Two recently drilled wells, on lot 54, Talbot Road North, and lot 6, Middle Road South, encountered the top of the Guelph at 1,003 and 1,045 feet below sea-level respectively. The latter well is about 2½ miles north of the former; this indicates a local north dip of about 18 feet a mile on top of this formation.

Within the outcrop area of the Norfolk, that is, east of the contoured area on the structure diagram, wells penetrating the Guelph formation are few and widely scattered. No details of structure are known, but available data indicate a regional southwest dip on top of the Guelph formation. Local reversal and variation in magnitude of this dip are suspected, but

cannot be definitely mapped. The following table summarizes available reliable data regarding the top of the Guelph in this region.

Lot	Concession	Township	Top of Guelph (datum: sea-level)
21	17	Blanchard	+ 18
34	7	Nissouri West	+ 30
10	10	London	−262
10	4	Nissouri West	− 80
24	B	Dorchester North	−205
20	2	Delaware	−438
12	5	Yarmouth	−305
24	R.I.S.	Yarmouth	−320
12	9	Yarmouth	−379
1	5	Malahide	−369
6	4	Yarmouth	−475

FUTURE GAS POSSIBILITIES

The Guelph formation is one of the most prolific producers of natural gas in Ontario. Several fields of commercial importance, located both east and west of the London area, are known. Detailed study of several of these fields has shown that variation in porosity is a leading factor in controlling accumulation and is equally as important as structure in this regard. Structural closure does not appear to be as essential as suitable porosity for accumulation of important quantities of gas in this formation. It thus follows that in prospecting this formation, even areas in which structural closure is not suspected cannot safely be overlooked and should not be discarded without testing.

The Guelph formation is present throughout the entire area covered by the accompanying structure diagram. It is everywhere sufficiently buried and overlain by rocks capable of preventing escape of any gas that might be present. Drilling has already shown that considerable quantities of gas are present at widely separated localities, even though no important discoveries have as yet been made.

All this being so, it is both reasonable and proper to state that wherever the Guelph has not been tested, it must be considered as potential.

A large part of the above area has not been tested so far as the Guelph and lower formations are concerned. In view of the fact that porosity conditions cannot be foretold, it becomes very difficult to recommend one locality in preference to another for prospecting. However, as a structure must always be considered as a favourable place for testing, any locality where there is any suggestion of a "high" should be drilled.

As already intimated, wells penetrating the Guelph formation are so widely scattered that reversals of the regional southwest dip on this formation cannot be localized to determine a structure, but from a study of the wells listed in the foregoing table, the general strike of the Guelph appears to change from almost north in the northern part of Nissouri West township, through northwest almost to west in Yarmouth township. This would indicate the presence of a broad, low arch plunging very gently to the southwest and occupying roughly the townships of Southwold, Yarmouth, Westminster, Dorchester North and South, Nissouri West and

72996—7½

East, and the eastern part of London. It is emphasized that this is based on very widely scattered data and is an indication rather than a proved fact. However, it is felt that if local "highs" and suitable porosity are present in this general region, chances of production are at least fair.

In Mosa township, substantial volumes of gas were struck in the Grimsby beds (Medina) in one or two wells. These beds are known to be productive in the Niagara Peninsula. In that region they are very sandy and it is thought that accumulation is controlled to a considerable extent by the relation between sand lenses and less pervious shale beds. Within the London area these beds have been penetrated at only a few places. Reference to Chapter III will show that, in general, these Medina beds are more shaly and calcareous than sandy. However, the limestone may function as a reservoir rock just as well as does the sand in the Niagara Peninsula. In view of the known presence of gas in these beds and the fact that they have not been tested except at a very few places, they must also be considered as potential. Sandy beds are known to be present in the Medina in Yarmouth, Ekfrid, and Dunwich townships. If testing in these townships fails to find gas in the Guelph formation, drilling should be continued to the Medina horizon; this would mean an average of about 300 feet additional drilling.

SURFACE GAS

About the time of the early development of the Bothwell oil regions (1864-5) a number of borings were made along the base and sides of the topographic ridge that extends in a southwest direction through Orford, Howard, and Harwich townships. Several of these wells encountered surprisingly large volumes of gas in the sand beds of the glacial deposits that overlie the bed-rock[1].

This surface gas is known as far west as Raleigh township and also extends east a short distance into Aldborough township. The most important occurrence is in Howard and Harwich townships, where it extends as a belt of irregular width between the towns of Ridgetown and Blenheim.

There are many wells for which no records were kept, but seven wells west of Ridgetown are reported[2] to have produced 106,681 M cubic feet during the winters of 1925 and 1926, and one well had an open flow capacity of 3,000 M cubic feet. In 1939, an estimated volume of 14,000 M cubic feet was produced from sixty-nine wells in Howard and Harwich townships.

Some wells have produced gas for about 50 years, but usually they become flooded with fresh water and plugged with fine sand so that within 10 or 15 years many of them do not produce enough to pay for their upkeep, and are abandoned. The wells are, in general, less than 150 feet deep and the gas is found in sands and gravels overlain by clay.

Investigation has shown that wherever this surface gas has been found, the underlying bed-rock is the Kettle Point Shale (Huron). This shale, where it outcrops, is known to be petroliferous,[3] and it is, therefore, thought that the shale is the source of the gas.

Stewart[4] considers this surface gas furnishes some evidence that gas is being generated at the present time from these Devonian shales: he writes as follows. "These shales are of great antiquity and it seems probable that

[1]Ont. Bur. Mines, 1st Rept., 1891, p. 123.
[2]Harkness, R. B.: Ont. Dept. Mines, 37 Ann. Rept., pt. 5, 1928, p. 76.
[3]Williams, M. Y.: Geol. Surv., Canada, Sum. Rept. 1917, pt. E, pp. 26-28.
[4]Stewart, J. S.: Trans. Roy. Soc., Canada, sec. 4, vol. 34, 1940, pp. 125-126.

the warping that produced the regional southwest dip and small folds took place at the end of Palæozoic time. There was, therefore, ample time for generation of gas and structural conditions favourable for accumulation long before Pleistocene time. As the shale lies at or near the surface and has been completely removed by erosion from many places, there was every chance of any such pre-Pleistocene accumulations of gas being dissipated. It may be, however, that the uplift and erosion with consequent changes of pressure and temperature, also cubical expansion and development of joint planes in these shales, produced conditions favourable for generation of gas. In this case, if generation of gas has been continuous, it must necessarily have been very slow and incomplete. It seems more likely that generation of gas has been long delayed or intermittent and it shows that generation of gas may be going on at the present time from strata of any age."

Glacial deposits are very heterogenous and the sands and gravels are very likely to be present as a series of irregular, detached lenses within more impervious clays. Thus the gas may occur as separated accumulations, and a given well may drain only a small area. If this is so, there may be small, isolated reservoirs of gas that have not yet been penetrated. Surface gas may be present wherever the Pleistocene deposits contain suitable reservoirs, sufficiently confined by relatively impervious clays and underlain by the Devonian petroliferous shales.

OTHER AREAS

The present commercially productive part of the London area is entirely within the region covered by Maps 693A and 694A. North of this region the London area has so far yielded neither gas nor oil in commercial quantity, although small shows of both these substances have been reported from a few localities.

Throughout this northern part the stratigraphy is essentially similar to that seen farther south except that the Rochester and Clinton formations are absent and the Norfolk formation everywhere constitutes the uppermost bed-rock, and is immediately overlain by glacial till. The detailed log of the Trewartha well, recorded in Chapter III, illustrates the stratigraphy in this part of the area.

RESERVOIR ROCKS

Rocks known to function as reservoirs for gas and oil farther south are also present here. These are in the Norfolk, Guelph, and Medina formations. In addition, the Trenton formation is known to be productive elsewhere in southwestern Ontario.

SOURCE BEDS

The most likely source rocks are the black, bituminous shales of the Billings formation. Elsewhere, these shales are known to be petroliferous and oil has been extracted from them in the past. It is also possible that fossiliferous limestones much higher stratigraphically (Silurian) may also be source beds, as an appreciable thickness of relatively impervious shale (Queenston) intervenes between the Billings formation and producing beds in the Guelph and Norfolk formations.

STRUCTURE

Very little is known regarding the detailed structure. As stated in Chapter IV, outcrop mapping indicates the presence of low corrugations or rolls with a general northeast trend in the Goderich-Ethel-Wingham

district. Observed dips are very low and do not suggest the presence of structures in the underlying formations of sufficient magnitude to form points of accumulation for oil or gas. Available records show only three wells penetrating the entire Palæozoic succession in this part of the area; and, so far as known, only these reached below the salt horizon of the Salina formation. Information regarding structure of the deeper formations is, therefore, meagre. In the Clinton-Mitchell-St. Marys region, the Trenton formation strikes approximately north 12 degrees west; the dip on this horizon, therefore, nearly approximates the regional direction for the entire area.

RESULTS OF TESTS

Several wells have penetrated beneath the Norfolk formation, but as most of these were drilled for salt they do not reach below the Salina formation. Thus they do not penetrate any of the prospective producing horizons below the Devonian. None of the three aforementioned wells that penetrate the entire sedimentary succession are reported to have encountered either gas or oil. The following is a summary of the deep drilling.

Location	Year drilled	Depth	Remarks
		Feet	
Goderich	1865	1,000	Salt well.
Exeter	1881	1,251	Salt well.
Seaforth	1870	1,135	Salt well.
Hensall	1880	1,206	Salt well.
Clinton	1869	1,239	Salt well.
Clinton	1939	3,531	Dry well.
Blyth	1879	1,215	Salt well.
Brussells	1872	1,244	Salt well; show of gas and oil in Salina? at 1,244 feet.
Wingham	?	1,185	Salt well.
St. Marys	1927	3,174	Show of gas in Salina at 860 feet.
St. Marys	1938	1,085	Dry well.
Mitchell	1926	3,188	Dry well.
Dublin	1873	1,396	Salt well.

GAS AND OIL PROSPECTS

It will be seen that results of deep drilling in the northern part of the London area are not encouraging. However, relatively little testing has been done and most of the wells are not deep enough to penetrate the lower formations known to be productive elsewhere.

All the wells test the Norfolk formation, but so far as known none has encountered oil or gas. A shallow well drilled in 1930 on lot 9, con. 5, McKillop tp., to a depth of 400 feet, was reported to have obtained a show of oil in the Norfolk at a depth of 360 feet. This well was apparently not completed and the writer has been unable to verify the reported oil show.

Farther south where these rocks are buried beneath younger Devonian strata, oil is found in the upper part of the formation in economic quantity. In the north, however, the formation is overlain only by glacial till and it outcrops at a number of places. Plenty of opportunity is, therefore, afforded for the escape of any gas or oil that may have been present in the horizon that is productive elsewhere. Reservoirs deeper within the formation may be sufficiently covered to retard the escape of any fluids they may contain, but nowhere, either within or outside the present producing region, has oil been found in the lower part of the formation.

It thus appears that the factors favourable to production from the Norfolk formation are outweighed by unfavourable factors. The proba-

bility of finding important quantities of either oil or gas in this formation in the northern part of the area is, therefore, greatly reduced. This does not mean that the formation offers absolutely no possibilities. It is several hundred feet thick and only the upper part is exposed. There is thus a considerable volume of sediments in which oil or gas, or both, could accumulate. But the entire formation is known to be limestone, and although much seems fairly dense or finely textured, there is no impervious cap rock to act as a retainer against upward migration. Variation in porosity is known to be capable of arresting migration under certain conditions. However, although the possibility of small accumulations being present cannot be ruled out, the foregoing conditions are serious difficulties in the way of accumulation of either gas or oil in important quantities.

The Guelph formation is a prolific producer of natural gas elsewhere in Ontario and small quantities of oil have also been found at a few places. Only three wells penetrate this formation in the area here considered, and all were dry wells. Nevertheless, the formation must be considered as potential.

Scarcity of wells prohibits any detailed mapping of subsurface structure: no structures favourable for trapping migrating oil or gas are, therefore, known. As previously suggested reverse dips seen at the outcrop are so gentle that their presence on the deeper formations cannot be safely assumed, although they may be there.

It has been stated that study of several gas fields in the Guelph formation elsewhere in southwestern Ontario has shown that variation in porosity is equally as important as structure in causing accumulation in this formation: also that structural closure does not seem to be essential in this regard. It thus seems reasonable to assume that even though structures on the Guelph are not certainly known, these rocks still warrant testing.

Any locality where porosity is suitable for the rock to act as a reservoir would warrant testing. But, as porosity cannot be foretold and data for determining subsurface structure are not available, prospecting the Guelph formation for gas becomes to a great extent a wild cat proposition. The only guide in selecting localities for testing is a reversal in dip observed at the surface. If such a reversal did extend down to the Guelph formation, it would constitute a favourable place for deep testing.

The Medina formation is gas bearing in the Niagara Peninsula and has been shown to contain appreciable volumes of gas at one place in the southern part of the London area. In this region, the lithology, though very similar, is more shaly and calcareous than in the Niagara Peninsula, where the actual reservoir rock is chiefly sandstone. This arenaceous content is known to undergo lateral change northwestward across the Ontario Peninsula from the Niagara region and to be replaced by shale and limestone in that direction.

Nothing is known regarding the subsurface structure of the Medina in this region and no specific locality can be recommended for testing. However, in view of its productiveness elsewhere and the presence in it of limestones that might, under favourable conditions of porosity, function as reservoir rocks, the Medina formation is considered as potential. Nothing can definitely be said regarding the chances of success on testing this formation.

Prospects of production from the Trenton formation are more speculative. A considerable number of wells have passed through this formation

at widely separated localities throughout most of the Ontario Peninsula. But although shows and small quantities of oil have been obtained at several places, at only one locality has it been of economic importance.

No definite data are available regarding the structure of the Trenton in the northern part of the London area. Structural closure that would afford conditions favourable for accumulation has not been recognized, and as no severe deformation of these rocks has taken place, closure of any appreciable magnitude is not expected. It is a reasonable assumption, therefore, that any accumulation would be controlled to a large extent by conditions of porosity.

Effective porosity in limestones is usually secondary, and due chiefly to leaching or solution by ground water: such action presupposes an erosional period. A disconformity is present at the top of the Trenton in the Georgian Bay and Manitoulin regions. Sproule[1] states that at Georgian Bay the hiatus is at a minimum. This would indicate a minimum duration for the action of ground water there. If the disconformity does not extend southward into the present area (we have not detected it in well samples here) lack of suitable porosity may well account for the discouraging results so far obtained by drilling into the Trenton formation. As porosity conditions cannot be foretold, it becomes impossible to recommend one locality in preference to another as a prospective testing site. But it cannot be said that the Trenton offers no possibility as a productive formation. Only drilling can test this formation, and in view of the present lack of information, testing would be purely a wild cat venture.

Summarizing the possibilities of the northern half of the London area there are four prospective producing horizons: these are in the Norfolk, Guelph, Medina, and Trenton formations.

The Norfolk outcrops at a number of places, thus greatly reducing its possibilities of production due to dissipation at the surface. It is, therefore, not looked upon with much favour as a prospective horizon.

The Guelph formation, in view of its prolific gas production elsewhere, and the fact that structural closure, though always a favourable condition, is not thought essential to accumulation, is considered as potential and warrants testing. Lack of structural data and porosity information prohibit recommendation of any particular district for prospecting. Testing is, therefore, largely a matter of wild cat drilling.

The Medina formation, though not considered as favourable as the Guelph, is nevertheless a potential formation. It is felt that continuation of an unsuccessful Guelph test to this horizon would be justified.

The Trenton formation cannot be dismissed as impossible, but testing would involve perhaps a maximum of risk in view of the increased cost due to its depth and the almost complete lack of structural data.

It is pointed out that in this region comparatively little testing has been done; that the prospective horizons below the Norfolk have scarcely been tested at all; and that so far as available data goes, there is no proof that favourable conditions of both porosity and structure are not present. It should also be remembered that even within the general producing areas elsewhere in southwestern Ontario, there are many dry wells. It would thus require the drilling of a considerable number of dry wells to condemn the present region as a whole.

[1]Sproule, J. C.: Geol. Surv., Canada, Mem. 202, p. 99 (1936).

CHAPTER VI

WELL RECORDS

The following table of well records has been prepared by J. S. Stewart of the Geological Survey from drillers' records and from field work conducted by him, and brought up to date (1940) by the writer. The records do not include all wells known to have been drilled in the area. For example, during the early development of some of the older oil fields many wells were drilled for which no records were kept, and beyond the knowledge that these wells have been drilled, no further information is now obtainable. It should be borne in mind that for many wells, particularly among those drilled prior to establishment of the Ontario Natural Gas Commission, complete information is not available; also, that there are many wells, particularly dry holes and abandoned wells in which the casing has been pulled, for which the location and elevation are not now obtainable. In addition, as property ownership may change at any time, some of the names of the farm owners given in the tables may now be incorrect. The yield given in the records is the initial yield: for natural gas wells it is in thousands of cubic feet (Mcf.) a day, and for oil wells it is in barrels (bbls.) a day.

The following abbreviations are used:

B.F. Broken Front.
C.R. Centre road.
E.C.R. East Centre road.
E.L.R. East Lake road.
E.N.B. East of North Branch Talbot road.
L.E.S. Lake Erie Survey.
L.F. Lake Front.
M.I.R. Moravian Indian Reserve.
N. North.
N.L.R. North Longwood road.
N.M.R. North Middle road.
N.T.R. North Talbot road.
R.1.N. Range One North.
R.1.S. Range One South.
R.1.S.E.R. Range One South Edgewood road
R.R. River range.
S. South.
S.B. South boundary.
S.L.R. South Lake road.
S.M.R. South Middle road.
S.T.R. South Talbot road.
T.L.R. Town Line range.
W.B.S. West Base Survey.
W.C.R. West Centre road.
W.L.R. West Lake road.

Wells in Aldborough Township, Elgin County

Lot	Con.	Designation	Location	Year drilled	Altitude in feet above sea-level	Depth in feet	Bedrock formation	Producing depth in feet	Producing formation	Yield Mcf. or bbls.	Pressure in lbs. a sq. in.	Thickness of drift in feet	Remarks
4	1	Lawrence P. Mytinger..... C. Campbell No. 1.....	1,500 ft. S. of N. line..... 150 ft. W. of E. line	1934	688	415	Hamilton	.....	.....	Dry	.....	230	Fresh water at 135 and 215 feet.
5	2	D. Kenedy No. 1.....	200 ft. S. of N. line..... 1,000 ft. W. of E. line	1934	700	500	"	.....	.....	Dry	.....	255	Small show of oil and water at 385 ft. Salt water at 495–500 ft.
6	2	Ferguson and Bird..... D. Ferguson No. 1.....	1,925 ft. N. of S. road..... 650 ft. E. of W. road	1937	718	413	"	.....	.....	Dry	.....	292	Show of oil and gas at 347 ft. Fresh water at 20 ft., rose 14 ft. Salt water at 365 ft., rose 165 ft.
4	3	S. Carson..... J. J. Johnston No. 1.....	850 ft. S. of N. road..... 2,450 ft. E. of W. road	1938	707	496	.....	.....	.....	Dry	.....	213	Fresh water at 15 ft., rose 9 ft. Fresh water at 95 ft., rose 70 ft. Salt water at 495 ft., rose 250 ft.
22	4	F. J. Carman.....	950 ft. N. of S. line..... 25 ft. E. of W. line	1921	701	380	"	.....	.....	Dry	.....	247	
12	6	Walker and Drake..... A. McMillan No. 1.....	150 ft. S. of N. road..... 750 ft. W. of E. road	1938	703	505	"	.....	.....	Dry	.....	261	Show of gas at 294 ft. Fresh water at 70 ft. Salt water at 505 ft.
15	7	Morrison.....	NE. Corner.....	1925	703	.....	.....	.....	.....	Dry	.....	.....	
21	7	F. J. Carman.....	5,100 ft. E. of W. road..... 50 ft. S. of N. road	.....	702	349	"	.....	.....	Dry	.....	240	
21	7	.....	NW. Corner.....	.....	704	.....	.....	.....	.....	Dry	.....	.....	
B	9	Union Test No. 40E.....	SE. Corner.....	1933	683	356	"	.....	.....	Dry	.....	290	Fresh water at 135 ft., rose 75 ft.
D	10	Union Gas Co. of Canada, Ltd.	1,650 ft. N. of S. line..... 100 ft. W. of E. line	1934	684	2,160	"	.....	.....	Dry	.....	235	Fresh water at 225 ft. Sulphur water at 490 ft.

1	11	Union Test No. 37E	NW. Corner	1933	674		"			Dry		240	Fresh water at 175 ft.
3	11	Union Test No. 38E	SW. Corner	1933	660	335	"			Dry		255	Fresh water at 190 ft.
B	11	Union Test No. 41E	SE. Corner	1933	659	347	"			Dry		280	Fresh water at 160 ft., rose 50 ft. Fresh water at 230 ft., rose 200 ft.
3	12	McColl	NE. Corner	1933	662	500				Dry			Show of oil.
5	12	Union Test No. 39E	2,300 ft. S. of N. road 3,700 ft. W. of E. road	1933	662	354	"			Dry		246	
A	12	Union Gas Co. of Canada, Ltd.	70 ft. N. of S. road 80 ft. W. of E. line	1941	649	1,679	"			Dry		170	Fresh water at 163 ft. Sulphur water at 890 ft. Salt water at 1,660 ft. Shows gas at 380, 1,176, and 1,671–1,675 ft.
7	13	McNichol	150 ft. S. of N. line 1,500 ft. E. of W. line	1933	618					Dry			Show of gas reported.
C	13	Pure Oil and Gas Co., Ltd. A. Lee No. 1	2,300 ft. W. of E. road 50 ft. S. of N. road	1936	648	384	"			Dry		153	Fresh water at 153 ft.
2	B.F.	Darke, Vass, *et al.* J. McIntyre No. 1	1,500 ft. N. of S. line 50 ft. E. of W. line	1935	678	430	"					212	Small producing oil well.
2	B.F.	J. McIntyre No. 2	2,200 ft. N. of S. line 50 ft. E. of W. line	1935	623	405	"			Dry		174	Well plugged and abandoned. Trace of oil at 235–240, 250–260, and 300–330 ft.
2	B.F.		NW. Corner		649								
14	B.F.	J. A. DeWitt D. Ellwood No. 1	500 ft. S. of N. road 60 ft. W. of E. road	1939	674	445	"			Dry		142	Fresh water at 140 ft., rose 50 ft.
Gore	A	Dymit	NW. Corner		678					Dry			
24	B	F. J. Carman	SE. Corner	1291	690	341	"			Dry		260	

Well in Dorchester South Township, Elgin County

22	9	Dominion Natural Gas Co., Ltd. J. Evert No. 1	600 ft. N. of S. road 150 ft. W. of E. line	1940	875	1,218	Norfolk			Dry		800	Fresh water at 175 and 300 ft. Salt water at 1,218 ft. (trace only).

Wells in Dunwich Township, Elgin County

Lot	Con.	Designation	Location	Year drilled	Altitude in feet above sea-level	Depth in feet	Bedrock formation	Producing depth in feet	Producing formation	Yield Mcf. or bbls.	Pressure in lbs. a sq. in.	Thickness of drift in feet	Remarks
17	1	S. Wilson	SW. Corner	.....	701	448	Hamilton	.....	.....	Dry	.....	212	Show of oil and gas at 251 ft.
17	1	McGill and Beattie E. Englehart No. 1	3,500 ft. N. of S. road 1,500 ft. E. of W. line	1936	658	447	"	.....	.....	Dry	.....	151	Show of oil at 196 and 212 ft. Fresh water at 138 ft. flowing. Salt water at 323-328 ft. Sulphur water at 432 ft.
18	2	D. McCallum	NE. Corner	1919	720	261	"	.....	.....	.....	.....	226	
20	2	A. Campbell	NE. Corner	1920	714	240	"	.....	.....	Dry	.....	208	Show of gas.
22	2	D. Campbell	NE. Corner on road	.....	714	252	Norfolk	.....	.....	.....	.....	.....	
17	3	A. Smith No. 1	1,400 ft. N. of S. road 500 ft. E. of W. line	.....	689	225	.....	.....	.....	Dry	.....	.....	Show of gas.
17	3	A. Smith No. 2	50 ft. N. of S. road 500 ft. E. of W. line	.....	697	.....	.....	.....	.....	.....	.....	.....	
18	4	D. McCallum No. 7	NW. Corner	.....	707	267	Hamilton	.....	.....	Dry	.....	234	
20	4	D. Campbell No. 6	NW. Corner	.....	719	425	"	285	Norfolk	Dry	.....	230	Show of oil.
22	4	A. Thompson No. 4	50 ft. S. of N. road 500 ft. E. of W. line	1920	726	270	"	.....	.....	Dry	.....	223	Trace of oil.
23	4	D. Patterson	20 ft. S. of N. road 750 ft. W. of E. line	.....	728	258	"	247	"	.....	.....	234	
23	4	D. Patterson	1,600 ft. S. of N. road 1,000 ft. W. of E. line	.....	730	.....	.....	.....	.....	Dry	.....	.....	Show of gas.
23	4	J. Patterson	SE. Corner	1920	733	472	"	.....	.....	.....	.....	252	Water at 200 ft.
A	4	W. Kindree No. 17	NE. Corner	.....	718	277	"	.....	.....	Dry	.....	245	Show of gas at 274 ft.
18	5	Dominion Natural Gas Co. L. Currie	200 ft. W. of E. road 75 ft. N. of S. line	1941	.....	1,383	Norfolk	.....	.....	Dry	.....	259	Fresh water at 285 ft., rose 248 ft. Sulphur water at 398 ft., rose 361 ft. Salt water at 1,376 ft.

23	5	P. McPherson No. 1	1,700 ft. S. of N. road..... 100 ft. W. of E. line		749	330								
23	5	P. McPherson No. 2	700 ft. S. of N. road..... 50 ft. W. of E. line		746									
23	5	P. McPherson No. 3	2,350 ft. N. of S. road..... 600 ft. W. of E. line		750									
23	5	Dominion Natural Gas Co..... J. Beecroft No. 1	100 ft. N. of S. line..... 25 ft. W. of E. line	1923	749	1,725	"			Dry		275		
23	5	J. Beecroft No. 2	850 ft. N. of S. road..... 100 ft. W. of E. line		752	450				Dry			Show of gas.	
23	5	J. Beecroft No. 3	50 ft. N. of S. road..... 600 ft. W. of E. line		746	359	Norfolk			Dry		274	Show of oil at 314 ft.	
24	5	Peace River Development Co.. W. J. Hatton No. 1	1,800 ft. S. of N. road..... 200 ft. W. of E. line	1924	747	336				Dry		281		
24	5	W. J. Hatton No. 2	1,700 ft. S. of N. road..... 650 ft. E. of W. line	1924	747	468	"	327 340	Norfolk			272		
24	5	W. J. Hatton No. 3	1,200 ft. S. of N. road..... 600 ft. E. of W. line	1924	745	357	"	272 327	"			266		
24	5	Peace River Development Co..	100 ft. N. of S. road..... 1,000 ft. W. of E. line	1924	746	362	"	278 327	"			272		
24	5	D. D. Tolman	2,200 ft. N. of S. road..... 200 ft. E. of W. line		750	522						277		
24	5	D. D. Tolman	SW. Corner		748	522	"							
A	5	Peace River Development Co.. G. A. Smith No. 5.	NW. Corner	1924	739	334	"	325	"			270		
A	6	D. E. Brown No. 19	NW. Corner		736	315	"			Dry		296	Show of oil.	
8	9	C. Schollenberger..... E. Bakus No. 1	6,600 ft. SW. of NE. road. 1,400 ft. SE. of NW. road	1937	690	511	Hamilton			Dry		270	Black water at 511 ft.	
22	9		600 ft. N. of S. road..... 800 ft. E. of W. line		683									
23	10	Dominion Natural Gas Co.....	1,500 ft. S. of N. road..... 300 ft. E. of W. line	1918	597	3,580				Dry		187		
23	10	Southern Ontario Gas Co.....	400 ft. S. of N. road..... 800 ft. E. of W. line	1918	601	1,530	Norfolk	1,210 1,540		6 Mcf.		240		
23	10		60 ft. S. of N. road..... 800 ft. E. of W. line		603	500				Dry				
24	10		NW. Corner		601	1,620								

Wells in Dunwich Township, Elgin County—Concluded

Lot	Con.	Designation	Location	Year drilled	Altitude in feet above sea-level	Depth in feet	Bedrock formation	Producing depth in feet	Producing formation	Yield Mcf. or bbls.	Pressure in lbs. a sq. in.	Thickness of drift in feet	Remarks
A	11	Union Gas Co. of Canada, Ltd. C. A. Pfeffer No. 1	90 ft. W. of E. farm line. 140 ft. S. of N. road	1938	687	1,734	Norfolk	.....	.....	Dry	.....	270	Fresh water at 240 and 270 ft. Show of gas at 1,674 ft.
16	12	A. J. Halpin No. 1	5,602 ft. S. of N. road. 398 ft. E. of W. line	1938	632	1,805	"	.....	.....	Dry	.....	148	Fresh water at 75 ft. Sulphur water at 150 ft.
18	A	D. McFarlane No. 9	SE. Corner	.....	747	321	"	.....	.....	.....	.....	285	
20	A	J. Bentley No. 13	NE. Corner	.....	750	305	"	.....	.....	.....	.....	291	
21	A	J. C. McCallum No. 8	200 ft. N. of S. road. 1,000 ft. E. of W. line	1920	761	318	"	.....	.....	.....	.....	316	
23	A	P. Campbell No. 12	NW. Corner	.....	748	291	"	289	Norfolk	.....	.....	279	
24	A	Wm. Milligan No. 11	SW. Corner	1920	766	317	"	.....	.....	Dry	.....	312	
A	A	J. D. Wilson No. 15	250 ft. S. of N. road. 1,000 ft. E. of W. line	.....	754	299	"	299	"	1 bbl.	.....	292	
B	A	Geo. Carroll No. 14	SW. Corner	1920	769	322	"	.....	.....	Dry		316	

Wells in Southwold Township, Elgin County

14	1	W. Mitchell	200 ft. N. of Lake road. 1,000 ft. E. of W. line	1910	604	.....	Norfolk	.....	.....	Dry	.....	.....	Show of gas reported.
16	1	F. Pallock	150 ft. S. of highway. 400 ft. W. of E. line	1866	597	298	.....	.....	.....	.....	.....	218	
5	3	Union Gas Co. of Canada, Ltd.	75 ft. S. of N. road. 800 ft. E. of W. line	1939	734	1,688	Hamilton	.....	.....	Dry	.....	260	Show of gas at 294 ft. Sulphur water at 294 ft. Salt water at 1,239 to 1,245 ft.
12	4	A. D. Turner	15 ft. N. of S. line. 750 ft. W. of E. line	.....	751	.....	.....	.....	.....	Dry	.....	.....	
17	4	McCallum	300 ft. N. of S. line. 800 ft. E. of W. line	.....	768	345	"	.....	.....	Dry	.....	337	

5	N.T.R.	Union Gas Co. of Canada, Ltd.. H. V. Sutherland.....	100 ft. W. of E. line..... 1,100 ft. N. of S. road	1938	702	1,754	Norfolk..	.....	.....	Dry	.....	276	Fresh water at 260 ft.
41	E.N.B.	Dominion Natural Gas Co..... Wm. Ackford No. 1.....	350 ft. N. of S. road..... 350 ft. W. of E. road	1940	778	1,200	"	.....	.....	.....	.....	270	Sulphur water at 332 and 640 ft.

Wells in Yarmouth Township, Elgin County

6	4	Central Pipe Line Co., Ltd..... M. F. Hepburn No. 1.....	4,400 ft. S. of N. road..... 4,200 ft. E. of W. road	1939	665	1,595	Norfolk..	.....	.....	Dry	.....	219	Show of gas at 1,153 ft. Fresh water at 65 and 205 ft.
22	4	Dominion Natural Gas Co..... W. H. Mills No. 1.....	350 ft. E. of W. road.... 1,710 ft. S. of N. line	1940	763	1,500	"	.....	.....	Dry	.....	308	Sulphur water at 588 ft., rose 403 ft. Salt water at 1,440 ft., rose 150 ft.
22–23	4	Dominion Natural Gas Co.....	1,125 ft. N. of S. line..... 675 ft. W. of E. line	1917	719	1,582	"	.....	.....	Dry	.....	320	
14	9	Dominion Natural Gas Co., Ltd D. Evely No. 1.....	50 ft. W. of E. road.... 2,100 ft. N. of S. road	1941	771	1,220	"	.....	.....	Dry	.....	300	Sulphur water at 302 ft., rose 262 ft. Black water at 740 ft., rose 700 ft.
12	10	Geo. Oldrieve..... A. Miller No. 1.....	610 ft. W. of E. road.... 500 ft. S. of N. road	1938	810	1,370	.....	.....	.....	Dry	.....	263	Fresh water at 270 and 553 ft. Sulphur water at 740 ft.
12	13	J. Tapson.....	1,550 ft. N. of S. line..... 100 ft. W. of E. line	1916	761	1,598	"	.....	.....	.....	.....	200	
24	R.1.S. E.R.	Dominion Natural Gas Co., Ltd. W. M. Ashton No. 1	60 ft. S. of N. road..... 60 ft. W. of E. road	1941	770	1,151	"	.....	.....	Dry	.....	261	Fresh water at 261 ft. Sulphur water at 620 ft.

Wells in Goderich Township, Huron County

		Goderich Salt Co. No. 2.....	Near C.N.R. Station, Goderich.	.....	737	1,214	Norfolk..	.....	.....	.....	.....	134	Salt well.
		Goderich Salt Co. No. 3.....	Near C.N.R. Station, Goderich.	.....	736	1,164	"	.....	.....	.....	.....	92	Salt well.
		Goderich Salt Co. No. 4.....	Near C.N.R. Station, Goderich.	.....	736	1,230	"	.....	.....	.....	.....	125	Salt well.

Well in Grey Township, Huron County

Lot	Con.	Designation	Location	Year drilled	Altitude in feet above sea-level	Depth in feet	Bedrock formation	Producing depth in feet	Producing formation	Yield Mcf. or bbls.	Pressure in lbs. a sq. in	Thickness of drift in feet	Remarks
1	10	.....	Town of Brussels.....	1872	1,120	1,244	.....	.....	.....	Dry	.....	16	Shows of gas and oil at 1,200 ft. Salt water at 1,012 ft.

Wells in Hullett Township, Huron County

23	2	Huron and Bruce Oil Co., Ltd.. H. Trewartha No. 1.....	3,900 ft. E. of W. road.... 325 ft. S. of N. road	1939	980	3,531	Norfolk..	.....	.....	Dry	.....	120	Fresh water at 120 ft., rose 30 ft. Fresh water at 240 ft., rose 60 ft.
16	4	W. Forest and J. Daley..... J. Mann.....	680 ft. W. of E. road.... 2,000 ft. S. of N. road	1938	976	198	"	.....	.....	Dry	.....	67	Fresh water at 98 ft., rose 60 ft. Drilling suspended September 1938.
		Stapleton well.....	Town of Clinton.....	1867	927	1,239	"	.....	.....	.....	.....	67	Salt well.

Well in McKillop Township, Huron County

9	5	J. Nolan No. 1.....	.....	1930	.....	400	Norfolk..	.....	.....	Dry	.....	93	Fresh water at 179 and 340 ft. Show of oil at 360 and 400 ft. Not completed.

Well in Tuckersmith Township, Huron County

38	1	B. Gibbings.....	350 ft. S. of N. road..... 600 ft. W. of E. line	1867	936	1,285	Norfolk..	.....	.....	.....	.....	98	Salt well. Abandoned.

Well in East Wawanosh Township, Huron County

41	13	Gray, Young and Sparling Co., Wingham.	NE. Corner.....	.....	1,043	1,185	Norfolk..	.....	.....	.....	.....	96	

Wells in Harwich Township, Kent County

21	1W.C.R.	Glenwood Natural Gas Co.....	200 ft. S. of N. line..... 2,200 ft. E. of W. line	1919	615	1,800	Hamilton	.....	.....	Dry	.....	150	
22	1W.C.R.	Union Test No. 26.....	SE. Corner.....	1931	612	418	.....	.....	.....	.....	.....	120	
24	1W.C.R.	Union Test No. 25.....	NW. Corner.....	1931	601	353	.....	.....	.....	.....	.....	907	
15	1E.C.R.	Union Test No. 19.....	NW. Corner.....	1930	643	443	Kettle Point	.....	.....	.....	.....	125	
18	2W.C.R.	Union Test No. 20.....	SE. Corner.....	1931	638	482	"	.....	.....	.....	.....	135	
		Glenwood Natural Gas Co.....	Rondeau Park, ½ mile from lighthouse on lake front.	1918	576	4,010	Hamilton	1,150	.....	Dry	.....	140	Show of gas.
20	3W.C.R.	Union Test No. 21.....	SE. Corner.....	1931	633	399	Kettle Point	.....	.....	.....	.....	125	
22	3W.C.R.	Union Test No. 22.....	SW. Corner.....	1931	626	370	.....	.....	.....	.....	.....	125	Water at 125 ft.
27	3W.C.R.	Union Test No. 23.....	NE. Corner.....	1931	597	307	.....	.....	.....	.....	.....	85	Water at 85 ft.
22	5L.E.S.	Glenwood Natural Gas Co.....	NE. Corner.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
23	5 L.E.S.	Glenwood Natural Gas Co.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4 wells.
13	6 L.E.S.	Union Test No. 15.....	SE. Corner.....	1930	686	512	"	.....	.....	.....	.....	190	
15	6 L.E.S.	Glenwood Natural Gas Co.....	900 ft. S. of N. road..... 500 ft. W. of E. line	1918	700	591	"	.....	.....	.....	.....	210	
17	6 L.E.S.	Union Test No. 14.....	SW. Corner.....	1930	689	496	.....	.....	.....	.....	.....	190	Fresh water at 180 ft.
20	6 L.E.S.	Union Test No. 13.....	SE. Corner.....	1930	702	512	.....	.....	.....	.....	.....	205	Fresh water at 195 ft.
20	8 L.E.S.	Union Test No. 16.....	NW. Corner.....	1930	646	452	"	.....	.....	.....	.....	128	Fresh water at 120 ft.
13	9 L.E.S.	Union Test No. 18.....	SE. Corner.....	1930	643	464	"	.....	.....	.....	.....	127	Fresh water at 120 ft.
17	9 L.E.S.	Union Test No. 17.....	SW. Corner.....	1930	644	474	"	.....	.....	.....	.....	129	
21	9 L.E.S.	.....	1,800 ft. N. of S. road..... 800 ft. E. of W. line	.....	.....	.....	.....	.....	.....	.....	.....	.....	

Wells in Harwich Township, Kent County—Concluded

Lot	Con.	Designation	Location	Year drilled	Altitude in feet above sea-level	Depth in feet	Bedrock formation	Producing depth in feet	Producing formation	Yield Mcf. or bbls.	Pressure in lbs. a sq. in.	Thickness of drift in feet	Remarks
21	13L.E.S.	F. H. Stover and Son	500 ft. N. of S. road, 500 ft. W. of E. line.	1931	616	3,400	Kettle Point			Dry		63	Fresh water at 63 ft., rose 40 ft. Salt water at 550, 1,755, and 1,957 ft.
4	T.L.R.	Union Test No. 5	SE. Corner	1928	692	522	"					173	
5	T.L.R.	Glenwood Natural Gas Co.	NE. Corner		700								3 wells.
6	T.L.R.	Union Test No. 3	200 ft. S. of N. road, 50 ft. E. of Centre line	1928	681	500	"					174	
9	T.L.R.	Union Test No. 1	NW. Corner	1928	648	487	"					137	
15	T.L.R.	Glenwood Natural Gas Co.											4 wells.
3	2W.B.S.		1,300 ft. S. of N. road, 200 ft. W. of E. line	1907	598	1,507	"					66	
4	2W.B.S.	Luke Smith, Frank Wilson No. 1	1,200 ft. S. of N. line, 150 ft. E. of W. line	1935	594	396						70	Small quantity of gas reported.
4	2W.B.S.	Frank Wilson No. 2	2,000 ft. S. of N. line, 100 ft. E. of W. line	1935	592	459				Dry		67	
4	2W.B.S.	Frank Wilson No. 3	850 ft. N. of S. line, 100 ft. E. of W. line	1935	593	385				Dry		58	
5	2W.B.S.	N. Wilson	2,250 ft. N. of S. line, 750 ft. W. of E. line	1933	595					Dry			
2	4W.B.S.	Union Test No. 24	SW. Corner	1931	598	321	"					84	Water at 180 ft.
18	1S.T.R.		NE. Corner	1921	594	540	"			Dry			
22	1S.T.R.												1 well.
23-24	1-2 S.T.R.	Knight											Several shallow wells; some oil production.
6	3S.T.R.	Mike Wilson	SW. Corner	1933	595					Dry			

6	3S.T.R.	Mike Wilson	1,200 ft. N. of S. road.... 700 ft. W. of E. line	1933	594	.....	.....	.....	.....	Dry	.....	.....	
9	4S.T.R.	.....	.....	1890	.....	500	.....	.....	.....	.....	.....	.....	

Wells in Howard Township, Kent County

14	1	Acme Oil and Gas Co., Ltd....	NE. Corner.....	1929	614	403	Kettle Point	.....	.....	Dry	.....	76	
18	1	Acme Oil and Gas Co., Ltd....	NE. Corner.....	1929	619	466	Hamilton	.....	.....	Dry	.....	82	
13	2	Acme Oil and Gas Co., Ltd....	SW. Corner.....	1929	631	412	Kettle Point	.....	.....	Dry	.....	102	
4	9	Union Test No. 2.....	100 ft. S. of N. road..... 1,000 ft. W. of E. line	1928	647	492	"	.....	.....	.....	.....	153	
4	9	Glenwood Natural Gas Co.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2 wells; no record.
5	10	Union Test No. 4.....	1,050 ft. S. of N. road..... 800 ft. W. of E. line	1928	694	539	"	.....	.....	.....	.....	164	
5	10	Union Test No. 8.....	50 ft. N. of S. road..... 550 ft. E. of W. line	1929	684	628	"	.....	.....	.....	.....	184	
8	10	Union Test No. 11.....	SW. Corner.....	1929	698	569	"	.....	.....	.....	.....	186	
4	11	Union Gas Co. of Canada, Ltd.	NE. Corner.....	1929	692	2,330	Hamilton	603	Norfolk..	50 Mcf.	.....	195	Water at 2,115 ft.
5	11	Union Test No. 10.....	SW. Corner.....	1929	688	569	Kettle Point	.....	.....	.....	.....	188	
6	11	Union Test No. 6.....	640 ft. S. of Centre line.. 40 ft. W. of E. line	1929	690	537	"	.....	.....	.....	.....	316	
6	11	Union Test No. 6A.....	740 ft. S. of Centre line.. 40 ft. W. of E. line	1929	690	707	"	.....	.....	.....	.....	295	
7	11	Union Gas Co. of Canada, Ltd.	1,300 ft. N. of S. road..... 60 ft. E. of W. line	1929	695	1,875	Hamilton	.....	.....	Dry	.....	330	Fresh water at 150 and 265 ft. Salt water at 655 and 1,865 ft.
8	11	Union Test No. 12.....	1,425 ft. N. of S. road..... 40 ft. W. of E. line	1929	717	590	Kettle Point	.....	.....	.....	.....	215	
80	S.T.R.	.....	250 ft. N. of lake shore.. 840 ft. W. of E. line	.....	643	1,926	"	.....	.....	.....	.....	150	
1	T.L.R.	Union Test No. 7.....	40 ft. N. of S. road..... 60 ft. W. of Centre line	1928	687	536	"	.....	.....	.....	.....	251	

Wells in Howard Township, Kent County—Concluded

Lot	Con.	Designation	Location	Year drilled	Altitude in feet above sea-level	Depth in feet	Bedrock formation	Producing depth in feet	Producing formation	Yield Mcf. or bbls.	Pressure in lbs. a sq. in	Thickness of drift in feet	Remarks
3	T.L.R.	Glenwood Natural Gas Co.											2 wells; no record.
4	T.L.R.	Union Gas Co. of Canada, Ltd.	SW. Corner	1929	693	2,317	Kettle Point			Dry		190	Gas at 200 ft. Fresh water at 200 ft. Sulphur water at 705 ft.
4	T.L.R.	Union Test No. 9	NE. Corner		680	558	"					178	
7	T.L.R.	Glenwood Natural Gas Co.	SE. Corner										

Wells in Orford Township, Kent County

10	11		300 ft. S. of N. road 500 ft. W. of E. line	1890	676	1,000				Dry		160	Suplhur water at 630 ft. Salt water at 965 ft.
19	12	E. E. Ashton	50 ft. S. of N. road 600 ft. W. of E. line	1932	680					Dry			
21	12	A. E. Roth H. Dickson No. 1	1,050 ft. NE. of SW. road 3,600 ft. NW. of SE. road	1938	693	531	Hamilton			Dry		160	Fresh water at 100 ft., rose 50 ft. Salt water at 531 ft.
23	14		1,200 ft. S. of N. road 500 ft. E. of W. line	1890	675	500				Dry		240	
23	14		1,200 ft. N. of S. line 400 ft. W. of E. line			2,200				Dry		240	
26	14	L. G. Kurts H. Bloom No. 1	550 ft. S. of N. line 955 ft. W. of E. line	1935	672	436	"					154	Oil at 165, 245, and 321–328 ft. Salt water at 421 ft. Small producing oil well.
26	14	H. Bloom No. 2	725 ft. S. of N. line 495 ft. W. of E. line	1935	678	435	"			Dry		150	Small show of oil at 318–324 ft. Salt water at 425 ft.

26	14	H. Bloom No. 3	490 ft. S. of N. line 400 ft. W. of E. line	1935	671	402	"			Dry		151	Fresh water at 100 ft. Small flow of oil at 275–280 ft.
26	14	H. Bloom No. 4	150 ft. S. of N. line 80 ft. W. of E. line	1935	677	438	"	155 406	Hamilton Norfolk	5 bbls.		135	Small producing oil well. Water at 384–406 ft.
26	14	F. W. Kehlet J. Downie No. 1	1,000 ft. S. of N. line 1,000 ft. E. of W. line	1935	670	445	"			Dry		211	Show of gas at 317–322 ft. Salt water at 445 ft.
26	14		100 ft. S. of N. road 650 ft. E. of W. line	1934	674					Dry			
6	15	Acme Gas and Oil Co., Ltd.		1929	618	453	"			Dry		68	
20	15	J. W. Murphy R. Murphy No. 1	1,500 ft. W. of E. road 550 ft. S. of N. road	1937	672	418	"			Dry		215	Show of oil at 330 and 395 ft. Fresh water at 65 ft., rose 40 ft. Salt water at 330 ft. Salt water with some oil at 395 ft.
20	15	Patrick Fitzpatrick C. Austin No. 3	1,300 ft. W. of E. road 450 ft. S. of N. road	1937	671	412	"	284 304	Norfolk			218	Small oil producer. Fresh water at 86, 160, and 212 ft.
22	15	Arthur Lather W. Mobey No. 3	2,375 ft. E. of W. road 2,400 ft. N. of S. road	1936	672	404	"			Dry		190	Fresh water at 123–126 ft.
23	15	W. Mobey No. 6	2,600 ft. E. of W. road 2,400 ft. N. of S. road	1937	652	360	"	357	"	2 bbls.		190	Small producing oil well.
23	15	F. W. Kehlet J. Ross No. 1	700 ft. N. of S. line 150 ft. W. of E. line	1395	667	415	"					160	Small producing oil well. Oil at 294–300, 332–351, and 395–400 ft. Fresh water at 205, 263, and 395 ft.
23	15	J. Ross No. 2	1,200 ft. N. of S. line 600 ft. W. of E. line	1935	669	415	"			Dry			Show of oil at 294 and 389 ft.
23	15	G. E. and D. E. Willits and C. Mobey	NW. corner	1934	670	411	"	264	"	2 bbls.		220	Fresh water at 180 ft.
23	15	Reliable Oil Syndicate C. Mobey No. 1	500 ft. S. of Thames River 75 ft. E. of W. line	1939	650	408	"			Dry		197	Show of gas at 311 and 378 ft. Fresh water at 185 ft. Salt water at 260, 311, 380, and 402 ft.
23	15	C. Mobey No. 2	50 ft. S. of N. line 315 ft. W. of Centre line	1940	645	418	"			Dry		190	Fresh water at 136 ft., rose 65 ft.

Wells in Orford Township, Kent County—Concluded

Lot	Con.	Designation	Location	Year drilled	Altitude in feet above sea-level	Depth in feet	Bedrock formation	Producing depth in feet	Producing formation	Yield Mcf. or bbls.	Pressure in lbs. a sq. in.	Thickness of drift in feet	Remarks
24	15	.....	300 ft. N. of S. line..... 600 ft. E. of W. line	1935	670	.....	.....	.....	.....	.....	.....	.....	Some oil reported.
25	15	Security Oil and Gas Co., Ltd.. C. Mobey No. 1.....	NE. Corner.....	1936	625	345	Hamilton	335 340	Norfolk	3 bbls.	.....	85	Fresh water at 100 ft.
25	15	Aetna Oil Co., Ltd..... C. Mobey No 1.....	2,100 ft. N. of S. road..... 100 ft. E. of W. line.....	1936	615	370	"	238 243	"	2 bbls.	.....	118	Fresh water at 12-50 ft. Salt water at 215-220 ft.
5	16	Acme Gas and Oil Co., Ltd....	NE. Corner.....	1929	618	453	"	.....	.....	Dry	.....	.....	
20	16	J. B. Fitzpatrick..... J. Lather No. 1.....	75 ft. N. of S. road..... 75 ft. W. of E. line.....	1938	672	425	"	265 400	"	.....	.....	205	Small producing oil well. Fresh water at 70 ft., rose 40 ft. Salt water at 400 ft., rose 260 ft.
20	16	Whitman.....	SE. Corner.....	1896	670	375	"	.....	.....	.....	.....	.....	
20	16	Lather and Staples..... J. Lather No. 1	.....	1940	.....	363	"	.....	.....	.....	.....	161	Salt water at 339 ft., rose 180 ft.
53	L.F.	Vacuum Gas and Oil Co.....	3,500 ft. S. of Talbot road. 725 ft. E. of W. line	1933	640	1,617	"	1,595 1,610	Guelph...	10 Mcf....	.....	180	Salt water at 525, 945, and 1,615 feet.
2	M.I.R.	Basic Resources, Ltd.....	SW. Corner.....	1930	.....	362	"	.....	.....	Dry	.....	195	Show of oil at 293 ft.
3	M.I.R.	Basic Resources, Ltd.....	SE. Corner.....	1930	628	303	"	297 300	Norfolk	.....	.....	126	Small oil well.
3	M.I.R.	Basic Resources, Ltd.....	500 ft. S. of N. line..... 1,500 ft. W. of E. line	1930	.....	426	"	.....	.....	Dry	.....	130	Water at 345 ft.
4	M.I.R.	Basic Resources, Ltd.....	300 ft. N. of S. road..... 500 ft. E. of W. line	.....	.....	403	"	.....	.....	Dry	.....	130	Some oil at 315 ft. Oil and water at 380 ft.
4	N.M.R.	Union Gas Co. of Canada, Ltd. McPherson and McKillop....	1,000 ft. S. of N. road..... 50 ft. W. of Centre lot line	1940	726	578	Kettle Point	.....	.....	Dry	.....	230	Fresh water at 130 and 220 ft.

54	N.T.R.	Mills Estate	1,000 ft. S. of N. line 100 ft. E. of W. line	1941	660	1,996	Hamilton			Dry		230	Fresh water at 136 ft. Salt water at 1,045 ft. Show gas at 775 ft.
54	N.T.R.	Vacuum Gas and Oil Co.	SE. Corner	1933	653	2,073	"	1,583 1,605	Guelph	15 Mcf.		185	Salt water at 525, 935, and 1,635–1,640 ft.
6	S.M.R.	Union Gas Co. of Canada, Ltd. C. McDonald	760 ft. N. along E. line 75 ft. W. at 90°	1941	712	1,901	Kettle Point			Dry		220	
55	S.T.R.	Mid-Continent Bond Corporation	1,150 ft. S. of Talbot road 250 ft. E. of W. line	1932	637	517	Hamtilon			Dry		150	Show of oil at 332 and 425 ft. Salt water at 515 ft.
60	S.T.R.	Olga Gas, Ltd. J. Cochrane No. 1	850 ft. W. of E. road 146 ft. S. of No. 3 highway	1938	652	1,710	"			Dry		153	Show of gas at 1,677 ft. Show of oil at 1,677-1,695 ft. Sulphur water at 995 ft. Salt water at 1,710 ft.

Wells in Zone Township, Kent County

1	1	Mercer	200 ft. N. of C.P.R. Sta., Thamesville	1934	619	423	Hamilton			Dry		72	
1	1	Lawrence		1934	618	401	"			Dry		82	
2	1	F. J. Carman, Test	900 ft. S. of N. line 1,800 ft. E. of W. line			284				Dry		66	
4	1	R. Shaw		1919		398				Dry			Show of oil reported.
5	1	Wm. Guest L. G. Herbert No. 1	350 ft. E. of W. road 550 ft. S. of N. road	1938	622	424	Kettle Point			Dry		62	Fresh water at 46 ft., rose 30 ft. Fresh water at 64 ft., rose 40 ft. Salt water at 424 ft., rose 275 ft. ¼ bbl. oil at 300 ft.
5	1	L. G. Herbert No. 2	1,175 ft. E. of W. road 350 ft. S. of N. road	1938	618	750	Hamilton			Dry		58	Fresh water at 52 ft., rose 30 ft. Fresh water at 112 ft., rose 40 ft. Salt water at 325 ft., rose 40 ft.
5	1	F. J. Carman, Test			615	235				Dry			Show of oil.
6	1	F. J. Carman, Test No. 1	SE. Corner			381	Kettle Point					68	

Wells in Zone Township, Kent County—Continued

Lot	Con.	Designation	Location	Year drilled	Altitude in feet above sea-level	Depth in feet	Bedrock formation	Producing depth in feet	Producing formation	Yield Mcf. or bbls.	Pressure in lbs. a sq. in	Thickness of drift in feet	Remarks
8	1	F. J. Carman, Test	SW. Corner	.....	.....	302	Kettle Point	.....	.....	.....	.....	37	
3	2	F. J. Carman, Test	.....	.....	.....	258	Hamilton	.....	.....	.....	.....	.....	
3	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Several other wells on this lot.
4	2	W. L. Forrest G. Boothroyd No. 2	800 ft. S. of N. line 500 ft. E. of W. line	1939	.....	384	"	.....	.....	.....	.....	75	Fresh water at 65 ft. Salt water at 378 and 384 ft.
5	2	E. A. Roth A. Cruickshank No. 1	675 ft. W. of E. road 675 ft. S. of N. road	1938	630	457	"	.....	.....	Dry	.....	76	Fresh water at 70 ft., rose 55 ft. Salt water at 455 ft., rose 250 ft.
5	2	F. J. Carman, Test No. 1	SW. Corner	.....	.....	240	"	.....	.....	.....	.....	120	
5	2	F. J. Carman, Test No. 2	SW. Corner	.....	.....	373	"	.....	.....	.....	.....	102	Pumped 200 bbls. of oil, exhausting very quickly.
5	2	F. J. Carman, Test No. 3	50 ft. S. of N. road 2,000 ft. W. of E. line	.....	.....	440	.....	.....	.....	Dry	.....	90	
7	2	F. J. Carman, Test No. 1	NW. Corner	.....	.....	386	Kettle Point	.....	.....	.....	.....	48	
7	2	F. J. Carman, Test No. 2	SW. Corner	.....	.....	283	.....	.....	.....	.....	.....	.....	
8	2	F. J. Carman, Test	NW. Corner	.....	.....	300	"	.....	.....	.....	.....	67	
10	2	F. J. Carman, Test	SW. Corner	.....	.....	332	"	.....	.....	.....	.....	60	
3	3	F. J. Carman, Test	NE. Corner	.....	.....	235	Hamilton	.....	.....	.....	.....	130	
5	3	E. P. Rowe	300 ft. S. of N. road 1,000 ft. W. of E. line	1924	631	3,985	"	.....	.....	Dry	.....	.....	Show of oil in basal beds between 3,935 and 3,954 ft. 10 other wells on this lot, some oil production.

6	3	F. J. Carman, Test	SE. Corner			415	"					71	Several other wells on this lot.
9	3	G. E. and D. E. Willits Corlet No. 1	950 ft. N. of S. line 950 ft. E. of W. line	1935	635	420				Dry		87	Fresh water at 65 ft.
15	3	Southern Ontario Gas Co N. O'Brien	NE. Corner	1914	646	2,041	"			Dry		62	Salt at 1,300 ft.
5	4	F. J. Carman, Test	SE. Corner			245	"					172	
6	4	E. A. Roth A. Cruickshank No. 1	80 ft. N. of S. road 45 ft. W. of E. road	1938	635	403	"			Dry		95	Fresh water at 50 ft., rose 50 ft. Salt water at 403 ft., rose 20 ft.
6	4	Luke Smith	SE. Corner	1931	635	417				Dry		110	Show of oil at 405 ft.
6	4	F. J. Carman, Test	1,000 ft. S. of N. line 2,000 ft. E. of W. line			393	"					73	4 other wells on this lot.
7	4	F. J. Carman, Test	SW. Corner			208	Kettle Point					76	
2	5	Wm. Morvitt M. Johnson No. 1	500 ft. N. of S. line 150 ft. E. of W. line	1940		335	Hamilton			Dry		117	Fresh water at 35 ft. ½ bbl. oil at 324 ft.
4	5	G. E. and D. E. Willits M. Mercer No. 1	NE. Corner	1935	635	420	"			Dry		175	Show of gas at 36 ft. Salt water at 414 ft., rose 250 ft.
5	5	Martin and Gibson R. Jones No. 4	45 ft. S. of N. road 1,550 ft. E. of W. road	1938	635	395	"			Dry		160	Fresh water at 130 ft., rose 50 ft. Show of oil at 325 ft.
5	5	R. Jones No. 5	40 ft. S. of N. road 2,050 ft. E. of W. road	1938	638	380	"	323	Norfolk			160	Small producing oil well. Fresh water at 140 ft., rose 50 ft.
5	5	W. Kennedy P. Jones No. 2	NW. Corner	1936	632	410	"			Dry		160	Show of oil at 275 ft. Salt water at 275, 398, and 410 ft.
5	5	G. E. and D. E. Willits R. Jones No. 1	900 ft. E. of W. road 800 ft. S. of N. road	1935	633	400	"			Dry		165	Small show of oil at 235 ft. Salt water at 255 ft.
5	5	F. J. Carman, Test	NE. Corner										
6	5	Sadosky Investment Co., Ltd. O. Jones No. 1	650 ft. N. of S. road 550 ft. W. of E. road	1936	638	420	"			Dry		155	Fresh water at 112 ft., rose 40 ft. Salt water at 417 ft., rose 250 ft.

Wells in Zone Township, Kent County—Continued

Lot	Con.	Designation	Location	Year drilled	Altitude in feet above sea-level	Depth in feet	Bedrock formation	Producing depth in feet	Producing formation	Yield Mcf. or bbls.	Pressure in lbs. a sq. in.	Thickness of drift in feet	Remarks
6	5	A. Waymire O. Jones No. 2	2,375 ft. E. of W. road 725 ft. N. of S. road	1937	637	387	Hamilton	.....	.....	Dry	.....	105	Fresh water at 52 ft. Salt water at 355 ft., rose 150 ft.
6	5	O. Jones No. 1	2,325 ft. E. of W. road 450 ft. N. of S. road	1937	640	406	"	324	"	3 bbls.	.....	115	Fresh water at 18 ft. Salt water at 324 ft.
6	5	Cornell No. 1	2,100 ft. E. of W. road 425 ft. N. of S. road	1937	636	348	Hamilton	330 335	Norfolk	10 bbls.	.....	108	Fresh water at 12 ft. Salt water and oil at 330 to 335 ft.
6	5	Cornell No. 2	1,800 ft. E. of W. road 425 ft. N. of S. road	1937	636	394	"	300 320 325	"	30 bbls.	.....	122	Fresh water at 82 and 120 ft. Salt water at 370 ft.
6	5	Luke Smith	700 ft. N. of S. road 1,300 ft. E. of W. line	1931	635	410	"	282 376	"	Dry	.....	117	Show of oil.
6	5	Luke Smith	SW. Corner	.....	636	.....	.....	.....	.....	.....	.....	.....	
6	5	Luke Smith	1,200 ft. N. of S. road 1,700 ft. E. of W. line	.....	638	.....	.....	.....	.....	.....	.....	.....	
7	5	G. E. Willits D. and J. Ferguson No. 1	3,000 ft. S. of N. road 1,100 ft. W. of E. road	1937	641	333	"	.....	.....	Dry	.....	75	Fresh water at 20 ft., rose 20 ft. Fresh water at 70 ft.
8	5	Chrysler and Luller Humphrey No. 1	240 ft. S. of N. line 850 ft. W. of E. line	1935	643	498	Kettle Point	.....	.....	Dry	.....	60	Show of gas at 71 ft. Fresh water at 68 ft., rose 50 ft. Salt water at 498 ft., rose 200 ft.
4	6	McCrie and Willits D. B. Granger No. 1	4,700 ft. N. of S. road 75 ft. W. of E. road	1938	641	426	Hamilton	.....	.....	Dry	.....	92	Salt water at 426 ft.
4	6	.....	900 ft S. of N. line 200 ft. E. of W. line	1932	641	440	"	.....	.....	Dry	.....	74	Show of oil. Salt water at 440 ft., rose 200 ft.
4	6	.....	300 ft. S. of N. line 2,000 ft. W. of E. line	1933	646	431	"	.....	.....	Dry	.....	150	Salt water at 431 ft., rose 300 ft.

5	6	F. J. Carman, Test	SW. Corner			407							
6	6	F. J. Carman, Test				335				Dry		90	Show of oil. 2 other wells on this lot.
7	6	F. J. Carman, Test	1,000 ft. N. of S. line 100 ft. W. of E. line			405							
7	6	Carman—Fairbanks	SW. Corner			335	"					90	
8	6	C. R. Walker Buchanan No. 1	945 ft. S. of N. line 595 ft. E. of W. line	1935	647	485	Kettle Point			Dry		88	Fresh water at 120 ft., rose 118 ft. Salt water at 378 ft., rose 260 ft.
3	7	Lather and Warwick S. Gamble No. 1	On N. line 1,600 ft. E. of W. road.	1936	636	432	Hamilton			Dry		148	Show of oil at 310 and 418-421 ft. Fresh water at 54 ft., rose 20 ft. Fresh water at 148 ft., rose 20 ft. Salt water at 319, 358, and 412 ft.
11	7	F. J. Carman, Test	SW. Corner										
14	7	F. J. Carman, Test	1,000 ft. S. of N. line 1,400 ft. W. of E. line										
7	8	E. B. Holmes W. Goodyear No. 1.	800 ft. S. of N. line 900 ft. W. of E. line	1937	661	499	"	362	Norfolk	1½ bbls.		163	Salt water at 221 ft., rose 180 ft.
7	8	W. Goodyear No. 2	800 ft. S. of N. line 1,500 ft. W. of E. line	1937	663	388	"	372	"	1½ bbls.		170	
7	8	W. Goodyear No. 7	60 ft. N. of S. line 1,000 ft. E. of W. road	1940	651	388		370	"	1 bbl.			
15	8	W. L. Forrest D. Maxwell No. 1.		1939		397	"	397	"			109	Show of oil at 374 and 387 ft. Fresh water at 17 ft. Producing oil well.
19	8	J. Von Berg H. Brewer No. 3	1,700 ft. N. of S. road 150 ft. E. of W. line	1937	659	391		383	"			175	Fresh water at 54 ft. Salt water at 391 ft. Small producing oil well.
19	8	H. Brewer No. 4	2,000 ft. N. of S. road 250 ft. E. of W. line	1937	661	380		370 380	"	3 bbls.		213	Salt water at 260 ft. Small producing oil well.
19	8	H. Brewer No. 5	1,400 ft. N. of S. road 150 ft. E. of W. line	1937	655	385		377 382	"	1 bbl.		206	Salt water at 230 and 280 ft. Small producing oil well.

Wells in Zone Township, Kent County—Continued

Lot	Con.	Designation	Location	Year drilled	Altitude in feet above sea-level	Depth in feet	Bedrock formation	Producing depth in feet	Producing formation	Yield Mcf. or bbls.	Pressure in lbs. a sq. in.	Thickness of drift in feet	Remarks
19	8	H. Brewer No. 2	1,800 ft. N. of S. road..... 300 ft. E. of W. line	1936	661	392	.....	390	Norfolk	.....	.....	206	Black water at 230 ft. Salt water at 240 ft. Small producing oil well.
19	8	H. Brewer No. 6	2,350 ft. E. of W. road.... 1,300 ft. N. of No. 2 highway	1937	658	385	Hamilton	285	"	½ bbl.	.....	203	Salt water at 235, 290, and 365 ft.
19	8	McGaffy No. 1	135 ft. E. of W. line..... 1,870 ft. N. of S. highway	1935	650	385	.....	.....	.....	Dry	.....	.....	
12	9	R. McCrie No. 1	Town of Bothwell..... 108 ft. E. of Walnut St. 264 ft. N. of Main St.	1937	684	511	Kettle Point	.....	.....	Dry	.....	85	Salt water at 507 ft
7	10	F. M. Crochner..... J. Johnston No. 1	20 ft. W. of E. line..... 215 ft. N. of S. highway	1937	679	433	.....	.....	.....	Dry	.....	.....	
13	10	.....	NW. Corner.....	1933	683	158	"	.....	.....	Dry	.....	88	
1	N.L.R.	Walker.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4 wells.
5	N.L.R.	.....	SE. Corner.....	.....	.....	400	.....	.....	.....	Dry			
7	N.L.R.	Fred M. Groschner..... J. Johnston No. 1	200 ft. N. of No. 2 highway 1,500 ft. W. of E. road	1937	678	433	Hamilton	.....	.....	Dry	.....	137	Fresh water at 137 ft., rose 107 ft.
16	N.L.R.	G. E. Willits	3,000 ft. S. of N. road..... 400 ft. E. of W. line	1935	663	380	"	.....	.....	Dry	.....	145	
19	N.L.R.	J. Von Berg..... H. Brewer No. 7	2,600 ft. E. of W. road.... 625 ft. N. of No. 2 highway	1938	657	387	"	230 370	Norfolk	.....	.....	201	Small producing oil well. Fresh water at 18 ft., rose 6 ft. Fresh water at 63 ft., rose 50 ft. Salt water at 230 ft., rose 150 ft. Salt water and oil at 360 ft.

B	N.L.R.	Yates Test				387	"	375	"			113	4 other wells on this lot: dry.
6A	S.L.R.	Acme Gas and Oil Co	NE. Corner	1930	645	345	"	290 308	"	Dry		120	Show of oil.
6A	S.L.R.	Reverend Father McHugh Rev. McHugh No. 1	25 ft. W. of E. line 36 ft. S. of N. line	1938	643	410	"			Dry		175	Fresh water at 12 ft., rose 6 ft.
6 and 7	R.R.	Acme Gas and Oil Co	SW. Corner	1930	617	296	"	265 295	"	Dry		160	Show of oil.
12	R.R.	Olga Gas and Oil Co	NE. Corner	1930	668	3,998	"			Dry		148	Water at 250, 560, and 1,910 ft.
14	R.R.	G.E. and D.E. Willits Lutz No. 1	1,100 ft. S. of N. road 100 ft. W. of E. line	1935	668	412	"	190 395	Hamilton Norfolk			165	Small producing oil well.
15	R.R.	Delhi Gas Syndicate P. Dalton No. 1.	SW. Corner	1936	660	417	"	400	"	5 bbls.		203	Fresh water at 10 ft. Show of oil at 235 ft.
15	R.R.	P. Dalton No. 2	1,700 ft. S. of highway No. 2 70 ft. E. of W. line	1936	661	417	"			Dry		192	Show of oil at 295, 320, and 340 ft. Fresh water at 10 ft. Salt water at 295, 320, and 340 ft.
15	R.R.	A. McRitchie No. 1	Centre of lot 2,400 ft. SE. of road	1936	661	412	"	222	Hamilton	2 bbls.		190	Fresh water at 58 ft. Salt water at 222 ft.
16	R.R.	C. and A. McRitchie No. 1	725 ft. S. of No. 2 highway 650 ft. E. of W. line	1937	670	406	"	365 375	Norfolk			140	Fresh water at 16, 60, and 198 ft. Salt water at 365 to 375 ft. Small producing oil well.
16	R.R.	C. and A. McRitchie No. 2	378 ft. (approx.) S. of N. line 378 ft. (approx.) W. of E. line	1936		430	"			Dry		175	Show of oil at 365 ft. Fresh water at 175 ft., rose 50 ft. Salt water at 365 ft., rose 215 ft.
16	R.R.	C. and A. Ritchie No. 3	2,640 ft. (approx.) S. of N. line 50 ft. (approx.) W. of E. line	1936		430	"			Dry		205	Show of oil at 244 and 337 ft. Salt water at 424 and 430 ft.
18	R.R.	G. I. Graff Mrs. M. McLennan No. 1	45 ft. W. of centre lot line 1,500 ft. N. of Thames River bank	1940	653	421	"			Dry		139	Casing pulled; plugged at 200, 280, and 380 ft.
18	R.R.	Mrs. M. McLennan No. 2		1940		402	"			Dry		129	Show of oil at 370 and 390 ft.

Wells in Zone Township, Kent County—Concluded

Lot	Con.	Designation	Location	Year drilled	Altitude in feet above sea-level	Depth in feet	Bedrock formation	Producing depth in feet	Producing formation	Yield Mcf. or bbls.	Pressure in lbs. a sq. in.	Thickness of drift in feet	Remarks
19	R.R.	Domestic Natural Gas Co., Ltd. F. and J. McRoberts No. 5.	100 ft. E. of W. line..... 500 ft. S. of N. line	1936	.....	382	Hamilton	245 265	Norfolk	6 bbls.	.....	164	Fresh water at 75 ft., rose 63 ft.
19	R.R.	Domestic Gas and Oil Co., Ltd. Newell No. 1	1,700 ft. S. of No. 2 highway 825 ft. E. of W. line.....	1937	677	398	"	260 345 360	"	1 bbl.	.....	140	Fresh water at 10 ft., rose 2 ft. Fresh water at 60 ft., rose 20 ft.
19	R.R.	Newell No. 2.....	3,250 ft. S. of No. 2 highway 750 ft. E. of W. line	1937	666	416	"	.....	.....	Dry.....	.....	190	Fresh water at 40 and 60 ft. Salt water at 235 to 240, and 330 ft.
19	R.R.	J. and F. McRoberts No. 4....	2,200 ft. S. of No. 2 highway 650 ft. E. of W. line	1937	674	427	"	.....	.....	Dry.....	.....	150	Salt water at 427 ft.
19	R.R.	J. and F. McRoberts No. 5....	800 ft. S. of No. 2 highway 25 ft. E. of W. line	1937	676	393	"	393	"	10 bbls.	.....	180	Fresh water at 60 ft., rose 20 ft. Salt water at 393 ft.
19	R.R.	J. and F. McRoberts No. 3....	1,600 ft. S. of No. 2 highway 25 ft. E. of W. line.....	1937	676	394	"	385	"	1 bbl.	.....	158	Fresh water at 15, 50, and 102 ft. Salt water with oil at 260, 330, and 385 ft.
19	R.R.	J. and F. McRoberts No. 2....	434 W. of E. line..... 2,000 ft. S. of highway No. 3	1937	679	380	"	260 365	"	2 bbls.	.....	165	Fresh water at 65 ft., rose 25 ft.
19	R.R.	Domestic Gas and Oil Co., Ltd.	1,600 ft. S. of N. road..... 450 ft. E. of W. line.....	1936	699	398	"	300 384	"	2 bbls.	.....	133	
20	R.R.	Domestic Natural Gas Co., Ltd. J. H. Johnson No. 1.....	150 ft. (approx.) N. of S. line 1,120 ft. (approx.) W. of E. line.....	1936	.....	405	"	345 395	"	.....	.....	125	Small producing oil well.
20	R.R.	J. H. Johnson No. 2.....	150 ft. W. of E. ½ line..... 200 ft. (approx.) N. of river	1936	.....	397	"	.....	.....	Dry.....	.....	108	Salt water at 365 and 397 ft.

20	R.R.	J. Angelerio..... J. Johnston No. 1.....	20 ft. E. of W. line 1,500 ft. (approx.) N. of Thomas River	1936	.....	422	"	404	"	2 bbls.	.....	148	Show of oil at 303 and 365 ft. Salt water at 404 ft.
24	R.R.	Winnett Estate..... Taylor No. 3.....	2,600 ft. S. of No. 2 highway 1,300 ft. W. of E. road	1936	675	410	"	345	"	.....	.....	172	Small producing oil well. Fresh water at 120 ft., rose 70 ft.
24	R.R.	Taylor No. 4.....	50 ft. N. of Thames River 960 ft. W. of E. road	1936	630	365	"	.....	.....	.....	.....	114	Small supply of oil at 170, 220, 325, and 330 ft. Salt water at 360 ft.

Wells in Bosanquet Township, Lambton County

21	3	Thedford Cold Storage Co.....	100 ft. N. of S. line..... 1,000 ft. E. of W. line	1931	669	500	.....	.....	.....	.....	.....	.....	Fresh water at 60 ft.
21	3	.....	500 ft. S. of N. road..... 900 ft. W. of E. line	1865	654	350	Hamilton	.....	.....	.....	.....	.....	
21	3	Buchanan and Brake.....	.....	1905	681	502	"	.....	.....	.....	.....	45	
23	3	Johnson and Hyatt.....	SE. Corner.....	.....	704	2,455	"	.....	.....	.....	.....	41	
3	4	W. N. Alley..... John Wilson No. 1.....	4,050 ft. E. of W. road..... 1,250 ft. S. of N. road	1939	770	500	"	.....	.....	Dry	.....	86	Fresh water at 86 ft., rose 60 ft. Salt water at 500 ft. Show of gas at 193 ft.
22	5	McKenzie and Buchanan.....	.....	1924	652	390	"	.....	.....	Dry	.....	2	
4	6	W. N. Alley..... J. S. Zimmerman No. 1	600 ft. W. of E. road..... 350 ft. N. of S. road	1939	757	500	"	.....	.....	Dry	.....	117	Fresh water at 100 to 110 ft., rose 100 ft. Salt water at 497 ft. Show of gas at 233 ft.
7	6	C. Wilson No. 1.....	1,525 ft. S. of N. road..... 2,500 ft. W. of E. road	1939	743	500	"	192	Hamilton	2 Mcf.	.....	105	Fresh water at 82 to 105 ft., rose 90 ft. Salt water at 490 ft., well plugged.
5	7	Dominion Natural Gas Co..... W. F. Gilliard No. 1.....	390 ft. E. of W. road.... 1,780 ft. N. of S. road	1940	743	480	"	.....	.....	Dry	.....	119	Fresh water at 98 ft. Show gas at 142 ft.
4	8	W. N. Alley..... Chas. Catt No. 2.....	825 ft. W. of E. road.... 725 ft. N. of S. road	1940	749	507	"	.....	.....	Dry	.....	106	Fresh water at 60 ft., rose 35 ft. Black water at 507 ft., rose 400 ft. Gas at 84, 220, 240 ft. Show of oil at 392 and 463 ft.

Wells in Bosanquet Township, Lambton County—Concluded

Lot	Con.	Designation	Location	Year drilled	Altitude in feet above sea-level	Depth in feet	Bedrock formation	Producing depth in feet	Producing formation	Yield Mcf. or bbls.	Pressure in lbs. a sq. in.	Thickness of drift in feet	Remarks
5	8	E. Catt No. 1	240 ft. W. of E. road 1,410 ft. N. of S. road	1939	748	512	Hamilton	213 415	Hamilton Norfolk	4 Mcf.	.....	105	Fresh water at 110 ft., rose 95 ft. Salt water at 509 ft., rose 150 ft. Show of oil at 398 ft.
7	9	D. K. Stewart No. 1	450 ft. E. of W. road 1,400 ft. S. of N. road	1939	727	513	Kettle Point	.....	.....	.....	.....	85	Fresh water at 77 ft., rose 50 ft. Salt and sulphur water at 490 ft.
12	10	Grand Trunk	400 ft. S. of N. road 2,500 ft. W. of E. line	.....	709	535	"	.....	.....	Dry	.....	90	
17	14	Wm. McIntyre No. 1	50 ft. N. of S. road 3,100 ft. E. of W. line	1934	676	522	"	147 203	Hamilton	20 Mcf.	35	56	Salt water at 56 and 62 ft.
14	15	A. A. Heal *et al*	600 ft. S. of N. line 600 ft. E. of W. line	1934	675	510	Hamilton	.....	.....	Dry	.....	115	
17	15	A. A. Heal *et al*	50 ft. N. of S. road 600 ft. E. of W. line	1934	679	513	"	157	"	10 Mcf.	50	110	Show of oil at 510 ft.
30	B	Newberry B. Sitter No. 1	150 ft. N. of S. line 150 ft. W. of E. line	1940	.....	470	"	.....	.....	Dry	.....	185	Fresh water at 125 and 238 ft. Salt water at 295 ft.
3	S.B.	High Pressure Oil and Gas Co.	800 ft. S. of N. road 250 ft. E. of W. line	1923	707	3,725	Hamilton	.....	.....	.....	.....	18	Salt water at 880 to 910 ft.
74	E.L.R.	A. A. Heal *et al* J. E. Vivian No. 2	SW. Corner	1934	668	529	"	.....	.....	Dry	.....	96	Salt water at 523 ft., with trace of oil.
75	E.L.R.	J. E. Vivian No. 1	100 ft. S. of N. line 2,500 ft. E. of W. line	1934	665	513	"	.....	.....	.....	.....	107	Salt water at 107 to 113 ft. Show of gas at 443 ft. Very small oil well with production from 422 and 455 ft.
35	W.L.R.	William's Salt Works	.....	.....	584	1,355	.....	.....	.....	.....	.....	.....	
49	W.L.R.	Stoney Point	SW. Corner	.....	633	375	"	.....	.....	.....	.....	30	

55	W.L.R.	Bert Wilson A. Page No. 1		1936	650	481	"			Dry		45	Show of oil at 445 and 470 ft. Salt water at 475 ft.
77	W.L.R.	J. Head No. 1	600 ft. N. of S. line..... 3,300 ft. W. of E. line	1925	652	507	"			Dry		86	Fresh water from 78 to 96 ft.
41	Port Franks	Walker Salt Corporation, Ltd..	200 ft. N. of S. line..... 200 ft. E. of river bank	1934	584	1,382	"			Dry		52	Fresh water at 50 and 248 ft. Sulphur water at 258 and 704 ft. Salt water at 278 and 990 ft.
9	I.R.	Geo. Sullivan *et al*	NE. Corner	1935	584	503	Kettle Point			Dry		9	Show of gas at 390 and 463 ft. Salt water at 501 ft.

Wells in Brooke Township, Lambton County

13	1	McClure				465	Kettle Point					85	Salt water at 464 ft.
4	2	Smily	NW. Corner		677	430	"			Dry		55	Show of oil.
6	2	Alderman	NE. Corner	1909	680	392	Hamilton					57	Gas and salt water at 93 ft.
7	2	Guardian Petroleum Development Co.	NW. Corner	1934	679	450	"			Dry		52	Fresh water at 58 ft. Salt water at 345 ft. Show of oil at 320 and 438 ft.
7	2	Guardian Petroleum Development Co.	NE. Corner	1934	679	355	"	323 337	Norfolk..			56	Fresh water at 57 ft. Small oil well.
7	2	Guardian Petroleum Development Co.	NE. Corner	1934	679	355	"			Dry		50	Fresh water at 57 and 125 ft. Show of oil at 316 ft.
8	2	Liley and Winkler Campbell No. 1	2,200 ft. N. of S. line..... 900 ft. E. of W. line	1935	682	400	"	332	"			58	Fresh water at 59 ft. Producing oil well.
8	2	W. Campbell No. 2	1,500 ft. N. of S. line..... 1,000 ft. E. of W. line	1935	680	351	Kettle Point			Dry		59	Fresh water at 58 ft. Show of oil at 327 ft.
8	2	Belle No. 1				348						55	
9	2	P. Campbell	1,700 ft. S. of N. road..... 100 ft. W. of E. line	1909	681	358	"			Dry		54	Salt water and gas at 353 to 358 ft. Show of oil at 319 ft.
9	2	Gubb and Russell F. Braithwaite No. 2	1,600 ft. S. of N. road 750 ft. W. of E. line	1935	679	400	Hamilton			Dry		52	Fresh water at 52 ft. Salt water at 400 ft.

Wells in Brooke Township, Lambton County—Continued

Lot	Con.	Designation	Location	Year drilled	Altitude in feet above sea-level	Depth in feet	Bedrock formation	Producing depth in feet	Producing formation	Yield Mcf. or bbls.	Pressure in lbs. a sq. in.	Thickness of drift in feet	Remarks
9	2	F. Braithwaite No. 3	.....	1935	.....	365	Kettle Point	.....	.....	Dry	.....	52	Fresh water at 58 ft.
10	2	H. Wilcox No. 1	2,000 ft. S. of N. road..... 500 ft. E. of W. line	1935	679	456	Hamilton	325	.....	Dry	.....	58	Fresh water at 57 ft. Salt water at 455 ft. Show of oil at 325 ft.
13	2	Wm. Lamb	2,000 ft. S. of N. road..... 100 ft. E. of W. line	.....	680	.....	Kettle Point	.....	.....	Dry	.....	65	
7	3	.....	SW. Corner.....	.....	679	396	Hamilton	.....	.....	Dry	.....	58	
5	4	Ohio Oil Co.	1,000 ft. S. of N. line..... 1,000 ft. E. of W. line	1900	684	3,380	.....	.....	.....	Dry	.....	65	
22	5	F. L. Patterson	1,800 ft. N. of S. road..... 200 ft. E. of W. line	1934	670	445	Kettle Point	.....	.....	Dry	.....	7	Fresh water at 22 ft. Sulphur water at 394 ft. Salt water at 438 ft.
12	7	.....	NE. Corner.....	.....	.....	498	"	.....	.....	Dry	.....	60	
28	8	F. W. Kehlet..... Graham No. 1	1,000 ft. N. of S. road..... 150 ft. E. of W. line	1934	727	472	"	.....	.....	Dry	.....	75	Fresh water at 75 ft.
12	9	Stevens King Syndicate..... M. Zavitz No. 1	SE. Corner.....	1934	702	501	Kettle Point	.....	.....	Dry	.....	46	Salt water at 500 ft. Gas at 219 ft. Show of oil at 387 ft.
1	10	Senator Michener	450 ft. S. of N. road..... 500 ft. E. of W. line	1926	686	508	"	.....	.....	Dry	.....	56	
25	11	Leo Wilson..... Wm. Duffy No. 1	NE. Corner.....	1934	739	465	"	.....	.....	Dry	.....	65	Fresh water at 65 ft. Salt water at 465 ft.
27	11	Leo Wilson	NW. Corner.....	1934	747	460	"	373 418	Norfolk	15 bbls.	.....	71	Fresh water at 50 ft., rose 30 ft.
28	11	Bert Wilson..... Woods No. 1	NW. Corner.....	1934	737	468	.....	.....	.....	Dry	.....	72	
28	11	R. E. McArthur	NE. Corner	1934	739	414	"	.....	.....	Dry	.....	70	Black water at 397 ft. Salt water at 410 ft.
16	12	Cullen and Walsh..... D. McDonald No. 1	NE. Corner.....	1934	760	540	"	.....	.....	Dry	.....	116	Fresh water at 97 ft. Sulphur water at 535 ft.

18	12	F. W. Kehlet	NE. Corner	1934	758	523	"			Dry		72	Fresh water at 72 ft., rose 52 ft.
23	12	Brookfield Oil and Gas Co.	1,700 ft. S. of N. road 700 ft. E. of W. line	1934	732	470	"			Dry		52	Fresh water at 48 ft. Brackish water at 424 to 429 ft. Show of oil at 388 ft.
26	12	Bert Wilson	NW. Corner	1934	752	482	"			Dry		54	Fresh water at 50 ft. Salt water at 482 ft.
27	12	Brookfield Oil and Gas Co. Lewis No. 1	NW. Corner	1934	753	459	Hamilton			Dry		77	Small show of oil 346, 410, and 420 ft
27	12	Leo Wilson *et al.* R. Serson No. 1	SW. Corner	1935	746	475	Kettle Point	348	"	2 bbls. 5 Mcf.		68	Small oil yield. Gas at 95 ft. Sulphur water at 68 ft. Brackish water at 400 ft. Salt water at 450 to 475 ft.
27	12	Bert Wilson J. Lewis No. 2	NW. Corner	1935	750	465	Hamilton			Dry		75	Salt water at 150 ft.
27	12	Scientific Oil and Gas Syndicate R. Serson No. 2	1,600 ft. N. of S. line 100 ft. E. of W. line	1935	747	453	Kettle Point	160	Hamilton	50 Mcf.		65	Fresh water at 55 ft. Salt water at 401 to 452 ft. Black water at 453 ft. Show of oil at 401 and 452 ft.
27	12	Blake and Craft	NW. Corner	1934	753	462	"			Dry		75	Fresh water at 75 ft. Salt water at 345 to 350 ft.
28	12	Stoddard and Darke Hare No. 1	NW. Corner	1934	751	452	Hamilton	342 395 407	Norfolk	23 bbls.		76	Fresh water at 66 and 79 ft.
28	12	Hare No. 2	NW. Corner	1934	750	460	"			Dry		76	Fresh water at 66 ft. Salt water at 460 ft.
29	12	Blake and Craft Geo. Reid No. 1	NW. Corner	1934	754	469	"			Dry		81	Small show of oil at 405, 423, and 460 ft.
29	12	F. W. Kehlet Geo. Reid No. 2	140 ft. S. of N. road 650 ft. E. of W. line	1934	752	475	"			Dry		93	Fresh water at 63 ft., rose 43 ft. Water at 460 ft.
10	13	Michigan Pacific Oil and Gas Co.	2,300 ft. N. of R.R. crossing 150 ft. E. of W. line	1932	713	2,637	Kettle Point			Dry		54	Water at 64 ft. Salt water at 520 ft., rose 235 ft.
21	13	Bert Wilson P. Kingston No. 1	SE. Corner	1936	746	469				Dry		63	Fresh water at 70 ft. Salt water at 414 ft.

Wells in Brooke Township, Lambton County—Concluded

Lot	Con.	Designation	Location	Year drilled	Altitude in feet above sea-level	Depth in feet	Bedrock formation	Producing depth in feet	Producing formation	Yield Mcf. or bbls.	Pressure in lbs. a sq. in.	Thickness of drift in feet	Remarks
22	13	Brookfield Oil and Gas Co..... Scott No. 1	SE. Corner.....	1935	745	461	Kettle Point	416 422	Norfolk	.....	.....	61	Small producing oil well.
22	13	Bert Wilson..... M. McLachlan No. 1.....	50 ft. S. of N. line..... 1,800 ft. E. of W. road	1937	751	392	"	390	"	.....	.....	78	Fresh water at 60 to 70 ft. Small producing oil well. Gas at 170, 190, 295, 356, and 390 ft.
22	13	Sullivan and Wilson..... M.McLachlan No. 3.....	50 ft. S. of N. line..... 500 ft. E. of W. road	1937	757	470	"	.....	.....	Dry	.....	69	Fresh water at 70 ft., rose 55 ft. Salt water at 465 ft., rose 215 ft.
22	13	Bert Wilson..... A. Gilliard No. 1.....	1,200 ft. S. of N. line..... 200 ft. W. of E. line	1937	750	475	"	.....	.....	Dry	.....	64	Fresh water at 60 ft., rose 40 ft. Salt water at 470 ft., rose 100 ft.
23	13	Leo Wilson Syndicate.....	600 ft. N. of S. road..... 150 ft. W. of E. line.....	1934	749	476	"	185 465	Hamilton Norfolk	15 Mcf. 25 bbls.	....	 62	
23	13	Bert Wilson.....	315 ft. N. of S. road..... 260 ft. W. of E. line	1934	747	476	Hamilton	.....	.....	Dry	.....	84	Fresh water at 50 ft. Black water at 476 ft.
23	13	Leo Wilson Syndicate..... F. Atcheson No. 3	NW. Corner.....	1935	752	439	Kettle Point	365	Norfolk	10 bbls.	.....	60	Fresh water at 59 and 85 ft.
23	13	Brookfield oil and Gas Co.....	1,000 ft. N. of S. road..... 490 ft. E. of W. line	1934	750	486	"	.....	.....	Dry	.....	65	Small show of oil at 359–364 ft. and 370–375 ft. Fresh water at 57 ft. Salt water at 438–444 and 462–468 ft.
23	13	Miss Johnstone..... F. Acheson No. 4	600 ft. E. of W. line..... 250 ft. N. of S. road	1936	746	500	"	.....	.....	Dry	.....	62	Fresh water at 62 ft. Salt water at 480 ft. Sulphur water at 495 ft.
24	13	Bert Wilson..... G. Bowie No. 2.....	1,700 ft. S. of N. line..... 50 ft. E. of W. line	1935	746	476	.....	.....	.....	.....	.....	.....	

24	13	G. Bowie	1,425 ft. W. of E. road 1,525 ft. N. of S. road	1938	748								
25	13	Leo Wilson	SW. Corner	1935	750	430							
25	13	Empire Gold Co., Ltd		1935	750	405	"			Dry		55	Fresh water at 55 ft. Salt water at 405 ft. Show of oil at 354 ft.
27	13	H. McLellan	700 ft. N. of S. road 100 ft. E. of W. line	1934	752	460	Hamilton	371 455	Norfolk	10 bbls.		85	Plugged Sept. 27, 1934. Salt water at 371, 410, 420, 455 ft.
28	13	Bert Wilson *et al*	SW. Corner	1934	753	471	"			Dry		72	Show of oil at 346 and 456 ft. Fresh water at 68 ft. Salt water at 346 and 471 ft.
28	13	Stoddard and Darke	1,000 ft. N. of S. road 750 ft. W. of E. line	1934	754	461	"	380	"			74	Small oil well. Brackish water at 390 to 396 ft.
29	13	Wilson, Brown, and Sullivan H. Watson No. 1	600 ft. N. of S. road 600 ft. E. of W. line	1934	753	492	"	395 455	"	20 bbls.		73	Water at 50 and 484 ft.
20	14	Wilson and Sullivan C. Lucas No. 1	125 ft. N. of S. line 580 ft. W. of E. line	1937	780	495	Kettle Point			Dry		104	Fresh water at 105 ft., rose 66 ft. Salt water at 495 ft.
22	14	M. McLachlan No. 2	50 ft. N. of S. line 1,000 ft. E. of W. road	1937	756	429	"	420	"	8 bbls.		68	Fresh water at 66 ft. Salt water at 420 ft. Show of oil at 405 ft.
22	14	Brookfield Oil and gas Co. Logan No. 2	SE. Corner	1934	753	445	"			Dry		63	Show of gas at 167 ft. Show of oil at 410 to 414 ft. Salt water at 419 to 445 ft.
22	14	Logan No. 1	2,000 ft. N. of S. line 50 ft. E. of W. line	1934	790	510	"			Dry		102	
22	14	Brookfield Oil and Gas Co.	SE. Corner	1935	755								
24	14	Bert Wilson O. B. Watt No. 1	165 ft. S. of N. road 1,950 ft. W. of E. road	1939	780	472	"			Dry		97	Fresh water at 86 ft., rose 50 ft.
28	14	Stoddard and Darke Foster No. 1	2,000 ft. S. of N. road 50 ft. W. of E. line	1934	757	455	Hamilton			Dry		80	Show of gas at 260 and 410 ft. Fresh water at 15 and 80 ft. Salt water at 410 and 452 ft.

Wells in Euphemia Township, Lambton County

Lot	Con.	Designation	Location	Year drilled	Altitude in feet above sea-level	Depth in feet	Bedrock formation	Producing depth in feet	Producing formation	Yield Mcf. or bbls.	Pressure in lbs. a sq. in.	Thickness of drift in feet	Remarks
22	1	Union Gas Co. of Canada, Ltd. Mrs. N. Bilton No. 1.....	93 ft. N of S. line..... 71 ft. E. of W. line	1938	641	1,920	Kettle Point	.....	.....	Dry	.....	52	Show of gas at 1,540 ft. Sulphur water at 500 ft.
23	1	Union Gas Co. of Canada, Ltd.	200 ft. N. of S. line..... 650 ft. W. of E. line	1928	650	2,106	"	.....	.....	Dry	.....	45	Salt water at 505 ft.
25	1	Union Gas Co. of Canada, Ltd.	600 ft. N. of S. line..... 100 ft. E. of W. line	1929	659	1,700	"	.....	.....	Dry	.....	42	Show of oil at 595 ft.
25	1	Ladd and Knight.....	600 ft. N. of S. road..... 200 ft. E. of W. line	1934	659	641	"	.....	.....	Dry	.....	40	Show of oil at 352 ft. Show of gas at 395 ft.
22	2	Union Gas Co. of Canada, Ltd. J. L. and C. Elliott No. 1.....	325 ft. N. of S. road..... 200 ft. E. of W. road	1938	628	1,905	"	.....	.....	Dry	.....	33	Fresh water at 35 ft. Sulphur water at 415 ft. Salt water at 1,860 ft. Show of gas at 108 ft.
19	4	D. J. W. Winnett.....	200 ft. N. of S. line..... 2,000 ft. W. of E. line	1924	645	454	"	.....	.....	Dry			
24	4	.....	NE. Corner.....	.....	654	.....	.....	.....	.....	.....	.....	.....	
25	4	Union Gas Co. of Canada, Ltd.	600 ft. S. of N. line..... 400 ft. W. of E. line	1919	657	1,712	"	.....	.....	.....	.....	55	Gas, oil, and salt reported.
25	4	Union Gas Co. of Canada, Ltd.	100 ft. N. of S. line..... 1,800 ft. W. of E. line	1929	657	1,865	"	1,630	Guelph	Dry	.....	55	Gas at 1,630 ft.
26	4	Union Gas Co. of Canada, Ltd..	385 ft. N. of S. line..... 625 ft. W. of E. line.....	1914	636	1,690	"	1,560 1,675	Salina Guelph	325 Mcf.	575	30	Some oil reported.
26	4	Union Gas Co. of Canada, Ltd.	825 ft. S. of N. line..... 600 ft. W. of E. line	1920	662	1,704	"	1,582	Salina?	235 Mcf.	575	50	Some oil reported at 1,685 ft.
26	4	A. L. Lertzman..... C. Tunks No. 1.....	63 ft. W. of E. road.... 1,200 ft. S. of N. line	1939	.....	380	Hamilton	.....	.....	Dry	.....	42	Small show of oil at 325 and 335 ft. Fresh water at 50, 140, and 251 ft.
27	4	D. H. Wood..... D. Dobbyn No. 1.....	400 ft. N. of S. line..... 600 ft. W. of E. line	1938	625	340	.....	337	Norfolk	22 bbls.	.....	12	Fresh water at 23 ft., rose 12 ft.

27	4	Parsons	NW. Corner			360	Kettle Point			Dry		58	
27	4	Wilson and Bennett	200 ft. S. of N. line 800 ft. W. of E. line			370	"						
29	4	A. L. Lertzman J. L. Monroe No. 1		1939		370	Hamilton	340	"			45	Small producing oil well. Fresh water at 70 to 75 ft.
24–27	4–5												Numerous shallow wells have been drilled into the Norfolk in this area.
18	5	McGregor	SE. Corner	1866			Kettle Point						
18	5	Birmingham	NW. Corner		625		"						
21	5	Drake and Walker S. Annette No. 1		1939		331	Hamilton			Dry		67	Fresh water at 60 ft.
24	5	Union Gas Co. of Canada, Ltd.	NW. Corner	1929	657	2,046	Kettle Point	1580	Guelph	118 Mcf.	410	55	Abandoned. Fresh water at 55 and 80 ft. Salt from 1,295 to 1,455 ft.
24	5	Union Gas Co. of Canada, Ltd.	50 ft. S. of N. line 2,100 ft. E. of W. line	1929	660	1,852	"	1,582	"	Dry		57	Show of oil at 1,582 ft. Salt water at 1,830 ft.
25	5	Union Gas Co. of Canada, Ltd.	900 ft. S. of N. line 1,100 ft. E. of W. line		660								
25	5	Union Gas Co. of Canada, Ltd.	580 ft. S. of N. line 225 ft. W. of E. line		660								
26	5	Union Gas Co. of Canada, Ltd.	800 ft. N. of S. line 600 ft. W. of centre line	1934	638	1,880	Hamilton	1,555	"	Dry		40	Fresh water at 60 ft. Sulphur water at 440 ft. Salt water at 1,695 ft. Gas at 1,555 ft.
27	5	Union Gas Co. of Canada, Ltd.	125 ft. N. of S. line 2,100 ft. W. of E. line	1919	661	1,700							
18	6	Olga Gas and Oil Co., Ltd. J. F. Coleman No. 1	900 ft. S. of N. line 50 ft. W. of E. road	1935	639	414	"	384	Norfolk	Dry		50	Show of oil at 384 ft. Fresh water at 50 ft. Salt water at 348 ft.
19	6	D. Ferguson No. 1	850 ft. S. of N. line 1,000 ft. W. of E. road	1935	654	338	"	287	"	Dry		69	Show of oil at 287 ft.
19	7		2,100 ft. W. of E. line 100 ft. S. of N. road		655								

Wells in Euphemia Township, Lambton County—Concluded

Lot	Con.	Designation	Location	Year drilled	Altitude in feet above sea-level	Depth in feet	Bedrock formation	Producing depth in feet	Producing formation	Yield Mcf. or bbls.	Pressure in lbs. a sq. in.	Thickness of drift in feet	Remarks
27	7	.....	.....	.....	670	80	Kettle Point	.....	.....	.....	.....	63	
30	7	.....	.....	.....	672	83	"	.....	.....	.....	.....	58	
17	8	Chas. McDonald.....	NE. Corner.....	1932	671	305	"	.....	.....	Dry	.....	77	
17	8	Olga Gas and Oil Co., Ltd..... C. McDonald No. 1.....	40 ft. N. of S. line..... 40 ft. E. of W. road	1935	681	401	Hamilton	.....	.....	Dry	.....	78	Show of oil and gas at 295 ft. Fresh water at 79 ft. Salt water at 397 to 401 ft.
19	8	G. E. and D. E. Willits..... A. Stewart	NW. Corner.....	1933	662	342	"	.....	.....	Dry	.....	68	
25	8	.....	200 ft. N. of S. line..... 2,000 ft. W. of E. line	.....	.....	.....	.....	.....	.....	Dry	.....	.....	
27	8	Lambton Oil and Gas Syndicate.	NE. Corner.....	.....	.....	451	"	.....	.....	.....	.....	.....	
28	8	J. F. Marshant.....	SE. Corner.....	1932	672	377	"	280	Norfolk	5 bbls.	.....	66	
31	8	J. F. Marshant.....	SE. Corner.....	1933	682	445	"	335	.....	Dry	.....	69	Salt water at 410 ft.
33	8	Brownlee.....	NE. Corner.....			480				Dry			
18	9	W. E. Stanley..... W. W. Johnston No. 1.....	115 ft. W. of E. road..... 4,180 ft. N. of S. road	1938	680	400	"			Dry	.....	93	Fresh water at 87 ft. Salt water at 331 ft.
19	9	Vogel No. 1.....	200 ft. N. of S. line..... 2,700 ft. W. of E. line	1932	672	450	"	.....	.....	Dry	.....	76	Fresh water at 74 ft. Salt water at 430 ft.
27	9	Lambton Oil and Gas Syndicate.	50 ft. S. of N. line..... 1,000 ft. E. of W. line	1932	671	415	"	.....	.....	Dry	.....	58	Fresh water at 60 ft.
27	9	Lambton Oil and Gas Syndicate.	100 ft. N. of S. line..... 1,500 ft. E. of W. line	.....	.....	.....	.....	.....	.....	Dry	.....	.....	
28	9	Lambton Oil and Gas Syndicate.	SW. Corner.....	1932	667	308	"	297	"	Dry	.....	68	Show of oil at 297 ft.

28	9	Lambton Oil and Gas Syndicate.	900 ft. N. of S. line..... 800 ft. E. of W. line	1932	672	350	"	.....	.....	Dry	.....	62	Fresh water at 64 ft. Small show of gas at 142, 170, and 300 ft.
33	9	.....	SW. Corner.....	.....	.....	.....	.....	.....	.....	Dry	.....	.....	
18	10	G. E. and D. E. Willits..... A. Shepherd No. 1.....	3,000 ft. S. of N. road..... 50 ft. W. of E. road	1937	680	472	"	.....	.....	Dry	.....	108	Fresh water at 40 ft. Salt water at 446 ft.
19	10	Vogel No. 2.....	100 ft. S. of N. line..... 2,000 ft. W. of E. line	1932	678	468	"	.....	.....	Dry	.....	98	Water at 420 ft.
25	10	G. E. Willits.....	NE. Corner.....	1929	692	406	"	.....	.....	Dry	.....	107	
26	10	Union Gas Co. of Canada, Ltd.	50 ft. N. of S. line..... 50 ft. W. of Centre line	1931	683	1,900	"	450	"	25 Mcf.	.....	70	Sulphur water at 310, 450, and 515 ft.
26	10	G. E. Willits.....	50 ft. N. of S. line..... 100 ft. E. of Centre line	1929	683	428	"	.....	.....	Dry	.....	79	
23	11	.....	500 ft. S. of N. line..... 1,300 ft. W. of E. line	.....	.....	.....	.....	.....	.....	Dry	.....	.....	

Wells in Warwick Township, Lambton County

18	IN	A. McKercher..... James Perry No. 1.....	80 ft. N. of No. 7 highway 1,400 ft. W. of E. road	1939	760	500	Kettle Point	.....	.....	Dry	.....	60	Fresh water at 55 ft., rose 25 ft.
2	1S	Canadian Dutch Oil Co.....	3,750 ft. S. of N. road..... 100 ft. E. of W. line	1923	719	595	"	560	Onondaga	.....	.....	.....	
6	1S	Canadian Dutch Oil Co.....	600 ft. S. of N. road..... 400 ft. E. of W. line	.....	728	538	"	.....	.....	Dry	.....	.....	
7	2S	Shillen.....	.....	1890	.....	440	"	.....	.....	.....	.....	.....	
8	2S	Shillen.....	900 ft. N. of S. road..... 100 ft. E. of W. line	.....	683	504	"	.....	.....	Dry	.....	.....	Show of oil.
10	2S	Wm. L. Forrest..... B. Law No. 2.....	4,000 ft. N. of S. road..... 700 ft. E. of W. road	1939	720	516	Hamilton	.....	.....	Dry	.....	37	Fresh water at 35 ft., rose 25 ft.
10	2S	Dolan Estate No. 1.....	3,500 ft. N. of S. road..... 200 ft. E. of W. road	1939	718	1,130	"	.....	.....	Dry	.....	48	Fresh water at 46 ft. Black water at 275 ft. Hole abandoned; plugged at 515 ft.
20	2S	Wynn.....	SE. Corner.....	.....	797	665	Kettle Point	.....	.....	Dry	.....	.....	
30	2S	Empire Gas and Oil Co., Ltd... F. Westgate No. 1.....	190 ft. E. of W. line..... 190 ft. N. of S. road	1939	792	508	"	.....	.....	Dry	.....	90	Fresh water at 120 ft., rose 100 ft. Salt water at 508 ft., rose 208 ft.

Wells in Warwick Township, Lambton County—Continued

Lot	Con.	Designation	Location	Year drilled	Altitude in feet above sea-level	Depth in feet	Bedrock formation	Producing depth in feet	Producing formation	Yield Mcf. or bbls.	Pressure in lbs. a sq. in.	Thickness of drift in feet	Remarks
30	2S	F. Westgate No. 2	790 ft. E. of W. line 130 ft. N. of S. road	1939	790	474	Kettle Point	.....	.....	Dry	.....	88	Fresh water at 115 ft., rose 15 ft. Salt water at 468 ft., rose 400 ft.
19	2N	W. Newcombe I. Lucas No. 1	890 ft. E. of W. road 2,440 ft. S. of N. road	1937	790	542	.....	.....	.....	Dry	.....	84	Fresh water at 81 to 84 ft. Black water at 540 ft.
19	2N	B. Wilson	NE. Corner	1934	781	535	Hamilton	.....	.....	Dry	.....	84	
17	3N	B. Wilson	SW. Corner	1935	756	512	"	.....	.....	Dry	.....	56	Show of oil.
23	3N	B. Wilson	100 ft. N. of S. road 900 ft. W. of E. line	1935	775	500	"	.....	.....	Dry	.....	67	
6	3S	Warwick Salt Company	200 ft. S. of N. road 1,000 ft. E. of W. line	1935	700	1,320	.....	.....	.....	.....	.....	.....	Salt well.
24	3S	W. B. Schoolcraft Racraft No. 1	1,950 ft. W. of E. road 4,500 ft. N. of No. 22 highway	1939	788	510	Kettle Point	.....	.....	Dry	.....	85	Fresh water at 25 and 93 ft.
7	4S	Welch	2,900 ft. N. of S. road 800 ft. E. of W. line	1927	703	703	"	.....	.....	.....	.....	.....	
19	4S	A. E. Beuhler Bagg and Doyle No. 1	2,130 ft. N. of No. 22 highway 125 ft. E. of No. 22 highway	1939	780	544	"	.....	.....	Dry	.....	90	Fresh water at 75 ft., rose 60 ft. Black water at 530 ft., rose 150 ft.
19	4S	Bagg and Doyle No. 2	700 ft. N. of No. 22 highway 525 ft. E. of No. 22 highway	1939	779	475	"	.....	.....	Dry	.....	88	Fresh water at 110 ft., rose 90 ft.
20	4S	Thos. Westgate No. 1	.....	1938	789	418	.....	.....	.....	Dry	.....	86	Fresh water at 86 ft. Salt water and oil at 408 ft. Show of oil at 367 ft.
21	4S	Hussey and Dale W. Wood No. 1	.....	1938	767	460	.....	.....	.....	.....	.....	90	Fresh water at 80 ft., rose 50 ft.

22	4S	W. Newcombe A. Williamson No. 1	800 ft. N. of No. 22 highway 5,100 ft. W. of E. road	1939	779	451	"	445	Norfolk	5 bbls.		108	Salt water and oil at 410 ft. Small quantity of oil at 410 ft.
22	4S	Von Berg S. Henderson No. 1	50 ft. N. of No. 22 highway 4,700 ft. W. of E. road	1938	778	448	"					90	Fresh water at 90 ft., rose 60 ft. Small quantity of oil at 385 and 420 ft.
22	4S	Lenik-Leja R. Ward No. 1	800 ft. N. of No. 22 highway 4,300 ft. W. of E. road	1939	779	490				Dry		90	Small show of oil at 420 ft.
23	4S	T. Draper W. Redman No. 1	50 ft. N. of No. 22 highway 3,250 ft. W. of E. road	1938	785	509	Hamilton			Dry		98	Fresh water at 105 ft., rose 85 ft.
23	4S	A. E. Gibson J. Westgate No. 1	47 ft. N. of No. 22 highway 2,700 ft. W. of E. road	1938	784	480	"	425	"	25 bbls.		99	Fresh water at 85 ft., rose 60 ft.
24	4S	F. Hambley Mrs. T. Westgate No. 1	90 ft. N. of No. 22 highway 1,875 ft. W. of E. road	1938	786	516	"			Dry		95	Fresh water at 95 ft., rose 60 ft. Sulphur water and oil at 475 ft. Show of oil at 360 to 365 ft.
24	4S	W. B. Schoolcraft A. Cameron No. 1	100 ft. N. of No. 22 highway 375 ft. W. of E. road	1939	790	491	"			Dry		112	Fresh water at 100 ft., rose 80 ft. Black water at 481 ft., rose 200 ft. Show of oil at 427 to 432 ft.
25	4S	F. R. MacIntosh A. S. Cameron No. 1	125 ft. E. of W. road.... 950 ft. N. of No. 22 highway	1938	794	503	"			Dry		120	Fresh water at 105 ft., rose 30 ft. Salt water at 430 ft., rose 39 ft. Salt water at 473 ft., rose 105 ft. Show of oil at 419 and 429 ft.
26	4S	A. Treleaven W. Morgan No. 1	55 ft. N. of No. 22 highway 2,875 ft. W. of E. road 875 ft. W. of E. line	1938	804	506	"			Dry		120	Fresh water at 118 ft., rose 85 ft. Salt water at 491 ft., rose 150 ft.
27	4S	H. Rose G. Pike No. 1	60 ft. N. of No. 22 highway 1,060 ft. W. of E. road	1939	809	495	"			Dry		130	Fresh water at 128 ft. Salt water at 495 ft.

Lot	Con.	Designation	Location	Year drilled	Altitude in feet above sea-level	Depth in feet	Bedrock formation	Producing depth in feet	Producing formation	Yield Mcf. or bbls.	Pressure in lbs. a sq. in.	Thickness of drift in feet	Remarks
27	4S	Bryson and Glabb..... Geo. Gordon No. 1	2,150 ft. N. of No. 22 highway 127 ft. W. of E. road	1939	799	450	Kettle Point	.....	Norfolk	.....	.....	126	Fresh water at 125 ft.; large supply. Salt water at 442 ft.; small supply. Oil at 442 ft.
27	4S	Busby and Ferguson..... R. Chambers No. 1.....	2,450 ft. N. of No. 22 highway 125 ft. W. of E. road	1938	799	527	Hamilton	440	"	30 bbls.	.....	124	Fresh water at 124 ft., rose 60 ft. Salt water and oil at 490 to 495 ft.
28	4S	John O'Neil No. 1.....	50 ft. N. of No. 22 highway 285 ft. E. of W. line	1938	811	528	"	.....	.....	Dry	.....	132	Fresh water at 120 ft. Salt water at 528 ft. Small supply of oil at 466 and 480 ft.
29	4S	H. Rose..... H. Rivers No. 1.....	100 ft. N. of No. 22 highway 2,300 ft. E. of W. road	1938	807	500	"	.....	.....	Dry	.....	125	Fresh water at 120 ft., rose 50 ft. Salt water at 500 ft., rose 100 ft.
17	5S	B. James and Co..... L. Buchner No. 1.....	2,250 ft. W. of E. road.... 500 ft. N. of C.N.R.	1939	770	503	"	.....	.....	Dry	.....	124	Fresh water at 75 ft., rose 55 ft.
17	5S	L. Buchner No. 2.....	1,375 ft. W. of E. road.... 900 ft. N. of C.N.R.	1939	775	500	Kettle Point	.....	.....	Dry	.....	97	Fresh water at 90 ft., rose 60 ft.
21	5S	W. N. Alley..... M. Kadey No. 1.....	2,100 ft. S. of No. 22 highway 7,100 ft. W. of E. road	1938	786	443	"	442	"	2 bbls.	.....	89	Fresh water at 88 ft.
21	5S	M. Kadey No. 2.....	1,850 ft. S. of No. 22 highway 7,150 ft. W. of E. road	1938	784	444	"	.....	"	.....	.....	117	Oil at 382, 439, and 444 ft.
21	5S	J. Perdue..... R. Chambers No. 1.....	1,800 ft. S. of No. 22 highway 6,850 ft. W. of E. road	1939	778	451	"	419	"	75 bbls.	.....	81	Fresh water at 80 ft., rose 40 ft. Small supply gas at 368 ft.
21	5S	J. A. Creed..... Mrs. Chambers No. 2.....	2,100 ft. S. of highway 22. 775 ft. W. of E. line	1940	.....	426	"	415	"	2 bbls.	.....	68	Fresh water at 68 ft. Show of oil at 392 ft.

21	5S	Mrs. Chambers No. 3	2,900 ft. S. of highway 22.. 100 ft. E. of W. line	1940	769	440	"	.....	.....	Dry	.....	75	Fresh water at 95 ft., rose 75 ft.
21	5S	E. Chambers No. 4	1,800 ft. S. of highway 22.. 300 ft. W. of E. line	1940	776	420	"	.....	.....	Dry	.....	72	
22	5S	Hussey, McCluskey, and Berg.. T. Westgate Sr. No. 1	4,750 ft. W. of E. road.... 210 ft. N. of C.N.R.	1938	800	396	"	.....	.....	.....	.....	100	Fresh water at 100 ft., rose 70 ft. Oil at 387 ft.
22	5S	T. Westgate Sr. No. 2	4,850 ft. W. of E. road.... 500 ft. N. of C.N.R.	1939	799	445	Hamilton	372 445	Norfolk	.....	.....	105	Fresh water at 105 ft., rose 95 ft. Oil at 372 and 445 ft.
22	5S	Corey, Hussey, and Bullen..... Mrs. L. Chambers No. 1.....	45 ft. S. of N. road..... 400 ft. E. of W. road	1930	778	465	"	428	"	4 bbls.	.....	94	Fresh water at 100 ft.
22	5S	John Emery..... A. Chambers No. 1.....	500 ft. N. of C.N.R..... 5,200 ft. W. of E. road	1939	795	468	"	432	"	.....	.....	93	Fresh water at 93 ft., rose 50 ft. Gas at 410 ft. Small quantity of oil at 432 ft.
22	5S	A. Chambers No. 2	850 ft. N. of C.N.R..... 5,300 ft. W. of E. road	1939	789	463	Kettle Point	.....	.....	Dry	.....	92	Fresh water at 80 ft., rose 60 ft. Salt water at 443 ft., rose 130 ft. Shows of oil at 385, 443 ft.
22	5S	Hussey, McCluskey, and Berg.. T. Westgate Sr. No. 3	5,000 ft. W. of E. road..... 800 ft. N. of C.N.R.	1939	.....	425	Hamilton	420	Norfolk..	.....	.....	108	Water at 105 ft.
23	5S	H. H. Heinig..... John Westgate No. 1.....	100 ft. N. of C.N.R..... 3,700 ft. W. of E. road	1939	801	497	Kettle Point	.....	.....	Dry	.....	99	Salt water at 497 ft.
23	5S	D. Durand..... Thos. Westgate No. 1	2,625 ft. W. of E. road.... 1,050 ft. N. of C.N.R.	1938	799	470	Hamilton	442	Norfolk	1 bbl.	.....	108	Fresh water at 100 ft., rose 70 ft. Salt water at 300 ft., rose 20 ft. Shows of oil at 367, 380, and 405 ft.
23	5S	Thos. Westgate No. 2.....	1,480 ft. N. of C.N.R..... 2,625 ft. W. of E. road	1938	795	480	"	404 434	"	8 bbls.	.....	113	Fresh water at 100 ft., rose 60 ft. Salt water at 305 ft., rose 30 ft.
23	5S	T. W. Cooper..... L. McLean No. 1.....	46 ft. N. of C.N.R..... 2,125 ft. W. of E. road....	1938	805	500	"	385 423 497	"	.....	.....	120	Fresh water at 107 ft., rose 37 ft.
23	5S	H. H. Heinig..... John Westgate No. 2.....	700 ft. N. of C.N R..... 3,900 ft. W. of E. road	1939	796	460	"	365	Hamilton	.....	.....	95	Fresh water at 100 ft., rose 85 ft. Small flow of oil at 365 ft.

Wells in Warwick Township, Lambton County—Continued

Lot	Con.	Designation	Location	Year drilled	Altitude in feet above sea-level	Depth in feet	Bedrock formation	Producing depth in feet	Producing formation	Yield Mcf. or bbls.	Pressure in lbs. a sq. in.	Thickness of drift in feet	Remarks
24	5S	W. B. Schoolcraft..... E. Acheson No. 1.....	75 ft. N. of C.N.R..... 1,325 ft. W. of E. road	1939	804	451	Kettle Point	382	Hamilton	.....	.....	105	Producing oil well.
24	5S	E. Acheson No. 2.....	860 ft. E. of W. line..... 429 ft. N. of C.N.R.	1939	800	403	"	377	Norfolk	20 bbls.	.....	102	Fresh water at 112 ft., rose 50 ft. Black water at 310 ft., rose 100 ft.
24	5S	Thos. Westgate No. 1.....	75 ft. N. of C.N.R..... 865 ft. W. of E. road	1939	802	473	"	381	"	5 bbls.	.....	103	Fresh water at 103 ft., rose 63 ft.
24	5S	Thos. Westgate No. 2.....	75 ft. N. of C.N.R..... 370 ft. W. of E. road	1939	803	430	"	361 391	"	.....	.....	116	Oil at 361 to 365 and 391 to 394 ft. Producing oil well.
24	5S	Thos. Westgate No. 3.....	440 ft. N. of C.N.R..... 635 ft. W. of E. road	1939	802	450	"	393	"	.....	.....	100	Fresh water at 101 ft., rose 61 ft. Oil at 393 ft.
24	5S	Thos. Westgate No. 4.....	450 ft. N. of C.N.R..... 125 ft. W. of E. road	1939	801	465	"	.....	.....	Dry	.....	110	Fresh water at 122 ft.
24	5S	Thos. Westgate No. 5.....	825 ft. N. of C.N.R..... 375 ft. W. of E. road	1939	799	460	"	.....	.....	Dry	.....	105	Fresh water at 105 ft., rose 75 ft.
24	5S	Mrs. Atcheson No. 3.....	.....	1940	.....	465	"	.....	.....	.....	.....	106	Fresh water at 105 to to 112 ft. Salt water and oil at 380 ft. Salt water and oil at 462 ft.
25	5S	Wilson and Sullivan..... Misses Pike No. 1.....	75 ft. N. of C.N.R..... 1,125 ft. E. of W. road	1938	805	370	"	.....	.....	.....	.....	108	Fresh water at 105 ft., rose 50 ft. Oil at 370 ft.
25	5S	Misses Pike No. 2.....	74 ft. N. of C.N.R..... 1,555 ft. E. of W. road	1939	805	469	"	423	"	5 bbls.	.....	118	Fresh water at 130 ft., rose 105 ft.
25	5S	D. Durand..... Thos. Westgate Jr. No. 1....	50 ft. S. of C.N.R..... 125 ft. E. of W. road	1939	805	466	"	360	"	.....	.....	115	Fresh water at 130 ft. Salt water at 310 ft. Show of oil at 370 ft.

25	5S	Wilson and Sullivan..... Thos Westgate Jr. No. 2.....	525 ft. N. of C.N.R..... 850 ft. E. of W. road	1939	801	469	"	.....	.....	Dry	.....	113	Fresh water at 112 ft., rose 100 ft. Salt water with oil at 424 ft.
25	5S	Thos. Westgate Jr. No. 3....	1,550 ft. S. of highway 22. 620 ft. E. of W. line	1940	.....	475	"	.....	.....	Dry	.....	108	Fresh water at 108 ft., rose 70 ft. Salt water at 470 ft.
26	5S	J. Von Berg..... L. Estabrook No. 6.....	350 ft. N. of C.N.R..... 2,675 ft. E. of W. road	1939	807	485	"	.....	.....	Dry	.....	124	Fresh water at 130 ft., rose 60 ft. Salt water with oil at 445 ft.
26	5S	Wilson and Sullivan..... A. Morgan No. 1.....	2,125 ft. W. of E. road..... 2,400 ft. S. of No. 22 highway	1939	804	450	"	422	"	13 bbls.	.....	118	Fresh water at 130 ft., rose 50 ft. Show of oil at 392 ft.
26	5S	L. Marley No. 1.....	2,600 ft. W. of E. road.... 50 ft. N. of C.N.R.	1938	809	458	"	.....	.....	Dry	.....	130	Fresh water at 122 ft., rose 40 ft. Shows of oil at 378 and 390 ft.
26	5S	T. Draper..... L. Marley No. 2.....	630 ft. N. of C.N.R..... 2,850 ft. W. of E. road	1939	804	452	"	.....	.....	Dry	.....	121	Fresh water at 125 ft., rose 95 ft. Fresh water at 150 ft., rose 120 ft.
26	5S	L. Marley No. 3.....	2,550 ft. W. of E. road.... 70 ft. N. of C.N.R.	1939	810	450	"	390	"	1 bbl.	.....	127	Fresh water at 120 ft., rose 80 ft. Show of oil at 380 ft.
26	5S	Von Berg..... L. Estabrook No. 1.....	74 ft. N. of C.N.R..... 3,350 ft. W. of E. road	1938	806	445	"	368 440	"	.....	.....	140	Fresh water at 100 ft., small supply.
26	5S	L. Estabrook No. 2.....	2,575 ft. S. of No. 22 highway 3,140 ft. W. of E. road	1938	803	442	"	364	"	10 bbls.	.....	135	Fresh water at 125 ft. Salty water at 190 ft.
26	5S	Wilson and Sullivan..... L. Estabrook No. 3.....	75 ft. N. of C.N.R..... 3,875 ft. W. of E. road	1938	806	469	"	371	"	20 bbls.	.....	119	Fresh water at 114 ft., rises 90 ft. 20 bbls. of oil during first hour.
26	5S	Von Berg..... L. Estabrook No. 4.....	3,050 ft. S. of No. 22 highway 3,380 ft. W. of E. road	1938	802	370	"	340 360	"	25 bbls.	.....	117	Fresh water at 22 ft.
26	5S	J. Von Berg..... L. Estabrook No. 5.....	600 ft. N. of C.N.R..... 3,200 ft. W. of E. road	1939	.....	480	"	.....	.....	Dry	.....	130	Fresh water at 130 ft., rose 60 ft. Salt water at 450 ft., small supply. Small quantity oil at 437 ft.

Wells in Warwick Township, Lambton County—Continued

Lot	Con.	Designation	Location	Year drilled	Altitude in feet above sea-level	Depth in feet	Bedrock formation	Producing depth in feet	Producing formation	Yield Mcf. or bbls.	Pressure in lbs. a sq. in.	Thickness of drift in feet	Remarks
26	5S	A. A. Heal A. Morgan No. 2	2,250 ft. S. of N. road 2,100 ft. W. of E. road	1939	805	450	Hamilton	.....	.....	Dry	.....	120	Fresh water at 130 ft., rose 100 ft. Salt water at 423 ft., rose 40 ft. Trace of oil at 423 ft.
26	5S	Wilson and Sullivan L. Eastabrook No. 7	575 ft. N. of C.N.R. 125 ft. E. of W. line	1939	.....	461	"	.....	.....	Dry	.....	118	
26	5S	L. Eastabrook No. 8	1,600 ft. S. of highway 22. 241 ft. E. of W. line	1940	796	385	"	376	Norfolk	25 bbls.	.....	110	Fresh water at 108 ft., rose 20 ft.
27	5S	A. A. Heal S. Burchell No. 5	1,600 ft. S. of No. 22 highway 1,100 ft. W. of E. road	1939	810	394	"	383	"	30 bbls.	.....	121	Fresh water at 151 ft., rose 120 ft. Show of oil at 379 ft.
27	5S	J. Von Berg *et al* John O'Neil No. 1	2,250 ft. S. of No. 22 highway 400 ft. W. of E. road	1939	817	531	"	.....	.....	Dry	.....	129	Fresh water at 129 ft., rose 69 ft. Sulphur water at 498 ft Water and oil at 528 ft.
27	5S	John O'Neil No. 2	2,200 ft. S. of No. 22 highway 50 ft. W. of E. road	1939	815	500	"	.....	.....	Dry	.....	133	Fresh water at 131 ft., rose 80 ft. Salt water at 490 ft., rose 50 ft.
27	5S	Burchell and Heal S. Burchell No. 1	2,800 ft. S. of No. 22 highway 1,325 ft. W. of E. road	1938	808	376	"	375	"	100 bbls.	.....	122	Fresh water at 120 ft., rose 80 ft.
27	5S	S. Burchell No. 2	2,250 ft. S. of No. 22 highway 1,250 ft. W. of E. road	1938	807	382	"	374	"	35 bbls.	.....	122	Fresh water at 122 ft., rose 78 ft. Sulphur water at 320 ft.
27	5S	S. Burchell No. 3	3,400 ft. S. of No. 22 highway 1,830 ft. W. of E. road	1939	812	495	"	.....	.....	Dry	.....	126	Fresh water at 152 ft., rose 110 ft. Salty water at 478 ft., rose 150 ft.
27	5S	S. Burchell No. 4	2,750 ft. S. of No. 22 highway 1,850 ft. W. of E. road	1939	805	490	"	393 408 420 429	"	.....	.....	137	Salty water at 429 ft., rose 120 ft. 1 bbl. a day of oil after shooting between 396 and 410 ft.

27	5S	S. Burchell No. 6	750 ft. W. of E. road 1,625 ft. S. of No. 22 highway	1939	810	449	"	435	"			131	Show of gas at 386 and 410 ft. Fresh water at 135 ft.
27	5S	A. A. Heal S. Burchell No. 8	3,440 ft. S. of N. line 825 ft. E. of W. line	1940	804	470	"			Dry		133	Fresh water at 131 ft., rose 60 ft. Salt water at 460 ft., rose 400 ft.
27	5S	S. Burchell No. 9	125 ft. E. of W. line 1,600 ft. S. of N. line	1940	809	440	"	425	"	2 bbls.		127	Fresh water at 120 ft., rose 80 ft.
27	5S	S. Burchell No. 7	690 ft. S. of N. line 1,025 ft. E. of W. line	1940	810	470	"			Dry		135	Fresh water at 122 ft., rose 35 ft. Salt water at 439 ft., rose 380 ft. Little oil at 439 ft.
28	5S	J. W. G. Winnett A. Westgate No. 1		1938	807	486	"	435	"	10 bbls.		124	Fresh water at 124 ft., rose 75 ft.
28	5S	E. Shaw and C. Smith E. Shaw No. 1	150 ft. E. of W. road 1,750 ft. S. of No. 22 highway	1938	808	470	"					123	Fresh water at 30 ft., rose 20 ft. Fresh water at 70 ft. Fresh water at 118 ft., rose 63 ft.
28	5S	E. Shaw No. 2	150 ft. E. of W. road 1,000 ft. N. of C.N.R.	1939	822	490	"			Dry		143	Fresh water at 40 ft., rose 20 ft. Fresh water at 80 ft., rose 55 ft. Fresh water at 128 ft., rose 65 ft.
28	5S	J. W. G. Winnett	100 ft. N. of C.N.R.	1938	791	458	"	355	"	5 to 10 bbls.		104	Fresh water at 108 ft.
		A. Westgate No. 2	1,400 ft. E. of W. road					425					Salt water at 458 ft.
30	5S	D. Banks H. Ball No. 1	1,000 ft. W. of E. road 80 ft. N. of C.N.R.	1939	784	470	"			Dry		105	Black water at 470 ft.
30	5S	D. Brush No. 1	2,100 ft. S. of No. 22 highway 500 ft. W. of E. road	1938	786	510	"			Dry		109	Fresh water at 90 ft., rose 20 ft. Salt water at 443 ft., rose 200 ft.
30	5S	A. Brush No. 2	2,000 ft. S. of No. 22 highway 500 ft. W. of E. road	1939	785	604	"			Dry		108	Fresh water at 80 ft. Salt water at 452 ft.
30	5S	A. Brush No. 3	50 ft. W. of E. road 150 ft. N. of C.N.R.	1939	772	402	"	360 400	"	100 bbls.		99	Fresh water at 25 ft., rose 23 ft. Fresh water at 160 ft., rose 158 ft.

Wells in Warwick Township, Lambton County—Continued

Lot	Con.	Designation	Location	Year drilled	Altitude in feet above sea-level	Depth in feet	Bedrock formation	Producing depth in feet	Producing formation	Yield Mcf. or bbls.	Pressure in lbs. a sq. in.	Thickness of drift in feet	Remarks
30	5S	A. Brush No. 4	400 ft. W. of E. road..... 50 ft. N. of C.N.R.	1939	774	416	Hamilton	358 410	Norfolk	40 bbls.	.....	97	Fresh water at 40 ft., rose 20 ft. Fresh water at 115 ft., rose 90 ft.
30	5S	H. Ball No. 2	225 ft. N. of C.N.R..... 1,150 ft. W. of E. road	1939	772	471	"	.....	.....	Dry	.....	94	Fresh water at 32 ft., rose 12 ft. Fresh water at 80 ft., rose 72 ft. Salt water at 445 ft., rose 30 ft. Black water at 470 ft., rose 150 ft.
30	5S	Jack Perdue A. Brush No. 5	250 ft. W. of E. line..... 500 ft. N. of S. line	1940	783	443	"	356 363	"	32 bbls.	.....	110	Fresh water at 60 ft., rose 20 ft. Fresh water at 170 ft., rose 20 ft.
30	5S	A. Brush No. 6	400 ft. N. of S. line..... 250 ft. W. of E. line	1940	781	475	"	.....	.....	Dry	.....	105	Fresh water at 65 ft., rose 20 ft. Black water at 470 ft., rose 45 ft. Show of oil at 397 ft.
2	6	Demaray and Carruthers	3,700 ft. N. of S. road.... 1,150 ft. E. of W. line	1933	693	540	Kettle Point	52	Kettle Point	Dry	.....	51	Show of gas. Fresh water at 52 ft. Sulphur water at 525 ft. Show of gas at 52 ft.
10	6S	MacIntosh and Cole R. A. Hume No. 1	250 ft. N. of S. road..... 3,650 ft. E. of W. road	1939	756	492	"	.....	.....	Dry	.....	70	Fresh water at 71 ft. Salty water at 423 ft., rose 125 ft.
10	6S	A. D. Snyder R. A. Hume No. 2	200 ft. N. of S. road..... 3,150 ft. E. of W. road	1939	747	488	"	.....	.....	Dry	.....	68	Fresh water at 68 ft., rose 48 ft. Fresh water at 94 ft., rose 74 ft.
19	6S	A. E. McKercher F. W. Short No. 1	1,750 ft. E. of W. road.... 1,100 ft. S. of C.N.R.	1939	788	487	"	.....	.....	Dry	.....	106	Fresh water at 101 ft., rose 50 ft.

20	6S	F. Woodward..... R. A. Hume No. 3	.....	1939	.....	475	"	.....	.....	Dry	.....	73	Show of oil at 393, 408, and 430 ft. Fresh water at 73 ft. Sulphur water at 80 ft.
22	6S	Pitcher, Sober, and Jackson.... Newell No. 1.....	1,625 ft. N. of S. road..... 1,050 ft. E. of W. road	1939	796	492	Hamilton	.....	.....	Dry	.....	110	Fresh water at 118 ft., rose 50 ft. Black water at 487 ft., rose 208 ft.
24	6S	B. Wilson..... A. G. Brown No. 1.....	125 ft. W. of E. road.... 750 ft. S. of C.N.R.	1938	806	477	"	380	Norfolk	3 bbls.	.....	123	Fresh water at 101 ft., rose 40 ft.
24	6S	Leo Wilson..... Brown No. 2.....	940 ft. S. of N. line..... 865 ft. W. of E. line	1940	815	491	"	456	"	5 bbls.	.....	127	Fresh water at 127 ft., rose 100 ft.
25	6S	Wilson and Sullivan..... Ed. Davidson No. 1.....	1,125 ft. E. of W. road.... 1,150 ft. S. of C.N.R.	1939	813	450	"	382	"	10 bbls.	.....	128	Fresh water at 135 ft., rose 100 ft.
25	6S	Ed. Davidson No. 2.....	1,130 ft. E. of W. road.... 1,650 ft. S. of C.N.R.	1939	813	491	"	390	"	1 bbl.	.....	130	Fresh water at 122 ft., rose 100 ft. Salt water at 310 ft., rose 60 ft.
25	6S	Clayton Davidson No. 1.....	1,625 ft. E. of W. road..... 750 ft. S. of C.N.R.	1939	812	490	"	.....	.....	Dry	.....	126	Fresh water at 11, 50, 120, 140 ft. Black water at 489 ft., Show of oil at 393 ft.
25	6S	F. E. McAfee..... A. G. Brown No. 2.....	125 ft. S. of N. line..... 100 ft. E. of W. line	1940	805	462	"	425	"	5 bbls.	.....	117	Fresh water at 115 ft., rose 100 ft. Salt water at 310 ft.
26	6S	D. Durand..... E. Davidson No. 1.....	2,200 ft. W. of E. road.... 675 ft. S. of C.N.R.	1938	805	484	"	.....	.....	Dry	.....	130	Fresh water at 122 ft., rose 100 ft. Salt water at 475 ft., rose 150 ft.
26	6S	F. E. McAfee..... G. Cran No. 1.....	2,620 ft. E. of W. road.... 1,175 ft. S. of C.N.R.	1939	809	480	"	.....	.....	Dry	.....	126	
26	6S	G. Cran No. 2.....	.....	1939	.....	452	"	395 405 445	"	.....	.....	129	Producing oil well. Fresh water at 129 ft.
28	6S	Beattie Bros..... Thos. Woods No. 1.....	1,120 ft. E. of W. road.... 2,900 ft. S. of C.N.R.	1939	766	427	"	.....	.....	Dry	.....	85	Fresh water at 82 ft., rose 50 ft. Small show of oil at 328 to 331 ft.
28	6S	C. Demaray..... L. Foster No. 1.....	60 ft. E. of W. road.... 600 ft. S. of C.N.R.	1939	798	452	"	.....	.....	Dry	.....	112	Salt water at 420 ft. Show of oil at 343 and 420 ft.

Wells in Warwick Township, Lambton County—Concluded

Lot	Con.	Designation	Location	Year drilled	Altitude in feet above sea-level	Depth in feet	Bedrock formation	Producing depth in feet	Producing formation	Yield Mcf. or bbls.	Pressure in lbs. a sq. in.	Thickness of drift in feet	Remarks
29	6S	McGill and Dykes..... A. Cran Estate.....	2,950 ft. S. of C.N.R..... 3,900 ft. E. of W. road	1939	767	408	Hamilton	332 395	Norfolk	Dry	.....	86	Fresh water at 30 ft. rose 30 ft. Salt water at 395 ft., rose 200 ft.
29	6S	Beattie Bros..... Gordon Cran No. 1.....	2,100 ft. E. of W. road.... 2,850 ft. S. of C.N.R.	1939	766	336	"	323	"	25 bbls.	.....	80	Fresh water at 76 to 80 ft., flowing.
29	6S	Lett and Wood..... Geo. A. Westgate No. 2.....	336 ft. E. of W. line..... 66 ft. N. of S. line	1940	777	425	"	.....	.....	.....	.....	80	Shows of oil at 149, 342, and 388 ft.
30	6S	F. A. Stonehouse..... H. O. Watson No. 1.....	300 ft. S. of N. line..... 100 ft. W. of E. line	1940	765	386	"	329	"	.....	.....	105	15 bbls. of oil for 4 days. Fresh water at 27 ft., rose to surface. Fresh water at 105 to 108 ft. Salt water at 384 ft., rose 300 ft.
18	7	H. B. Smith.....	NW. Corner.....	1927	771	501	Kettle Point	225 500	Hamilton Norfolk	55 Mcf. 25 Mcf.	50	105	Black water at 488 ft.

Wells in Adelaide Township, Middlesex County

12	1S	Adelaide Oil Co..... Howard Brock.....	50 ft. S. of N. road..... 1,000 ft. E. of W. line	.....	787	327	Hamilton	.....	.....	Dry	.....	.....	
14	1S	Union Gas Co.....	NE. Corner.....	.....	787	.....	.....	.....	.....	Dry	.....	.....	
14	1S	.....	1,000 ft. S. of N. road..... 500 ft. W. of E. line	.....	791	375	"	.....	.....	Dry	.....	.....	
14	1S	Hunter and Speirs..... C. Branton No. 1.....	1,440 ft. S. of N. line..... 543 ft. E. of W. line	1940	788	413	"	.....	.....	Dry	.....	147	Fresh water at 227 to 241 ft.
14	1N	Kidd and Adams..... G. B. Glenn No. 2.....	2,550 ft. W. of E. road.... 4,430 ft. N. of S. road	1939	780	387	"	.....	.....	Dry	.....	218	Fresh water at 170 ft., rose 100 ft. Salt water at 368 ft.

14	1N	Dexter Oil and Gas Co., Ltd. G. B. Glenn No. 1.		1936		395	"			Dry		105	Fresh water at 60 ft. Salt water at 395 ft.
14	1N	Glenn Syndicate	2,300 ft. N. of S. road 50 ft. E. of W. line		788	836							
14	1N	Adelaide Oil Co	SE. Corner		787	350	"						
14	1N	Adelaide Oil Co	SW. Corner		783	425	"						Water at 350 ft.
14	1N	Adelaide Oil Co. Geo. Glenn	1,400 ft. S. of N. line 400 ft. W. of E. line		787	281	"					130	
15	1S	Geo. Glenn	NW. Corner		788	301	"			Dry		110	
15	1S	Independent Oil Co. H. Parker	500 ft. S. of N. road 350 ft. E. of W. line		789	350				Dry			
15	1N	Independent Oil Co	1,000 ft. N. of S. road 650 ft. W. of E. line		784	340				Dry			
19	1N	Independent Oil Co	SW. Corner		812	372				Dry			Water at 372 ft.
15	2N	Pennington well	150 ft. N. of S. line 1,000 ft. W. of E. line		784	314		308	Norfolk	Dry			
7	3N		SW. Corner	1923	767	296	"			Dry		160	
1	4N		1,000 ft. N. of S. road 50 ft. E. of W. line	1923	802	372	"			Dry		142	
3	4S	D. Banks F. Richardson No. 1	1,180 ft. W. of E. road 165 ft. N. of S. road	1938	758	476	"	373	"	10 bbls.		85	Fresh water at 80 ft., rose 50 ft. Salt water with oil at 367 to 373 ft.
4	4S	Douglas and Hawkins W. Hawkins	3,950 ft. S. of N. road 25 ft. E. of W. road	1939	750	425	"			Dry		100	Fresh water at 180 ft.
10	4N		SW. Corner	1923	734	552	"			Dry		175	
1	5S	Jackson and Cann J. Estabrook No. 1	50 ft. E. of W. road 150 ft. S. of C.N.R.	1939	765	394	"	357 390	"	100 bbls.		102	Fresh water at 98 ft., rose 78 ft. Show of sulphur gas at 340 ft.
1	5S	Cameron and Lett R. Waltham No. 1.	1,500 ft. E. of W. road 1,325 ft. N. of C.N.R.	1938	768	450	"	340 385	"	5 bbls.		85	Fresh water at 85 ft., rose 84 ft.
1	5S	R. Waltham No. 2	1,080 ft. E. of W. road 125 ft. S. of C.N.R.	1939	765	384	"			Dry		100	Fresh water at 80 ft. Salt water at 384 ft.
1	5S	A. L. Lertzman Mrs. Newton No. 1	100 ft. N. of C.N.R. 625 ft. E. of W. road	1939	764	390	"	360 390	"			110	Producing oil well. Fresh water at 100 ft. Salt water with oil at 390 ft.

Wells in Adelaide Township, Middlesex County—Concluded

Lot	Con.	Designation	Location	Year drilled	Altitude in feet above sea-level	Depth in feet	Bedrock formation	Producing depth in feet	Producing formation	Yield Mcf. or bbls.	Pressure in lbs. a sq. in.	Thickness of drift in feet	Remarks
1	5S	Jackson and Cann..... J. Eastabrook No. 2	.....	1939	.....	401	Hamilton	401	Norfolk	.....	.....	100	Producing oil well. Fresh water at 40, 80, and 102 ft. Sulphur water at 328, 345, and 382 ft.
1	5S	J. Eastabrook No. 3.....	.....	1939	.....	398	"	385	"	.....	.....	96	Producing oil well. Fresh water at 50 and 97 ft.
1	5S	A. L. Lertzman..... W. Harris No. 1.....	.....	1939	.....	394	"	339 394	"	.....	.....	97	Small producing oil well. Fresh water at 95 ft.
1	5S	W. Harris No. 2.....	.....	1939	.....	397	"	397	"	.....	.....	109	Small producing oil well. Fresh water at 43 and 84 ft.
1	5S	W. Harris No. 3.....	.....	1939	.....	425	"	345	"	1 bbl.	.....	95	Small producing oil well. Fresh water at 45 ft.
1	5S	Mrs. Newton No. 2.....	.....	1939	.....	390	"	360 387	"	69 bbls.	.....	120	Producing oil well. Fresh water at 100 ft.
1	5S	Mrs. Newton No. 3.....	125 ft. W. of E. line..... 25 ft. N. of C.N.R.	1939	.....	397	"	360 393	"	.....	.....	112	Small producing oil well. Fresh water at 100 ft. Salt water at 393 ft.
1	5S	Jack Perdue..... J. Eastbrook No. 4	50 ft. S. of C.N.R..... 450 ft. E. of W. line	1940	762	390	"	.....	.....	Dry	.....	105	Fresh water at 53 ft. Sulphur water at 112 ft. Show of oil at 385 ft.
1	5S	Otterville Gas Co..... C. Waltham	.....	1940	.....	384	"	384	"	2 bbls.	.....	102	Fresh water at 115 ft. Show of oil at 333 ft.
3	5S	A. L. Lertzman..... G. Carrol No. 1.....	800 ft. N. of railroad.... 300 ft. W. of E. line	1939	751	450	"	.....	.....	Dry	.....	135	Fresh water at 286 ft.
3	5S	H. Early No. 1.....	.....	1939	.....	467	"	.....	.....	Dry	.....	85	Fresh water at 80 and 95 ft.

6	5N	.....	SE. Corner.....	.....	723	.....	.....	.....	.....	.....	.....	.....		
7	5N	Geo. Willits.....	NW. Corner.....	.....	760	261	"	.....	.....	Dry	.....	182		
7	5N	Geo. King.....	SW. Corner.....	1921	720	358	"	258 300	Norfolk	.....	.....	142		
7	5N	Geo. King.....	350 ft. N. of S. road..... 1,000 ft. E. of W. line	1921	722	271	"	209 245	"	Dry		145	Show of gas.	
7	5N	Geo. King.....	400 ft. N. of S. road..... 200 ft. E. of W. line	1921	730	277	"	.....	.....	Dry	.....	155	Show of gas.	
8	5S	T. Draper..... Mrs. Galbraith No. 1	4,975 ft. N. of S. road..... 2,575 ft. E. of W. road	1939	747	425	"	.....	.....	Dry	.....	130	Fresh water at 110 ft., rose 80 ft. Salt water at 370 ft., rose 200 ft.	

Wells in Caradoc Township, Middlesex County

1	2	Union Test No. 12 E.....	NW. Corner.....	1931	733	325	Hamilton	.....	.....	.....	.....	195		
2	2	.....	NW. Corner.....	.....	740	.....	.....	.....	.....	Dry	.....	.....		
4	4	Union Test No. 15 E.....	NE. Corner.....	1931	754	331	"	.....	.....	.....	.....	227		
12	4	Union Test No. 27 E.....	SW. Corner.....	1931	782	320	"	.....	.....	.....	.....	188		
18	4	Union Test No. 35 E.....	SW. Corner.....	1931	813	321	"	.....	.....	.....	.....	197	Fresh water at 185 ft.	
1	6	Union Test No. 23 E.....	SE. Corner.....	1931	728	307	"	.....	.....	.....	.....	192	Fresh water at 182 ft.	
5	6	Union Test No. 18 E.....	NW. Corner.....	1931	731	327	"	.....	.....	.....	.....	212	Fresh water at 207 ft.	
8	6	Union Test No. 19 E.....	SE. Corner.....	1931	785	340	"	.....	.....	.....	.....	293	Fresh water at 150 ft.	
10	6	Union Gas Co. of Canada, Ltd.	60 ft. N. of S. road..... 1,000 ft. E. of W. line	1931	778	1,905	"	.....	.....	Dry	.....	210	Sulphur water at 406 ft. Salt water at 1,580 ft. and 1,715 to 1,720 ft.	
11	6	Union Test No. 21 E.....	SE. Corner.....	1931	763	296	"	.....	.....	.....	.....	191	Fresh water at 168 ft.	
17	6	Union Test No. 31 E.....	SW. Corner.....	1931	786	293	"	.....	.....	.....	.....	224	Fresh water at 80 ft.	
9	7	Union Test No. 25 E.....	NE. Corner.....	1931	764	308	"	.....	.....	.....	.....	235		
14	7	Union Test No. 29 E.....	SE. Corner.....	1931	783	298	"	.....	.....	.....	.....	222	Fresh water at 160 ft.	
19	7	Union Test No. 33 E.....	SW. Corner.....	1931	799	305	"	.....	.....	.....	.....	225		
21	R.1.S.	.....	NE. Corner.....	1918	682	328	"	.....	.....	.....	.....	104		

Wells in Caradoc Township, Middlesex County—Concluded

Lot	Con.	Designation	Location	Year drilled	Altitude in feet above sea-level	Depth in feet	Bedrock formation	Producing depth in feet	Producing formation	Yield Mcf. or bbls.	Pressure in lbs. a sq. in.	Thickness of drift in feet	Remarks
21	R.1.N.	.....	300 ft. N. of S. road..... 700 ft. W. of E. line	1918	694	364	Hamilton	135	Hamilton	.....	.....	113	Gas reported.
22	R.1.N.	.....	2,200 ft. N. of S. road..... 1,200 ft. E. of W. line	1918	758	620	"	295	Norfolk	.....	.....	213	Gas and oil reported.
22	R.1.N.	.....	2,900 ft. N. of S. road..... 350 ft. E. of W. line	1918	757	470	"	.....	.....	Dry	.....	215	
22	R.1.N.	.....	1,250 ft. N. of S. road..... 500 ft. E. of W. line	1918	689	235	"	186 221	Hamilton Norfolk	.....	.....	120	Oil reported.
22	R.1.N.	.....	200 ft. N. of S. road..... 1,000 ft. W. of E. line	1918	685	200	"	.....	.....	Dry	.....	105	
22	R.1.N.	.....	SW. Corner.....	1918	684	400	"	175 135	" Hamilton	.....	.....	100	Oil reported at 175 ft. Gas reported at 135 ft.
22	R.1.N.	.....	SW. Corner.....	1918	680	176	"	135 168	" Norfolk	.....	.....	105	Oil reported at 168 ft. Gas reported at 135 ft.
22	R.1.N.	.....	.....	1918	680	330	"	165	.....	.....	.....	111	Oil reported at 165 ft.
23	R.1.N.	.....	850 ft. N. of S. road..... 100 ft. E. of W. line	.....	699	2,620	Norfolk	.....	.....	.....	.....	170	
23	R.4.S.	Gillies No. 21.....	SE. Corner.....	.....	703	1,485	Hamilton	.....	.....	Dry	.....	80	Show of gas at 180 ft. and 1,250 ft. Fresh water at 80 ft. Salt water at 1,385 ft.

Wells in Delaware Township, Middlesex County

10	2	Union Gas Co. of Canada, Ltd. F. Poole No. 1.....	60 ft. N. of S. road..... 70 ft. E. of W. road	1938	761	1,303	Norfolk	.....	.....	Dry	.....	192	Fresh water at 153 ft. Sulphur water at 730 ft. Salt water at 1,295 ft.

20	2	Bruce and Jones No. 1	50 ft. W. of E. road.... 50 ft. N. of S. line	1939	786	1,819	"			Dry		250	Show of gas at 1,320 ft. Fresh water at 190 ft. Sulphur water at 295 ft. Salt water at 1,320 ft.
19	3	J. Parsons	100 ft. S. of N. line..... 1,700 ft. W. of E. line	.....	795	282							
2	D	Symms and Wilson	SE. Corner	1918	692					Dry			
3	D	Symms and Wilson	1,000 ft. S. of N. line..... 350 ft. W. of E. line	1918	693	1,200	Hamilton			Dry		130	Fresh water at 130 ft. Sulphur water at 182 ft. Salt water at 1,194 to 1,200 ft. Gas at 1,082 ft. Show of oil from 1,150 to 1,194 ft.
3	D	Symms and Wilson	300 ft. S. of N. line..... 1,900 ft. W. of E. line	1918	689					Dry			
5	D	Acres	650 ft. N. of S. line..... 1,900 ft. W. of E. line	.....	687	1,133	Norfolk?					92	
5	D		100 ft. N. of S. line..... 1,350 ft. W. of E. line	.....	722	1,200		1,100 1,175	Salina Guelph			131	Gas at 1,100 ft. Show of gas and oil at 1,175 ft.
7	D	Osborne	500 ft. S. of N. line..... 3,500 ft. W. of E. line	.....	686	1,165				Dry		60	Sulphur water at 172 and 700 ft. Some gas at 1,136 to 1,150 ft. Show of oil at 172 ft.

Wells in Dorchester North Township, Middlesex County

1	1	Dominion Natural Gas Co..... G. Huntly No. 1		1940	.....	923	Norfolk..			Dry		162	Fresh water at 163 ft., rose 50 ft. Salt water at 923 ft., rose 300 ft.
3	1	Progressive Gas and Oil Co....	NE. Corner	.....	922	1,050	"			Dry		139	
4	1	Progressive Gas and Oil Co....	50 ft. S. of N. road..... 1,000 ft. W. of E. line	1915	905	1,065	"	930	Guelph	290 Mcf.	200	125	Show of oil in the Guelph.
4	1	Progressive Gas and Oil Co....	800 ft. S. of N. road..... 500 ft. W. of E. line	1920	895	1,103	"			Dry			
4	1	Progressive Gas and Oil Co....	900 ft. S. of N. road..... 850 ft. W. of E. line	1920	895	1,012	"			Dry		101	

Wells in Dorchester North Township, Middlesex County—Concluded

Lot	Con.	Designation	Location	Year drilled	Altitude in feet above sea-level	Depth in feet	Bedrock formation	Producing depth in feet	Producing formation	Yield Mcf. or bbls.	Pressure in lbs. a sq. in.	Thickness of drift in feet	Remarks
4	1	Progressive Gas and Oil Co....	600 ft. S. of N. road.... 900 ft. W. of E. line	1920	900	990	Norfolk	955	Guelph	250 Mcf.	200	121	
4	1	Progressive Gas and Oil Co....	500 ft. S. of N. road .... 1,000 ft. W. of E. line	1921	903	1,005	"	.....	"	237 Mcf.	160	125	
4	1	Progressive Gas and Oil Co....	.....	1923	.....	1,030	"	.....	.....	.....	.....	110	
4	1	.....	.....	1916	.....	1,050	"	.....	"	500 Mcf.	.....	120	Fresh water at 30 to 40 ft. and 78 to 80 ft.
16	2N	Dominion Natural Gas Co..... M.E. St. Clair No. 1	.....	1941	.....	1,061	"	.....	.....	Dry	.....	93	Fresh water at 129 ft., rose 35 ft. Sulphur water at 425 ft., rose 385 ft.
1	B	Dominion Natural Gas Co..... G. Hutchinson No. 1.....	1,500 ft. N. of S. line..... 75 ft. W. of E. line	1940	911	865	"	.....	.....	Dry	.....	120	Fresh water at 130 ft., rose 110 ft. Sulphur water at 180 ft. Salt water at 858 ft., rose 758 ft.
24	B	D. Connors..... W. Knott No. 1.....	1,350 ft. E. of W. road.... 3,700 ft. N. of S. road	1937	890	1,483	"	.....	.....	Dry.....	.....	130	Fresh water at 134 ft., rose 25 ft. Sulphur water at 490 ft.
24	R1	J. H. Gaul..... H. Anderson No. 1	NW. Corner.....	1935	894	1,405	"	.....	.....	Dry	.....	158	Show of gas at 1,055 and 1,102 ft. Fresh water at 30 and 200 ft. Sulphur water at 680 ft.

Wells in Ekfrid Township, Middlesex County

3	1N	Union Gas Co. Test 13 E.....	NW. Corner.....	1931	736	318	Hamilton	.....	.....	Dry	.....	265	Fresh water at 185 ft.
18	1N	F. J. Carman.....	650 ft. S. of N. road..... 1,000 ft. W. of E. line	.....	730	385	.....	.....	.....	.....	.....	.....	

7	2N	Union Gas Co. Test 16 E	SE. Corner	1931	735	347	"	.....	.....	Dry	.....	220	Fresh water at 168 ft., rose 148 ft.
22	2N	F. J. Carman	SE. Corner	.....	723	.....	.....	.....	.....	Dry	.....	.....	
9	3N	Union Gas Co. Test 8 E	NW. Corner	1931	742	388	.....	.....	.....	Dry	.....	190	Fresh water at 178 ft.
13	3N	Union Gas Co. No. 3	NE. Corner	1931	735	1,772	"	365	.....	Dry	.....	130	Show of oil at 365 ft. Fresh water at 125 ft. Sulphur water at 390 and 415 ft. Salt water at 1,600, 1,750, and 1,770 ft.
15	3N	Union Gas Co. Test 6 E	NW. Corner	1931	733	450	"	.....	.....	Dry	.....	148	Fresh water at 128 ft.
1	4N	F. W. Kehlet McArthur No. 1	SE. Corner	1934	722	393	"	.....	.....	Dry	.....	193	Fresh water at 170 ft. Salt water at 388 ft.
1	4N	Union Gas Co. Test 11 E	SE. Corner	1931	722	313	"	.....	.....	Dry	.....	180	Fresh water at 178 ft., rose 160 ft.
4	4N	Union Gas Co. Test 10 E	SE. Corner	1931	723	345	"	.....	.....	Dry	.....	160	
7	4N	Union Gas Co. Test 9 E	SE. Corner	1931	732	402	"	.....	.....	Dry	.....	184	Fresh water at 128 ft.
14	4N	Union Gas Co. Test 7 E	SE. Corner	1931	736	387	"	.....	.....	Dry	.....	.....	
10	5N	Harvey No. 6	300 ft. N. of S. road 1,400 ft. W. of E. line	.....	727	180	"	.....	.....	Dry	.....	.....	
7	R.1.N.	F. J. Carman No. 4	NE. Corner	1918	726	341	.....	.....	.....	Dry	.....	.....	
8	R.1.N.	F. J. Carman No. 2	SW. Corner	.....	733	347	"	.....	.....	Dry	.....	205	
9	R.1.N.	F. J. Carman No. 5	NE. Corner	.....	732	360	.....	.....	.....	Dry	.....	185	
17	R.1.N.	E. P. Rowe	600 ft. N. of S. road 900 ft. W. of E. line	1932	720	450	"	.....	.....	Dry	.....	164	
3	R.1.S.	Union Gas Co. Test 2 E	SE. Corner	1931	716	340	"	.....	.....	Dry	.....	185	
3	R.1.S.	F. J. Carman No. 3	NE. Corner	1918	702	310	"	.....	.....	Dry	.....	259	
4	R.1.S.	F. J. Carman No. 1	NW. Corner	.....	689	345	.....	.....	.....	Dry	.....	.....	
10	R.1.S.	Switzer	250 ft. N. of S. line 600 ft. W. of E. line	.....	716	377	"	354	.....	Dry	.....	.....	Show of oil. Salt water at 377 ft.
10	R.1.S.	Union Gas Co. Test 1 E	SW. Corner	1931	709	340	"	.....	.....	Dry	.....	177	Fresh water at 135 ft.
24	R.1.S.	.....	SE. Corner	.....	698	325	.....	.....	.....	Dry	.....	.....	
20	R.2.N.	W. R. Eddie	SW. Corner	.....	717	1,600	.....	.....	.....	Dry	.....	.....	Show of gas at 900 ft.
1	R.2.S.	Union Gas Co. Test 4 E	NE. Corner	1931	716	330	"	.....	.....	Dry	.....	181	
5	R.2.S.	F. J. Carman	NE. Corner	1918	675	268	.....	.....	.....	Dry	.....	160	

Wells in Ekfrid Township, Middlesex County—Concluded

Lot	Con.	Designation	Location	Year drilled	Altitude in feet above sea-level	Depth in feet	Bedrock formation	Producing depth in feet	Producing formation	Yield Mcf. or bbls.	Pressure in lbs. a sq. in.	Thickness of drift in feet	Remarks
6	R.2.S.	Union Gas Co. Test 3 E.....	NE. Corner.....	1931	712	311	Hamilton	.....	.....	Dry	.....	205	Fresh water at 135 ft., rose 50 ft.
8	R.2.S.	Union Gas Co. Test 5 E.....	NW. Corner.....	1931	723	300	"	.....	.....	Dry	.....	210	
8	R.2.S.	F. J. Carman.....	600 ft. S. of N. road..... 1,000 ft. E. of W. line	.....	727	355	.....	.....	.....	Dry	.....	209	Black water at 337 ft. Salt water at 352 ft.
8	R.2.S.	Union Gas Co.....	1,000 ft. S. of N. road..... 100 ft. E. of W. line.....	1933	726	1,811	"	275 1,340	Hamilton Salina....	Dry	....	215	Show of oil and gas at 275 and 1,340 ft. Fresh water at 145 and 210 ft. Sulphur water at 345 and 700 ft. Salt water at 1,450 ft.
9	R.2.S.	F. J. Carman No. 6.....	SE. Corner.....	.....	711	254	"	.....	.....	.....	.....	.....	
11	R.2.S.	Wilson-Sullivan Development Co. D. Black No. 1.....	125 ft. N. of middle lot line 800 ft. E. of W. line	1940	708	365	"	.....	.....	Dry	.....	179	
12	R.2.S.	E. P. Rowe.....	1,100 ft. N. of S. road..... 50 ft. W. of E. line	1932	698	438	"	.....	.....	Dry	.....	150	Show of oil at 325 to 335 ft., and 345 to 350 ft.
21	R.2.S.	J. L. Tait.....	SE. Corner.....	.....	715	.....	.....	.....	.....	Dry	.....	.....	
4	R.3.S.	F. J. Carman No. 8.....	NW. Corner.....	1918	692	268	"	.....	.....	Dry			
8	R.3.S.	F. J. Carman No. 10.....	NE. Corner.....	.....	720	440	"	.....	.....	Dry	.....	219	
9	R.3.S.	F. J. Carman No. 7.....	NE. Corner.....	.....	711	254	"	.....	.....	Dry	.....	.....	
10	R.3.S.	F. J. Carman No. 11.....	NW. Corner.....	1918	702	264	"	.....	.....	Dry	.....	.....	
11	R.3.S.	F. J. Carman No. 16.....	SE. Corner.....	1919	705	255	"	.....	.....	Dry	.....	.....	
13	R.3.S.	F. J. Carman No. 17.....	SE. Corner.....	1919	707	255	"	.....	.....	Dry	.....	.....	
16	R.3.S.	F. J. Carman No. 19.....	SE. Corner.....	1919	700	326	"	.....	.....	Dry	.....	.....	

5	R.4.S.	F. J. Carman No. 15	SE. Corner		702	277				Dry			
7	R.4.S.	F. J. Carman No. 13	SE. Corner	1919	698	333	"			Dry			Show of oil at 225 ft.
7	R.4.S.	F. J. Carman No. 14	100 ft. S. of N. road, 800 ft. E. of W. line		711	338	"			Dry			Show of oil.
8	R.4.S.	F. J. Carman No. 18	100 ft. S. of N. road, 900 ft. E. of W. line		709	249	"			Dry			
9	R.4.S.		3,000 ft. N. of S. road, 200 ft. W. of E. line		711								
7	R.5.S.	Union Gas Co. of Canada, Ltd., No. 1	1,000 ft. S. of N. road, 740 ft. W. of E. line	1931	678	3,582	"			Dry		195	Show of oil at 3,535 ft. Show of gas at 215, 1,175 to 1,180 ft. Fresh water at 215 ft. Sulphur water at 650 ft. Salt water at 1,370 and 1,520 ft.
7	R.5.S.	F. J. Carman No. 21	SW. Corner	1919	646	185				Dry			
9	R.5.S.	F. J. Carman No. 20	NE. Corner	1919	677	247	"	228	Hamilton	Dry			Show of oil at 228 ft.

Wells in London Township, Middlesex County

10	10	Union Gas Co. of Canada, Ltd. G. Needham No. 1	50 ft. N. of S. road, 100 ft. E. of W. line	1939	918	1,467	Norfolk			Dry		132	Fresh water at 130 ft. Salt water at 1,205, 1,257, and 1,307 ft.
21	10	Middlesex and Dover Oil Co	1,750 ft. S. of N. road, 650 ft. W. of E. line	1923	921	1,713	"					186	
22	10	Middlesex and Dover Oil Co	1,000 ft. N. of S. road, 900 ft. W. of E. line	1922	932	313							
30	16		1,300 ft. N. of S. road, 300 ft. E. of W. line		872	1,760				Dry		165	
City of London		Carling Brewing and Malting Co.		1890		503	Hamilton						Information unconfirmed.
		Sulphur spring	Oxford St.	1872	768	1,100							
		Sulphur spring	Thames and Dundas Sts.	1865	770	765	"						Sulphur water at 114 ft.
		Public Utilities Commission	Nightingale Ave. and Dundas St.	1921	821	318	"						
		Public Utilities Commission	Wellington and Nelson Sts.	1921	780	232	"	124		Dry			Show of gas.
			Asylum grounds	1904	867	2,250	Norfolk					130	

Wells in McGillivray Township, Middlesex County

Lot	Con.	Designation	Location	Year drilled	Altitude in feet above sea-level	Depth in feet	Bedrock formation	Producing depth in feet	Producing formation	Yield Mcf. or bbls.	Pressure in lbs. a sq. in.	Thickness of drift in feet	Remarks
29	5	A. L. Lertzman..... J. Tidball No. 1	.....	1939	.....	560	Norfolk..	.....	.....	Dry	.....	160	Light show of oil at 240 ft. Fresh water at 230 ft. Black sulphur water at 370 ft.
29	7	Senator Michener.....	650 ft. S. of N. line..... 250 ft. W. of E. line	.....	786	1,494	Hamilton	.....	.....	Dry	.....	55	Show of gas and oil reported at 1,450 to 1,490 ft.
29	7	Byron MacCallum..... R. A. Dorman No. 1.....	2,200 ft. N. of S. line..... 100 ft. E. of W. line	1940	784	1,537	.....	.....	.....	Dry	.....	68	Fresh water at 80 ft.

Wells in Metcalfe Township, Middlesex County

1	1	John Beattie..... J. Eastabrook No. 3.....	606 ft. E. of W. line[1]..... 1,200 ft. S. of N. line	1941	.....	411	Hamilton	376	Norfolk	7 bbls.	.....	45	
1	1	McGaffey and Earl..... J. Eastabrook No. 4.....	780 ft. E. of W. line[1]..... 1,800 ft. S. of N. line	1941	.....	402	"	.....	.....	.....	.....	89	Fresh water at 90 ft., flowing. Salt water at 385 ft., rose 272 ft.
1	1	McGaffey Bros..... J. Eastabrook No. 1.....	166 ft. S. of N. line[1]..... 320 ft. W. of E. line	1939	.....	348	"	319 344	"	25 bbls.	.....	95	Producing oil well. Gas at 319 ft. Fresh water at 35 and 95 ft.
1	1	J. Eastabrook No. 2.....	316 ft. S. of N. line[1]..... 378 ft. E. of W. line	1939	.....	399	"	375	"	15 bbls.	.....	95	Fresh water at 90 to 95 ft., rose 85 ft. Salt water at 375 to 380 ft. Gas and oil at 313 and 350 ft.
4	1	Reid and Adams..... John Freer No. 1.....	4,200 ft. W. of E. road.... 400 ft. N. of S. road	1939	752	396	"	368	"	.....	.....	122	Fresh water at 118 ft., rose 103 ft. Salt water at 368 ft., rose 110 ft. Small flow of oil.

4	1	John Freer No. 2	4,900 ft. W. of E. road 225 ft. N. of S. road	1939	748	328	"	312	"	....	....	121	Fresh water at 120 ft., small supply.
4	1	Reid-Adams Development Co., Ltd. John Freer No. 3	500 ft. N. of S. road 840 ft. W. of E. line	1940	748	360	"	335	"	4 bbls.	....	115	Fresh water at 91 ft.
6	1	Reliable Oil Syndicate H. McLean No. 1	1,365 ft. N. of S. road 185 ft. W. of E. road	1939	742	428	"	....	....	Dry	....	108	Show of oil at 350 ft. Fresh water at 108 ft. Black water at 420 ft.
1	2	A. L. Lertzman C. Patterson No. 1.	....	1939	....	425	"	....	....	Dry	....	73	Fresh water at 45 ft., rose 38 ft.
3	2	K. L. Dorman Katharine Denning No. 1	350 ft. N. of S. line 240 ft. E. of W. line	1940	745	402	"	....	....	Dry	....	110	Fresh water at 80 ft.
3	2	Beattie Bros. H. Watson No. 1	1,600 ft. S. of N. road 100 ft. W. of E. road	1939	745	428	"	....	....	Dry	....	110	Show of oil at 272 and 304 to 310 ft. Fresh water at 87 ft.
3	2	I. Greenizen E. Earley No. 1	298 ft. W. of E. line 135 ft. S. of N. road	1939	....	470	"	....	....	Dry	....	95	Fresh water at 85 ft., rose 25 ft. Salt water at 470 ft.
4	2	Beattie Bros. Arthur Freer No. 1	4,300 ft. W. of E. road 150 ft. S. of N. road	1939	749	447	"	311 324 358	"	40 bbls.	....	120	Salt water at 400 ft., rose 70 ft. Black water at 446 ft., rose 200 ft.
4	2	Mrs. Geo. Freer No. 4	....	1941	....	518	"	....	....	Dry	....	104	Salt water at 500 ft., rose 340 ft.
4	2	Reid and Adams Arthur Freer No. 2	4,300 ft. W. of E. road 500 ft. S. of N. road	1939	749	376	"	313 357 372	"	....	....	122	Fresh water at 122 ft., small supply. Gas at 307 to 319 ft.
4	2	Arthur Freer No. 3	4,300 ft. W. of E. road 900 ft. S. of N. road	1939	749	380	"	355 364	"	100 bbls.	....	119	Salt water at 244 ft.
4	2	Beattie Bros. and Reid-Adams Arthur Freer No. 4	....	1939	....	397	"	....	....	Dry	....	102	Show of oil at 390 to 397 ft. Salt water at 390 to 397 ft.
4	2	Reid-Adams Development Co., Ltd. Arthur Freer No. 7	1,030 ft. E. of W. line 300 ft. N. of S. road	1940	747	345	"	307 340	"	10 bbls.	....	118	Fresh water at 92 ft., rose 60 ft. Gas at 307 ft.
4	2	Arthur Freer No. 5	567 ft. N. of S. road 243 ft. E. of W. line	1940	746	440	"	305	"	....	....	107	Fresh water at 95 to 105 ft. Salt water at 326 to 328 ft. Small flow oil at 326 to 328 ft.

[1]Location from driller's application form, Natural Gas Commissioner's office, Toronto.

Wells in Metcalfe Township, Middlesex County—Continued

Lot	Con.	Designation	Location	Year drilled	Altitude in feet above sea-level	Depth in feet	Bedrock formation	Producing depth in feet	Producing formation	Yield Mcf. or bbls.	Pressure in lbs. a sq. in.	Thickness of drift in feet	Remarks
4	2	Arthur Freer No. 6	2,640 ft. S. of N. line 135 ft. E. of W. line	1940	747	345	Hamilton	340	Norfolk	150 bbls.	.....	107	Fresh water at 106 ft. Salt water at 340 ft.
4	2	Arthur Freer No. 11	1,511 ft. S. of N. line 630 ft. W. of E. line	1940	750	401	"	.....	.....	Dry	.....	107	
4	2	Arthur Freer No. 10	630 ft. W. of E. line 1,742 ft. S. of N. line	1940	745	384	"	365	"	2 bbls.	.....	95	
4	2	Arthur Freer No. 9	1,796 ft. S. of N. line 1,150 ft. W. of E. road	1940	745	407	"	332	"	100 bbls.	.....	109	Fresh water at 103 ft., rose 80 ft.
4	2	Arthur Freer No. 8	1,210 ft. E. of W. line 175 ft. S. of N. road	1940	749	525	"	.....	.....	Dry	.....	118	Fresh water at 92 ft., rose 60 ft. Shows of oil at 312, 344, and 410 ft.
4	2	Beattie Bros. Mrs. Geo. Freer No. 3	2,627 ft. S. of N. line 642 ft. E. of W. line	1940	744	380	"	320	"	100 bbls.	.....	102	Salt water at 320 to 321 ft., rose 315 ft.
4	2	Mrs. Geo. Freer No. 2	150 ft. W. of E. line 1,490 ft. S. of N. line	1940	747	378	"	327	"	20 bbls.	.....	108	Salt water at 327 ft., rose 315 ft.
4	2	Mrs. Geo. Freer No. 1	150 ft. W. of E. line 2,113 ft. S. of N. line	1940	745	378	"	323	"	200 bbls.	.....	95	Salt water at 355 ft., rose 90 ft.
5	2	J. A. Beattie J. Brigham No. 1	3,900 ft. W. of E. road 2,150 ft. S. of N. road	1938	745	370	"	331 340	"	7 bbls.	.....	100	Fresh water at 97 ft., rose 85 ft. Salt water at 289 ft., rose 150 ft.
5	2	Reid and Adams J. Brigham No. 2	3,900 ft. W. of E. road 525 ft. S. of N. road	1939	746	378	"	358 364	"	.....	.....	117	Salt water at 252 ft., rose 100 ft.
5	2	J. Brigham No. 3	3,950 ft. W. of E. road 115 ft. S. of N. road	1939	749	362	"	.....	.....	Dry	.....	121	Fresh water at 115 to 121 ft. Salt water at 362 ft.
5	2	Reid-Adams Development Co., Ltd. J. Brigham No. 4	40 ft. E. of W. line 150 ft. S. of N. road	1940	750	480	"	.....	.....	.....	.....	115	Fresh water at 60 ft., rose 20 ft. Salt water at 405 ft., rose 50 ft.

5	2	J. Brigham No. 5	75 ft. E. of W. line 570 ft. S. of N. line	1940	748	410	"			Dry		117	Salt water at 372 ft., rose 30 ft.
7	2	F. Hambly Miss Redman No. 1	462 ft. W. of E. line 1,584 ft. S. of N. line	1940	739	356	"			Dry		109	Salt water at 356 ft.
8	2	W. E. Stanley Wm. Tedball No. 1	3,785 ft. E. of W. road 400 ft. S. of N. road	1939	739	376	"			Dry		109	Fresh water at 109 ft., rose 20 ft. Fresh water at 160 ft., rose 160 ft.
8	2	Reliable Oil Syndicate Wm. Tedball No. 2	300 ft. E. of W. line 350 ft. N. of S. line	1939	742	404	"			Dry		120	Black water at 366 ft., rose 300 ft.
16	2	Barr and Fauling	600 ft. S. of N. road 900 ft. W. of E. line.	1927	714	3,700	"	3,600	Trenton	Dry		174	Fresh water at 210 ft. Black water at 290 ft. Show of gas at 3,600 ft.
2	3	K. L. Dorman Wilkinson No. 1	250 ft. W. of E. line 2,000 ft. N. of S. line	1940	744	360	"			Dry		98	
3	3	Beattie Bros. H. Watson No. 1	4,400 ft. S. of N. road 50 ft. W. of E. road	1939	742	423	"	380	Norfolk	Dry		102	Fresh water at 101 ft. Salt water at 417 ft. 1 bbl. of oil in 3 days.
3	3	Gregory and Hess N. MacLean No. 1	350 ft. S. of N. line 640 ft. E. of W. line	1940	748	350	"					112	Fresh water at 101 ft. Small flow oil at 335 ft.
5	3	P. L. Jackson John McNeil No. 1	3,100 ft. W. of E. road 5,200 ft. S. of N. road	1939	746	415	"			Dry		105	Fresh water at 105 ft., rose 85 ft. Black water at 412 ft., rose 191 ft.
6	3	Gregory and Hess W. G. Westgate No. 1	500 ft. S. of Centre lot line 500 ft. E. of W. line	1940	743	410	"			Dry		115	Fresh water at 102 to 115 ft. Salt water at 405 ft.
1	4		1,250 ft. S. of N. road 50 ft. E. of W. line		719	422	"			Dry			Salt water at 422 ft.
1	4	A. B. Holmes E. Healy No. 3	300 ft. S. of N. line[1] 300 ft. E. of W. line	1941		395	"			Dry		86	Fresh water at 94 ft., rose 80 ft.
2	4	Ajax Oil and Gas Co. W. J. McLean	360 ft. S. of N. line[1] 188 ft. W. of E. line	1941		378	"			Dry		104	Fresh water at 112 ft., rose 100 ft. Salt water at 372 ft., rose 158 ft. Show oil at 372 ft.
2	4	Dr. Holmes Callahun No. 1	300 ft. S. of N. line[1] 350 ft. E. of W. line	1941		490	"					100	Fresh water at 120 ft., rose 100 ft. Small show oil at 410 ft.
3	4	Buchanan No. 1	350 ft. S. of N. line[1] 950 ft. E. of W. line	1941		380	"					100	Fresh water at 200 ft. Small quantity oil at 360 ft.

[1]Location from driller's application form, Natural Gas Commissioner's Office, Toronto.

Wells in Metcalfe Township, Middlesex County—Concluded

Lot	Con.	Designation	Location	Year drilled	Altitude in feet above sea-level	Depth in feet	Bedrock formation	Producing depth in feet	Producing formation	Yield Mcf. or bbls.	Pressure in lbs. a sq. in.	Thickness of drift in feet	Remarks
4	4	Gregory and Hess..... G. A. Denning No. 1.....	1,452 ft. S. of N. line..... 495 ft. E. of W. line	1940	732	370	Hamilton	.....	.....	Dry	.....	95	Fresh water at 95 ft., rose 70 ft. Salt water at 365 ft., rose 150 ft.
4	4	G. F. Gregory and Son..... G. A. Denning No. 1.....	1,452 ft. S. of N. line..... 495 ft. E. of W. line	1940	732	370	"	.....	.....	Dry	.....	95	Fresh water at 95 ft., rose 70 ft. Salt water at 365 ft., rose 150 ft.
11	4	C. Demaray..... Wm. McIntyre No. 1.....	582 ft. E. of W. line..... 50 ft. S. of N. line	1935	720	391	"	.....	.....	Dry	.....	136	Fresh water at 113 ft. Black water at 385 ft.
12	4	Wilcox and Kine..... A. Brady No. 1.....	350 ft. S. of N. road..... 393 ft. W. of E. line	1940	698	375	"	.....	.....	Dry	.....	98	
11	5	I. Carruthers and C. Demaray.. W. L. McDonald No. 1	NE. Corner.....	1935	710	276	"	.....	.....	Dry	.....	110	Fresh water at 85 to 90 ft.
7	7	F. W. Kehlet.....	1,000 ft. S. of N. road..... 950 ft. E. of W. line	1934	729	468	"	.....	.....	Dry	.....	120	Fresh water at 102 ft.
12	12	.....	650 ft. S. of N. road..... 1,400 ft. E. of W. line	1934	729	425	"	.....	.....	Dry	.....	90	
16	12	A. Treleaven.....	1,700 ft. N. of S. road..... 60 ft. E. of W. line	1929	715	500	"	.....	.....	Dry			
17	12	Judson and Treleaven.....	SW. Corner.....	1929	735	502	"	.....	.....	Dry	.....	83	
19	12	A. Treleaven.....	1,550 ft. N. of S. road..... 750 ft. W. of E. line	1929	724	502	"	.....	.....	Dry	.....	79	Fresh water at 105 ft.
24	12	A. Treleaven.....	1,800 ft. N. of S. road..... 100 ft. E. of W. line	1929	719	500							
1	13	Union Gas Co. of Canada, Ltd..	SE. Corner.....	1931	721	285	.....	.....	.....	Dry			
14	13	A. Treleaven.....	50 ft. S. of N. road..... 660 ft. W. of E. line	.....	711	440	"	.....	.....	Dry	.....	85	Black water at 425 ft.

20	13	Judson and Treleaven	SW. Corner	1929	734	500	Kettle Point			Dry		98	
24	13		1,400 ft. N. of S. road, 50 ft. E. of W. line		723	500	"			Dry		48	

Wells in Mosa Township, Middlesex County

1	1	Graham	500 ft. N. of S. road, 800 ft. W. of E. line		728								
1	1	Graham	1,500 ft. N. of S. road, 800 ft. W. of E. line		730								
8	1	F. J. Carman	NW. Corner	1921	716	468	Hamilton					136	
16	1	McCallum	2,500 ft. S. of N. road, 500 ft. E. of W. line		700								
21	1	McCallum	NE. Corner		697								
1	2		Corner of McRae and Main Sts., Glencoe.		727	1,510	"						
8	2	Beattie and McGill, J. Beattie No. 1	300 ft. E. of W. road, 1,250 ft. S. of N. road	1937	720	305	"			Dry		93	Fresh water at 90 ft.
13	2	F. J. Merchant	50 ft. S. of N. road, 1,100 ft. W. of E. line	1934	702	427	"			Dry		130	Show of oil at 150, 315 to 330, and 355 to 360 ft.
17	2	F. J. Carman	1,250 ft. N. of S. road, 250 ft. E. of W. line	1934	699	367	"			Dry		164	
17	2		1,100 ft. S. of N. road, 400 ft. W. of E. line		703								
18	2	Newberry Oil and Gas Syndicate.	750 ft. N. of S. road, 600 ft. W. of E. line		698	317	"					117	
8	3	Ontario Petroleum Co	2,200 ft. N. of S. road, 50 ft. E. of W. line		710	406	"					118	
11	3		1,400 ft. N. of S. road, 400 ft. W. of E. line		704								
13	3	Southern Ontario Gas Co	700 ft. N. of S. road, 100 ft. E. of W. line	1931	701	2,000	"	1,514 1,863	Guelph Grimsby	41 Mcf.		70	Fresh water at 71 ft., rose 50 ft. Black water at 475 ft., rose 375 ft. Salt water at 1,790 ft.

Wells in Mosa Township, Middlesex County—Continued

Lot	Con.	Designation	Location	Year drilled	Altitude in feet above sea-level	Depth in feet	Bedrock formation	Producing depth in feet	Producing formation	Yield Mcf. or bbls.	Pressure in lbs. a sq. in.	Thickness of drift in feet	Remarks
13	3	.....	1,500 ft. S. of N. road..... 50 ft. W. of E. line	.....	704	495	Hamilton	.....	.....	.....	.....	.....	
14	3	Southern Ontario Gas Co.....	2,000 ft. N. of S. road..... 100 ft. E. of W. line.....	1930	700	1,967	"	1,512 1,856	Guelph Grimsby	24 Mcf.	.....	130	Black water at 435 ft., rose 200 ft. Salt water at 1,624 ft., rose 150 ft. Salt water at 1,860 ft., rose 225 ft.
14	3	Southern Ontario Gas Co.....	1,600 ft. N. of S. road..... 850 ft. E. of W. road	1931	703	1,900	"	1,510 1,520 1,862	Salina Grimsby	1,770 Mcf.	910	93	Show of oil at 355 and 1,520 ft.
14	3	Southern Ontario Gas Co.....	270 ft. S. of N. road..... 900 ft. W. of E. line	.....	703	2,006	"	.....	.....	Dry	.....	122	Water at 435, 451, 1,660, 1,810 ft.
14	3	Southern Ontario Gas Co.....	1,350 ft. N. of S. road..... 200 ft. W. of E. line	1931	703	1,632	"	1,525	Salina....	107 Mcf.	740	80	Fresh water at 80 ft. Black water at 475 ft. Salt water at 1,610 ft.
15	3	Southern Ontario Gas Co.....	1,260 ft. S. of N. road..... 940 ft. E. of W. line	1931	701	1,990	"	.....	.....	Dry	.....	85	Show of oil at 310 ft. Fresh water at 90 ft., rose 75 ft. Black water at 450 ft., rose 340 ft.
15	3	Southern Ontario Gas Co.....	1,500 ft. N. of S. road..... 500 ft. W. of E. line	1930	702	1,995	Black shale	.....	.....	Dry	.....	80	Sulphur water at 430 ft. Salt water at 1,620 ft.
15	3	Southern Ontario Gas Co.....	1,000 ft. S. of N. road..... 400 ft. W. of E. line	1930	699	1,984	Hamilton	1,511 1,854	" Grimsby	1,048 Mcf.	950	80	Black water at 650 ft. Salt water at 1,630 ft.
15	3	Southern Ontario Gas Co.....	2,100 ft. S. of N. road..... 800 ft. W. of E. line	1930	700	1,995	"	.....	.....	Dry	.....	.....	
15	3	Lowery.....	NW. Corner.....	.....	695	.....	"	.....	.....	Dry	.....	103	Show of oil.
17	3	.....	1,650 ft. S. of N. road..... 50 ft. W. of E. line	.....	697	.....	.....	.....	.....	.....	.....	.....	
17	3	.....	200 ft. N. of S. road..... 700 ft. E. of W. line	.....	690	.....	.....	.....	.....	.....	.....	.....	

17	3		50 ft. N. of S. road..... 700 ft. W. of E. line		692									
1	4	Harvey	NE. Corner		724	156	Black shale					89		
1	4	Harvey	SE. Corner		726	180						108		
3	4		1,000 ft. S. of N. road..... 25 ft. E. of W. line		711									
3	4		2,000 ft. S. of N. road..... 400 ft. W. of E. line	1886	714	514	"					88		
6	4		NW. Corner		703	500								
6	4		2,000 ft. N. of S. road..... 1,000 ft. E. of W. line		714									
6	4		50 ft. S. of N. road..... 1,000 ft. W. of E. line		712									
7	4		NE. Corner		709									
7	4		200 ft. S. of N. road..... 500 ft. W. of E. line		708									
7	4		600 ft. S. of N. road..... 500 ft. W. of E. line		707									
9	4	Wilson and Carlyle..... Jas. Gates No. 1.....	350 ft. S. of N. road..... 650 ft. W. of E. line		703	425	Hamilton					110		
9	4	Jas. Gates No. 2.....	100 ft. S. of N. road..... 600 ft. E. of W. line		705	381	"					67		
9	4	Jas. Gates No. 3.....	50 ft. S. of N. road..... 1,000 ft. E. of W. line		705	330	"					100		
9	4	Jas. Brown No. 2.....	50 ft. S. of N. road..... 500 ft. W. of E. line		705	413	"							
10	4	McDonald No. 1.....	600 ft. S. of N. road..... 650 ft. W. of E. line		702	431	"					107		
10	4	McDonald No. 2.....	1,350 ft. S. of N. road..... 400 ft. W. of E. line		706	412	"			Dry		80	Show of oil at 308 ft.	
12	4	Lowery	1,600 ft. N. of S. road..... 300 ft. E. of W. line		702	395	"			Dry		108	Show of oil at 395 ft.	
13	4	Lowery	2,500 ft. S. of N. road..... 500 ft. E. of W. line		701	537								
13	4	Lowery	1,700 ft. N. of S. road..... 200 ft. W. of E. line		701	498						131		

Wells in Mosa Township, Middlesex County—Continued

Lot	Con.	Designation	Location	Year drilled	Altitude in feet above sea-level	Depth in feet	Bedrock formation	Producing depth in feet	Producing formation	Yield Mcf. or bbls.	Pressure in lbs. a sq. in.	Thickness of drift in feet	Remarks
13	4	.....	2,000 ft. N. of S. road..... 50 ft. W. of E. line	.....	700	413	Hamilton	.....	.....	Dry	.....	111	Show of oil at 399 ft.
17	4	Fred W. Craft..... M. Armstrong No. 1	1,250 ft. S. of N. road..... 350 ft. E. of W. line	1935	698	433	"	.....	.....	Dry	.....	135	Fresh water at 80 ft. Salt water at 428 ft.
17	4	.....	2,100 ft. S. of N. road..... 600 ft. E. of W. line	1907	686	406	"	.....	.....	Dry	.....	120	Show of oil at 377 ft.
1	5	Harvey.....	NE. Corner.....	.....	724	136	"	.....	.....	Dry	.....	.....	
3	5	.....	1,400 ft. N. of S. road..... 450 ft. E. of W. line	.....	719	.....	.....	.....	.....	Dry	.....	.....	
3	5	.....	1,500 ft. N. of S. road..... 50 ft. E. of W. line	.....	717	.....	.....	.....	.....	.....	.....	.....	
5	5	Gillies No. 1.....	1,500 ft. N. of S. road..... 50 ft. W. of E. road	.....	690	331	.....	.....	.....	Dry	.....	.....	Show of oil at 327 ft.
5	5	Gillies No. 2.....	1,400 ft. N. of S. road..... 250 ft. W. of E. line	.....	690	310	.....	.....	.....	Dry	.....	.....	Show of oil at 310 ft.
5	5	Gillies No. 3.....	1,700 ft. N. of S. road..... 650 ft. W. of E. line	.....	688	310	.....	.....	.....	.....	.....	.....	
5	5	.....	175 ft. S. of N. road..... 1,000 ft. E. of W. line	.....	717	438	"	.....	.....	.....	.....	93	
6	5	Ontario Petroleum Co.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	19 wells; considerable oil production.
7	5	Ontario Petroleum Co.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10 wells, ranging from 269 to 472 ft. in depth; considerable oil production.
8	5	Toronto Glencoe Oil Co.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	12 wells, ranging from 300 to 390 ft. in depth; some oil production.

8	5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	7 wells in addition to the above; some oil production.
8	5	.....	2,000 ft. S. of N. road 50 ft. W. of E. line	.....	708	.....	.....	.....	.....	.....	.....	.....	
9	5	.....	SW. Corner	.....	705	.....	.....	.....	.....	.....	.....	.....	
9	5	.....	SE. Corner	.....	706	419	Hamilton	371	Norfolk	Dry	.....	77	Show of oil at 312 ft.
9	5	.....	300 ft. N. of S. road 650 ft. W. of E. line	.....	709	377	"	.....	.....	.....	.....	.....	Heavy flow of gas at 238 and 282 ft.
10	5	Wilson and Carlyle McNaughton No. 1	SE. Corner	.....	702	478	"	.....	.....	.....	.....	92	
11	5	.....	SE. Corner	.....	700	.....	.....	.....	.....	.....	.....	.....	Salt water at 413 ft.
12	5	.....	2,000 ft. S. of N. road 100 ft. E. of W. line	.....	700	.....	.....	.....	.....	.....	.....	.....	
18	5	.....	SW. Corner	.....	684	.....	.....	.....	.....	.....	.....	.....	
2	6	.....	1,500 ft. N. of S. road 50 ft. E. of W. line	.....	718	465	Black shale	.....	.....	.....	.....	80	Salt water at 465 ft.
4	6	Sibly No. 1	1,900 ft. S. of N. road 100 ft. E. of W. line	.....	717	368	Hamilton	.....	.....	.....	.....	.....	Oil at 358 ft.
4	6	Sibly No. 2	1,500 ft. N. of S. road 200 ft. E. of W. line	.....	717	367	.....	.....	.....	.....	.....	.....	
4	6	Sibly No. 3	.....	.....	718	417	.....	.....	.....	.....	.....	103	Salt water at 412 ft.
4	6	Harvey No. 2	2,150 ft. N. of S. road 50 ft. E. of W. line	.....	719	378	"	.....	.....	Dry	.....	84	Shows of oil at 345 to 350 and 365 ft.
5	6	Harvey No. 3	2,000 ft. S. of N. road 50 ft. W. of E. line	.....	716	338	.....	.....	.....	.....	.....	.....	
6	6	Ontario Petroleum Co.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	24 wells, ranging from 215 to 389 ft. in depth; some oil production.
6	6	Southern Ontario Gas Co.	400 ft. S. of N. road 800 ft. E. of W. line	1929	706	3,755	"	.....	.....	Dry	.....	82	Fresh water at 74 ft. Salt water at 154 and 164 ft. Black water at 425 ft. Salt water at 635 ft. Salt water at 1,835 ft. Show of oil at 154 ft. Show of gas at 1,560 ft.
6	6	Dominion Petroleum Co., Ltd.. I. Secord No. 11	1,280 ft. N. of S. line[1] 30 ft. E. of W. line	1939	.....	390	"	349	"	4½ bbls.	.....	90	Producing oil well.

[1]Location from driller's application form, Natural Gas Commissioner's Office, Toronto.

Wells in Mosa Township, Middlesex County—Continued

Lot	Con.	Designation	Location	Year drilled	Altitude in feet above sea-level	Depth in feet	Bedrock formation	Producing depth in feet	Producing formation	Yield Mcf. or bbls.	Pressure in lbs. a sq. in.	Thickness of drift in feet	Remarks
6	6	Dominion Petroleum Co., Ltd.. Ross Doughles No. 11	225 ft. S. of N. line[1]..... 75 ft. E. of W. line	1940	.....	395	Hamilton	340	Norfolk	5 bbls.	.....	95	Fresh water at 95 ft., rose 75 ft.
6	6	J. A. Walker No. 20.....	1,800 ft. S. of N. road..... 4,600 ft. E. of W. road	1937	702	380	.....	345 360	"	.....	.....	.....	Fresh water at 30 ft. Fresh water at 80 ft. Small producing oil well.
6	6	J. A. Walker No. 21.....	1,850 ft. S. of N. road..... 4,900 ft. E. of W. road	1937	703	377	"	200 255	.....	2 bbls.	.....	82	Fresh water at 15 and 80 ft. Salt water at 377 ft., rose 100 ft.
6	6	J. A. Walker No. 22.....	1,825 ft. S. of N. road.... 5,150 ft. E. of W. road	1937	703	365	"	230 350 360	"	.....	.....	92	Fresh water at 15 and 80 ft. Salt water at 355 ft. Small producing oil well.
6	6	J. A. Walker No. 23.....	1,500 ft. S. of N. road..... 4,850 ft. E. of W. road	1938	703	370	.....	350	"	.....	.....	.....	Fresh water at 78 ft., rose 40 ft. Small oil well.
6	6	J. A. Walker No. 24.....	1,500 ft. S. of N. road..... 5,050 ft. E. of W. road	1938	703	370	"	355 370	"	8 bbls.	.....	87	Fresh water at 80 ft., rose 35 ft.
6	6	J. A. Walker No. 25.....	1,525 ft. S. of N. road..... 5,275 ft. E. of W. road	1938	704	380	"	270 280	"	.....	.....	87	Fresh water at 80 ft., rose 50 ft. Small producing oil well.
6	6	J. A. Walker No. 26.....	1,550 ft. S. of N. road..... 5,550 ft. E. of W. road	1938	704	376	"	330 350	"	.....	.....	96	Fresh water at 80 ft. Small producing oil well.
6	6	J. A. Walker No. 27.....	1,700 ft. S. of N. road..... 5,400 ft. E. of W. road	1938	706	380	"	265 355	"	250 bbls.	.....	87	Fresh water at 80 ft., rose 40 ft.
6	6	J. A. Walker No. 28.....	2,100 ft. S. of N. road..... 5,425 ft. E. of W. road	1938	706	375	"	345	"	.....	.....	87	Fresh water at 87 ft., rose 50 ft. Small producing oil well.

6	6	J. A. Walker No. 29	2,050 ft. S. of N. road..... 5,200 ft. E. of W. road	1938	704	381	"	345	"	.....	.....	87	Fresh water at 87 ft., rose 40 ft. Small producing oil well.
6	6	J. A. Walker No. 30	1,250 ft. S. of N. road..... 5,250 ft. E. of W. road	1938	702	375	"	345	"	.....	.....	87	Fresh water at 80 ft., rose 40 ft. Small producing oil well.
6	6	I. Secord No. 10	4,550 ft. E. of W. road.... 1,000 ft. N. of S. road	1938	702	380	"	340	"	.....	.....	87	Fresh water at 80 ft., rose 40 ft. Small producing oil well.
7	6	N. Gillies No. 11	200 ft. N. of S. road..... 3,425 ft. E. of W. road	1938	701	400	"	360	"	.....	.....	90	Fresh water at 83 ft., rose 40 ft. Small producing oil well.
7	6	N. Gillies No. 12	550 ft. N. of S. road..... 3,550 ft. E. of W. road	1938	696	395	"	345	.....	.....	.....	90	Fresh water at 90 ft., rose 45 ft. Producing oil well.
7	6	N. Gillies No. 13	723 ft. N. of S. road..... 3,175 ft. E. of W. road	1938	698	400	"	345	"	.....	.....	85	Fresh water at 85 ft., rises 40 ft. Producing oil well.
7	6	N. Gillies No. 14	750 ft. N. of S. road..... 3,400 ft. E. of W. road	1938	699	380	"	345	"	.....	.....	85	Fresh water at 85 ft., rose 40 ft. Producing oil well.
7	6	N. Gillies No. 15	925 ft. N. of S. road.... 3,525 ft. E. of W. road	1939	702	390	"	340	"	5 bbls.	.....	91	Well shot between 330 and 390 ft.
7	6	N. Gillies No. 16	1,125 ft. N. of S. road..... 3,500 ft. E. of W. road	1939	700	390	"	340	"	4 bbls.	.....	90	Producing oil well.
7	6	N. Gillies No. 17	1,250 ft. N. of S. road..... 3,700 ft. E. of W. road	1939	700	390	"	340	"	.....	.....	90	Producing oil well.
7	6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		23 wells; some oil production.
7	6	J. Shields No. 7	45 ft. N. of S. line[1]..... 450 ft. E. of W. line	1939	.....	390	"	340	"	4 bbls.	.....	75	Producing oil well. Fresh water at 70 ft.
7	6	J. Shields No. 8	.....	1939	.....	390	"	340	"	4 bbls.	.....	75	Producing oil well.
7	6	J. Shields No. 9	.....	1939	.....	390	"	340	"	3 bbls.	.....	75	Producing oil well. Fresh water at 95 ft.
7	6	N. Gillies No. 18	279 ft. S. of N. line[1]..... 75 ft. W. of E. line	1940	.....	385	"	335	"	4 bbls.	.....	90	

[1]Location from driller's application form, Natural Gas Commissioner's Office, Toronto.

Wells in Mosa Township, Middlesex County—Continued

Lot	Con.	Designation	Location	Year drilled	Altitude in feet above sea-level	Depth in feet	Bedrock formation	Producing depth in feet	Producing formation	Yield Mcf. or bbls.	Pressure in lbs. a sq. in.	Thickness of drift in feet	Remarks
7	6	J. Shields No. 10	210 ft. N. of S. line[1] 135 ft. E. of W. line	1940	.....	380	Hamilton	340	Norfolk	.....	.....	75	Producing oil well. Fresh water at 95 ft., rose 40 ft.
7	6	J. Shields No. 11	50 ft. N. of S. line[1] 130 ft. E. of W. line	1940	.....	390	"	.....	.....	.....	.....	75	Fresh water at 95 ft., rose 40 ft. Show of oil at 340 ft.
7	6	N. Gillies No. 19	529 ft. S. of N. line[1] 25 ft. W. of E. line	1940	.....	390	"	330	"	4 bbls.	.....	90	
7	6	N. Gillies No. 20	1,330 ft. S. of N. line[1] 370 ft. W. of E. line	1940	.....	390	"	330	"	4 bbls.	.....	90	
7	6	N. Gillies No. 21	900 ft. S. of N. line[1] 320 ft. W. of E. line	1940	.....	395	"	345	"	4 bbls.	.....	90	
7	6	N. Gillies No. 22	700 ft. S. of N. line[1] 480 ft. W. of E. line	1940	.....	390	"	345	"	4 bbls.	.....	90	
7	6	N. Gillies No. 23	498 ft. N. of S. line[1] 234 ft. E. of W. line	1940	.....	397	"	345	"	4 bbls.	.....	90	
7	6	N. Gillies No. 24	200 ft. E. of W. line[1] 225 ft. N. of S. line	1940	.....	395	"	340	"	4 bbls.	.....	90	Fresh water at 95 ft., rose 30 ft.
7	6	J. Shields	1,560 ft. S. of N. line[1] 42 ft. W. of E. line	1941	.....	355	"	.....	.....	.....	.....	60	Fresh water at 45 ft., rose 30 ft.
9	6	Alf. Quick No. 1	1,100 ft. S. of N. road 500 ft. W. of E. line	.....	680	327	"	.....	.....	.....	.....	82	
9	6	Alf. Quick No. 2	850 ft. S. of N. road 1,000 ft. E. of W. line	.....	678	460	.....	.....	.....	Dry	.....	.....	
13	6	J. Harvey No. 1	.....	.....	691	.....	.....	.....	.....	.....	.....	72	
5	7	J. Shields No. 1	SW. Corner	1933	712	425	"	.....	.....	Dry	.....	86	Fresh water at 86 ft. Salt water at 411 ft.
5	7	.....	100 ft. N. of S. road 50 ft. E. of W. line	.....	709	.....	Kettle Point	.....	.....	.....	.....	50	

6	7	H. and J. Johnston	1,800 ft. S. of N. road 1,000 ft. E. of W. line		709					Dry		76	Show of oil.
6	7	H. and J. Johnston	1,700 ft. S. of N. road 50 ft. W. of E. line		712					Dry			
6	7	Sloan and Zook P. McTavish No. 1	NW. Corner	1935		439	Hamilton			Dry		90	Fresh water at 30 and 130 ft.
7	7												13 wells, ranging in depth from 301 to 401 ft.; some oil production.
8	7	Wilson and Carlyle R. M. McAlpine No. 1	900 ft. S. of N. road 50 ft. W. of E. line		701	425	"	370	Norfolk			70	
8	7	R. M. McAlpine No. 2	1,650 ft. S. of N. road 200 ft. W. of E. line		703		"			Dry		80	
8	7	R. M. McAlpine No. 3	1,200 ft. S. of N. road 100 ft. W. of E. line		703					Dry			
8	7		1,500 ft. S. of N. road 900 ft. E. of W. line		667		"			Dry		31	Show of oil at 320 and 355 ft.
8	7	Dominion Petroleum Co., Ltd.	2,400 ft. S. of N. road 200 ft. E. of W. line	1933	695	409	"	391 397	"			81	Fresh water at 75 ft. Salt water at 397 ft. 1 bbl. of oil per hour.
8	7	Dominion Petroleum Co., Ltd.	2,150 ft. S. of N. road 900 ft. W. of E. line		668		"	245 320	Hamilton Norfolk	Dry		30	Show of oil.
8	7	Dominion Petroleum Co., Ltd.	NW. Corner		660	451	"						
10	7	Robinson No. 7	NW. Corner		697					Dry		67	
6	8	Bert Wilson	SW. Corner	1933	712	425	"			Dry		86	Fresh water at 86 ft., rose 56 ft. Salt water at 411 ft., rose 200 ft. Show of oil at 365 ft.
8	8	B. J. Carruthers No. 1	SE. Corner		703	464	"					80	Oil with salt water at 420 ft.
9	8	Wilson and Carlyle Ferguson No. 1	SE. Corner		699	460	"			Dry		72	
3	9	F. J. Carman	2,000 ft. S. of N. road 800 ft. E. of W. line		710	116	Kettle Point						
8	9		SE. Corner		703		"						

[1]Location from driller's application form, Natural Gas Commissioner's Office, Toronto.

Wells in Mosa Township, Middlesex County—Concluded

Lot	Con.	Designation	Location	Year drilled	Altitude in feet above sea-level	Depth in feet	Bedrock formation	Producing depth in feet	Producing formation	Yield Mcf. or bbls.	Pressure in lbs. a sq. in.	Thickness of drift in feet	Remarks
9	9	.....	SE. Corner.....	.....	647	.....	.....	.....	.....	.....	.....	.....	
1	R.1.N.	F. J. Carman.....	SE. Corner.....	1919	703	328	Hamilton	.....	.....	Dry	.....	.....	
18	R.1.N.	J. A. DeWitt..... J. Harold No. 1.....	2,500 ft. W. of E. road.... 100 ft. S. of N. road	1938	690	387	"	.....	.....	Dry	.....	135	Fresh water at 110 ft.
26	R.1.	Robert McRie *et al*..... W. Saylor No. 1.....	52 ft. E. of W. line..... 792 ft. N. of S. line	1836	.....	513	"	.....	.....	Dry	.....	100	Salt water at 510 ft.
2	R.2.N.	F. J. Carman.....	SE. Corner.....	.....	724	345	"	.....	.....	Dry	.....	.....	
4	R.2.N.	F. J. Carman.....	SW. Corner.....	1917	710	358	"	.....	.....	Dry	.....	.....	
5	R.2.N.	London Oil and Gas Co.....	SW. Corner.....	1922	712	500	"	.....	.....	Dry	.....	195	Salt water at 493 ft.
13	R.2.N.	Acme Oil and Gas Co.....	50 ft. S. of N. road..... 750 ft. W. of E. line	1923	706	140	.....	.....	.....	.....	.....	.....	
2	R.1.S.	F. J. Carman.....	SE. Corner.....	1919	707	332	"	.....	.....	.....	.....	.....	
2	R.1.S.	F. J. Carman.....	200 ft. S. of N. road..... 1,000 ft. W. of E. line	.....	713	338	"	.....	.....	Dry	.....	195	
3	R.1.S.	F. J. Carman.....	SE. Corner.....	1919	704	325	"	.....	.....	Dry	.....	.....	
17	R.1.S.	J. A. DeWitt..... Mrs. Henderson No. 1.....	15 ft. S. of No. 2 highway 50 ft. W. of E. road	1938	663	400	"	.....	.....	Dry	.....	132	Fresh water at 90 ft., rose 90 ft.
18	R.1.S.	H. Downey No. 1.....	2,300 ft. W. of E. road.... 90 ft. S. of No. 2 highway	1937	655	390	"	.....	.....	Dry	.....	100	Fresh water at 64 ft., rose 60 ft.
2	R.2.S.	F. J. Carman.....	1,750 ft. S. of N. line..... 50 ft. W. of E. line	1919	705	332	"	.....	.....	Dry	.....	283	
14	S.L.R.	McGill and Willits..... C. Davis No. 1.....	4,400 ft. W. of E. road.... 460 ft. S. of No. 2 highway	1938	695	329	"	.....	.....	Dry	.....	129	Fresh water at 128 ft.

Wells in West Nissouri Township, Middlesex County

1	2	H. Whitner and J. L. Snively.... W. J. Guest No. 1	SE. Corner.....	1916	893	1,506	.....	936	.....	3 Mcf.	150	109	Salt water at 1,120 ft.
10	4	Aloka Oil and Gas Co..... W. F. Duffin No. 1.....	1,320 ft. S. of N. road..... 300 ft. E. of W. road	1938	920	1,445	Norfolk	.....	.....	Dry	.....	140	Fresh water at 4 ft. Salt water at 1,145, 1,175, and 1,295 ft.
34	7	Volcanic Gas and Oil Co., Ltd.. S. Davis No. 1.....	1,515 ft. W. of E. road..... 200 ft. N. of S. line	1938	1,070	1,110	"	.....	.....	Dry	.....	75	Fresh water at 110 ft. Salt water at 1,050 ft.

Wells in East Williams Township, Middlesex County.

3	3	East Williams well No. 1.	SW. Corner.....	.....	750	1,942	Hamilton	200 235	Norfolk	Dry	.....	182	Show of gas.
3	14	Hamilton Gas and Oil Co..... J. Morrison No. 1.....	1,740 ft. S. of N. road.... 750 ft. E. of W. line	1922	773	492	"	341 347	"	Dry	.....	243	Fresh water at 243 ft. Salt water at 341 ft. Show of gas.
1	C.R.	.....	1,400 ft. N. of S. line..... 50 ft. E. of W. line	.....	734	202	"	.....	.....	Dry	.....	190	
8	C.R.	.....	NW. Corner.....	.....	795	274	.....	.....	.....	.....	.....	.....	

Wells in West Williams Township, Middlesex County

1	7	F. J. Carman.....	SE. Corner.....	1923	737	209	Hamilton	.....	.....	Dry	.....	183	
15	7	F. J. Carman.....	SW. Corner.....	1923	767	270	"	.....	.....	.....	.....	151	
10	8	F. J. Carman.....	NW. Corner.....	1923	722	240	"	.....	.....	Dry	.....	144	
20	9	F. J. Carman.....	SW. Corner.....	1923	737	263	"	.....	.....	.....	.....	130	
15	15	.....	50 ft. N. of S. road..... 750 ft. W. of E. line	.....	696	200	.....	180 195	.....	.....	.....	175	Gas reported at 180 and 195 ft.
7	19	Park Hill Salt Works.....	NE. Corner.....	1884	661	1,300	.....	.....	.....	.....	.....	140	
23	21	A. L. Lertzman..... A. P. Knight No. 1.....	600 ft. W. of E. road.... 1,050 ft. N. of C.N.R.	1939	613	513	"	.....	.....	Dry	.....	130	Fresh water at 130 ft., rose 70 ft. Fresh water at 212 ft., rose 150 ft.

Wells in West Williams Township, Middlesex County—Concluded

Lot	Con.	Designation	Location	Year drilled	Altitude in feet above sea-level	Depth in feet	Bedrock formation	Producing depth in feet	Producing formation	Yield Mcf. or bbls.	Pressure in lbs. a sq. in.	Thickness of drift in feet	Remarks
2	C.R.	.....	1,700 ft. S. of N. line..... 250 ft. W. of E. line	.....	688	.....	.....	.....	.....	Dry	.....	138	
4	C.R.	.....	NE. Corner.....	1923	744	213	Hamilton	.....	.....	Dry	.....	129	Fresh water at 128 ft.

Wells in Nissouri East Township, Oxford County

19	8	Major Petroleum Co..... H. Henderson No. 1.....	900 ft. S. of N. line..... 1,250 ft. E. of W. line	1932	1,034	965	Norfolk	.....	.....	Dry	.....	100	Fresh water at 100 ft.
32	8	Volcanic Gas and Oil Co., Ltd... Mrs. S. J. Greason No. 1.....	160 ft. N. of S. line..... 160 ft. E. of W. farm line	1938	1,090	1,100	"	.....	.....	Dry	.....	8 7	Fresh water at 95 ft. Salt water at 1,062 ft.
35	10	H. Cooper No. 1.....	100 ft. W. of E. road.... 100 ft. N. of S. line	1937	1,098	1,442	"	.....	.....	Dry	.....	8 1	Fresh water at 68 ft. Salt water at 1,070 and 1,145 to 1,150 feet.

Wells in Blanchard Township, Perth County

21	17	St. Mary's Cement Co.....	500 ft. S. of N. line..... 1,300 ft. E. of W. line	1927	1,015	3,174	Norfolk	.....	.....	Dry	.....	18	Show of gas at 860 to 880 ft. Fresh water at 75 ft. Sulphur water at 500 ft. Salt water at 1,000 ft.
21	18	Volcanic Gas and Oil Co., Ltd... R. J. Sparling No. 1	1,500 ft. E. and 255 ft. N. of SW. corner of lot	1938	1,025	1,085	"	.....	.....	Dry	.....	23	Fresh water at 42 ft. Salt water at 1,025 ft.

Well in Elma Township, Perth County

			Town of Listowel.....	1885	.....	1,200	.....	.....	.....	.....	.....	.....	

Well in Hibbert Township, Perth County

15	1	.....	Town of Dublin.....	1873	.....	1,396	Norfolk	.....	.....	.....	.....	75	Salt well.

Wells in Logan Township, Perth County

16	1	.....	Town of Mitchell.....	.....	.....	2,008	Norfolk	.....	.....	.....	.....	.....	Salt well.
20	2	Mitchell Oil Syndicate.....	.....	1926	1,153	3,188	"	.....	.....	Dry	.....	140	