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DEPARTMENT OF MINES AND TECHNICAL SURVEYS

MINES BRANCH

INDUSTRIAL MINERALS DIVISION

INDUSTRIAL WATER RESOURCES OF CANADA

Water Survey Report No. 3

Upper St. Lawrence River-Central Great Lakes Drainage Basin in Canada

BY

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INDUSTRIAL WATER RESOURCES OF CANADA

Upper St. Lawrence River-Central Great Lakes Drainage Basin in Canada

INTRODUCTION

This is the third in a series of reports which give in detail the results of investigations of the chemical quality of waters available for industrial use in Canada.

Water Survey Reports Nos. 1 and 2[1] deal respectively with the methods and procedures used in the investigation and with the chemical quality of industrial waters in the Ottawa River drainage basin. Report No. 1 also includes tables and information to assist in interpreting the analytical data presented in subsequent reports of the series.

This third report gives in detail the results of studies carried out from 1948 to 1952 in the central portion of the extensive St. Lawrence River-Great Lakes system in Canada. This system is one of the world's most notable fresh water transportation routes; from the Strait of Belle Isle at the northern entrance to the Gulf of St. Lawrence to the head of Lake Superior is a sailing distance of 2,338 miles; from Montreal, Que. to Fort William, Ont., 1,215 miles. This large system drains some 359,312 square miles[2] in Canada.

Table I shows the area and depth of the six Great Lakes in the system.

TABLE I[2]

Lake	Length (miles)	Breadth (miles)	Maximum Depth (feet)	Total area (square miles)	Area on Canadian side of Boundary (square miles)
Superior	383	160	1,302	31,820	11,200
Michigan	321	118	923	22,400	0
Huron	247	101	750	23,010	13,675
St. Clair	26	24	23	460	270
Erie	241	57	210	9,940	5,094
Ontario	193	53	774	7,540	3,727
	1,411	.....	.....	95,170	33,966

For survey purposes, and to permit earlier publication of data this basin has been divided into three drainage areas, namely the Lower St. Lawrence River basin, the Upper St. Lawrence River-Central Great Lakes basin, and the Upper Great Lakes basin (see Figure 1). This report covers the central area (about 39,000 square miles) which is drained by the St. Lawrence River and the Great Lakes from the mouth of the Ottawa River to the mouth of the French River, exclusive of a small area in Quebec south of the St. Lawrence River which will be included in the Lower St. Lawrence River drainage area.

Part I of the report tabulates the results of monthly sampling and spot sampling of surface waters in this area, carried out for the most part during the years 1948 and 1949.

Part II of the report tabulates the analytical data on municipal water supplies within this basin obtained during the period 1948 to 1952, and includes information on the operation of the various systems.

No attempt is made to discuss in detail all the information recorded in this report, but some statistics on water use in the area are given.

For survey purposes, this basin is taken as that area in Canada drained from the north by the St. Lawrence River and the Great Lakes system west of the Ottawa River basin and south and east of the French River basin. The relation of this area to the remainder of this huge river and lake system is shown in Figure 1.

[1] Scope, Procedure and Interpretation of Results—Water Survey Report No. 1; Mines Branch Report No. 833, Department of Mines and Technical Surveys, Ottawa, 1952. The Ottawa River Drainage Basin, Water Survey Report No. 2; Mines Branch Report No. 834, Department of Mines and Technical Surveys. Ottawa, 1951.

[2] The Canada Year Book, 1950—Dominion Bureau of Statistics.

FIGURE 1. MAP SHOWING DRAINAGE BASINS UNDER STUDY IN EASTERN CANADA

Within this area lies all of Southern Ontario, except that portion within the basin of the Ottawa River and its tributaries which has already been dealt with in Water Survey Report No. 2. It is one of the older settled portions of Canada and is under intensive cultivation. Over 3,600,000 persons, or more than one-quarter of Canada's total population live in this highly industrialized area. Industrialization is both heavy and diversified, including heavy engineering, steel, and chemical industries.

In the southwestern portion of the basin and along the main river and lake system the country is relatively flat, said to be underlain chiefly by flat or gently dipping strata of Palæozoic age, and almost all arable land is under cultivation. In many areas overdevelopment has led to drastic deforestation, draining of swamps, etc., resulting in severe spring flooding and summer drought. Some streams that once flowed the year round are now 85 per cent dry during the summer.

It will be noted from Figure 2 that in this south and southwest portion of the basin many of the tributary streams are small, and that the majority have their source in higher land west of Lake Simcoe and south of Georgian Bay. This area is also well settled and unfortunately largely deforested. Most of the rivers in this portion of the basin are therefore subject to wide variation in flow, with like variation in mineral content. Since they flow through relatively flat, cultivated land they are usually sluggish and carry comparatively heavy loads of suspended matter.

Much of the northern and eastern portion of the basin lie within the Canadian or Precambrian Shield (Laurentian Highlands). The tributary streams which rise in these more rocky, heavily-wooded, and less populated highland areas have waters more typical of the Ottawa River basin, that is, they display less variation in flow and are clearer and softer in character.

The extreme southern portion of the basin, the Niagara Peninsula, is famous for its milder climate, its extensive fruit growing and, in recent years, its amazing industrial growth. It is considered by many that, unlike the remainder of the basin, this area's climate is not controlled by northern winds and air currents but rather by southern influences, such as winds, etc. coming up the Mississippi River and Ohio River basins.

It is no doubt due to this fortuitous combination of climate, rich soil, and availability of plentiful water supplies that this area has become the industrial heart of Canada.

In the more easterly portion of the basin, in particular along Lake Ontario and the Upper St. Lawrence River, the Laurentian Highlands are close to the lake system and so the amount of available arable land decreases. Waters in this area are different in character to those in the south-western portion of the basin. In this area, industry is concentrated along the banks of the St. Lawrence River and the shore of Lake Ontario.

SURVEY PROCEDURE

The procedure used in survey studies in this area was in general similar to that outlined in detail in Water Survey Report No. 1.

Early in 1948 a preliminary survey of the area was made and suitable sampling locations were chosen with due regard to the representative nature of the sample and the facilities for sampling and shipment of samples. The co-operation of the many municipal officials who collected samples for this survey is gratefully acknowledged. At other locations the services of gauge readers, employed by the Water Resources Division, Department of Northern Affairs and National Resources, were used.

Monthly samples were obtained at a number of locations for at least a one-year period, 1948 to 1949. During the years 1949, 1950, and 1951 field studies were carried out in the basin by means of the mobile laboratory.

ANALYTICAL PROCEDURE

The methods of analyses and the procedures used in reporting analytical results in this report are essentially those outlined in detail in Water Survey Report No. 1.

Prior to June 15, 1950, no tests were carried out until the complete analysis was started. This resulted in some waters being rather long in storage prior to analysis. Since many municipal water supplies in this area come from heavily mineralized ground waters, such storage caused changes in pH, in the $CaCO_3$–CO_2 equilibrium, and in other values. Analytical results obtained in the field on some of these waters permitted assessing the loss of $CaCO_3$ due to storage and correcting for the loss, but in many cases additional samples were obtained at a later date and analysed immediately upon arrival in the laboratory. To minimize such error, all samples entering the laboratory after June, 1950, were immediately tested for those constituents and physical characteristics which

normally alter in storage. *However, storage time on these samples is still reported as the length of time elapsing between sampling and the start of final or complete analysis.* Details regarding this procedure are given in Water Survey Report No. 1.

Averages of the water analyses at monthly stations have been calculated, but are not weighted as to flow. Saturation index, per cent sodium, and sum of constituents have also been reported for most waters.

WATER TEMPERATURES

In any industrial area, particularly where heavy industry predominates, one of the major uses of water is for cooling, and therefore the temperature of available water supplies is most important. Ground waters, being normally colder, are more suitable than surface waters for cooling purposes but large users often find the ground water supply inadequate. Because of the demand by industry for information on water temperatures, thermometers were issued to all collectors prior to work in this basin. The temperature of the water when sampled is reported in Table IV, Part I, and this information on major rivers and lakes is summarized in Table II.

TABLE II

Surface Water Temperatures of the St. Lawrence River and the Great Lakes

(Summary of data in Table IV)

Location	Recorded Maximum Temperature		Recorded Minimum Temperature		Yearly Average	
	Date	°F.	Date	°F.	Year	°F.
St. Lawrence River, Caughnawaga, Que.	July 10/50	73	—	—	1950–51	
St. Lawrence River, Cornwall, Ont.	Sept. 4/48	71	Feb. 9/48	32	1948–49	49
St. Lawrence River, Gananoque, Ont.	Aug. 4/48	68	Mar. 4/48	34	1948–49	50
Lake Ontario, Port Hope, Ont.	Sept. 5/48	68	Dec. 9/48	32	1948–49	43
Lake Ontario, Grimsby, Ont.	Sept. 6/48	68	Feb. 14/48	34	1948–49	50
Lake Erie, Port Stanley, Ont.	Aug. 9/48	65	Mar. 9/48	32	1948–49	46
Niagara River, Chippawa, Ont.	Sept. 7/48	69	Mar. 8/48	36	1948–49	52
Detroit River, Windsor, Ont.	Aug. 13/48	71	Feb. 18/48	33	1948–49	51
St. Clair River, Sarnia, Ont.	Aug. 14/48	66	Feb 18/49	34	1948–49	49
Lake Huron, Goderich, Ont.	Aug. 21/48	72	Feb. 19/49	33	1948–49	50
Lake Huron, Collingwood, Ont.	Aug. 16/48	68	Mar. 9/51	33	1948–49	45
Lake Superior, Port Arthur, Ont.	Aug. 24/48 Sept. 24/48	59	Jan. 28/49	33	1948–49	43

The Department of Research and Development of the Canadian National Railways carried out a more extensive study of surface water temperatures in this river-lake system in August, 1950, and have kindly made the results, summarized in Table III, available for publication in this report.

It will be noted that the results of both studies agree closely, and that the warmest waters are generally found in August or early September. The St. Lawrence River, in so far as studied, maintains a relatively constant temperature of around 70° F. to near Kingston, Ontario. In the neighbourhood of Kingston and slightly upstream therefrom there appears, as shown by the Department of Research and Development's studies, to be a pocket of colder water (55° F.) Lake Ontario and Lake Erie are slightly cooler than the St. Lawrence River—about 68° F. Lake Huron, as shown in Table III is a few degrees colder, although the results of monthly samples at filter plants along the shore did not so indicate.

The meagre information on water temperatures in the Upper Great Lakes showed maximum summer temperatures in the St. Mary's River and Lake Superior of about 60° F. It would appear that lower summer water temperatures can be expected in Lake Superior than in the other Great Lakes.

It is probable that water drawn from great depths in the middle of the lakes would be colder but, since it is impractical for industry to go much farther from shore than most municipal intakes, and the lakes are for the most part quite shallow near shore, these shore waters are the ones that must be used.

Surprisingly enough, the St. Lawrence River generally shows a maximum hot weather temperature of about 70° F. Careful and extensive sounding along the river may find either a deep hole or an underground spring that will provide a water of somewhat lower temperature, but nothing of this nature appears yet to have been found, save for the lower temperatures near Kingston. Whether this drop in temperature is partly due to mixing of cooler waters from the centre of Lake Ontario is unknown. No such temperature drop was found at the inlet to the Niagara and St. Clair Rivers.

TABLE III

Water Temperatures in St. Lawrence River-Central Great Lakes Basin*

Drainage Basin Designation	Surface Water	Location of Reading	Depths at which Readings Obtained	Minimum Temperature Readings Recorded during Warmest Summer Month, August, 1950	Average
			Feet	°F.	
Lower St. Lawrence River Basin	St Lawrence River	Sillery, Que.	87	70·5	
	" " "	Quebec Bridge	77	71	
	" " "	Quebec Bridge	160	70·5	
	St. Lawrence River below St. Maurice River	Three Rivers, Que.	35	70	
	St. Lawrence River above St. Maurice River	Three Rivers, Que.	35	69·5	69·8
	St. Lawrence River below Richelieu River	Sorel, Que.	15	70	
	St. Lawrence River above Richelieu River	Sorel, Que.	46	68·0	
	St. Lawrence River	at end of Montreal Island.	42	69	
	St. Maurice River	At mouth at Three Rivers, Que.	10	70	
	" " "	Shawinigan Falls, Que.	19	68	
	" " "	Grand-Mère, Que.	50	67	
	Lac des Piles		10	65	
			20	65	
			30	59	
			35	52	
			40	49	
			45	46	
			50	44	
			60	44	
			70	42	
			100	41	
			125	40·5	
			150	40	
			200	40	
			250	40	
			300	40	
	St. Francis River	Drummondville, Que.	6	71·5	
	Yamaska River	St. Hyacinthe, Que.	3	76	
	Richelieu River	near Sorel, Que.	37	70	
	" "	at Sorel Que.	Filter plant pumphouse	71·5	
	" "	St. Hilaire, Que.	12	73	
	" "	St. Johns, Que.	10	73	71·9
	Richelieu River at mouth	Rouses Point, N.Y.	20	71	
	Lake Champlain	E. Alburg, N.Y.	15	72	
	Missisquoi Bay (Lake Champlain)	Phillipsburg, Que.	9	72·5	
Ottawa River Drainage Basin	L'Assomption River	Charlemagne, Que.	4	70	69·5
	Rivière des Prairies	near mouth	18	69	

* Survey by Department of Research and Development, Canadian National Railways, Montreal, Que.

TABLE III—Concluded

Water Temperatures in St. Lawrence River-Central Great Lakes Basin*—Concluded

Drainage Basin Designation	Surface Water	Location of Reading	Depths at which Readings Obtained	Minimum Temperature Readings Recorded during Warmest Summer Month, August, 1950	Average
				Feet	°*F.*
Upper St. Lawrence River-Central Great Lakes Basin	St. Lawrence River	Beauharnois, Que.	From Quebec. Hydro plant tailrace	68	
	" " "	St. Timothée, Que.	10	67	
	" " "	Valleyfield, Que.	9	66	68·7
	" " "	Pte. au Diable, Que.	16	68	
	" " "	Coteau Landing, Que.	10	69	
	" " "	Cornwall, Ont.	35	70	
	" " "	Prescott, Ont.	45	69·5	
	" " "	Brockville, Ont.	106	70	
	" " "	Rockport, Ont.	257	69·5	
	" " "	Gananoque, Ont.	33	70	
	" " "	Kingston, Ont.	80	58	
	Lake Ontario	at La Moine Point	58	53	
	" "	Millhaven, Ont.	142	58	55
	" "	Bath, Ont.	125	52	
	" "	Sandhurst, Ont.	110	54	
	" "	Picton, Ont.	19	68	
	Bay of Quinte (Lake Ontario)	Deseronto, Ont.	22	70	
	" "	Belleville, Ont.	19	70	67·7
	Lake Ontario	Port Hope, Ont.	27	67	
	" "	Ajax, Ont.	pumphouse	66	
Upper St. Lawrence River-Central Great Lakes Basin	" "	Grimsby, Ont.	17	66	
	" "	Niagara-on-the-Lake, Ont.	60	67	
	Welland Canal	St. Catharines, Ont.	30	69	
	Lake Erie	Fort Erie, Ont.	0	66	66·5
	" "	Port Stanley, Ont.	17	67	
	Detroit River	Windsor, Ont.	27	70	
	Lake Huron (St. Clair River)	Sarnia, Ont.	25	64	
	Lake Huron	Goderich, Ont.	18	66	
	" "	Kincardine, Ont.	10	62	
	" "	Port Elgin, Ont.	30	62	64·1
	Owen Sound (Lake Huron)	Owen Sound, Ont.	27	63	
	Georgian Bay (Lake Huron)	Meaford, Ont.	20	64	
	" "	Midland, Ont.	45	68	

* Survey by Department of Research and Development, Canadian National Railways, Montreal, Que.

Water Surface Elevations of the Great Lakes

Yearly means, with maximum and minimum monthly means of each year.

ELEVATIONS ARE IN FEET ABOVE MEAN SEA LEVEL AND ARE REFERRED TO THE U.S.LAKE SURVEY DATUM OF 1903 ADJUSTMENT.

ELEVATIONS ARE IN FEET ABOVE MEAN SEA LEVEL AND ARE REFERRED TO THE U.S.LAKE SURVEY DATUM OF 1903 ADJUSTMENT.

Figure 3. Graphs showing water levels in the Great Lakes System from 1860 to 1953 inclusive.

PART I

Chemical Quality of Surface Waters in the Upper St. Lawrence River-Central Great Lakes Drainage Basin in Canada

Monthly samples were collected at twenty locations during the period 1948 to 1950, usually for the one-year period, Feb. 1948 to Jan. 1949 inclusive. In early 1947, at the same time that studies were under way in the Ottawa River drainage basin, monthly sampling was carried out at three other locations. Monthly sampling at two locations within the Upper Great Lakes basin and at one location within the Lower St. Lawrence River basin was carried out during the 1948–1951 period to assist in correlating the work in the central portion of the system with later work in the other portions.

During the years 1948 to 1951 field studies were carried out and extra samples of surface waters were collected.

Table IV reports in detail the chemical analyses of all surface waters studied within this basin. At the monthly sampling stations average analyses, usually for a one-year period, have been calculated. These are arithmetical means and are not weighted as to river discharge. The saturation index, sum of constituents, and per cent sodium are reported for these "average" waters and for most spot samples. The interpretation of these values and others reported in Tables IV and V, is discussed in Water Survey Report No. 1.

Some of the surface waters reported in Table IV will be found repeated in Table V, Part II, since they are used directly or with chlorination as municipal supplies.

Figure 2 (in folder) shows the location of the various sampling points; these are also listed in Appendix A.

Figure 3 shows the levels of the Great Lakes since 1860 as reported by the Canadian Hydrographic Service.

Figure 4 shows graphically the variation in total and non-carbonate hardness of the waters of the main St. Lawrence River-Great Lakes system as one proceeds downstream.

Figures 5, 6, 7, 8, and 9 present graphically some of the data of Table IV, illustrating the seasonal variation in mineral content and the relationship between river flow or lake level and the mineral content of the waters.

DISCUSSION

It will be noted from Figure 2 that most of the important water supplies within the basin have been studied. It is believed that surface waters not reported in Table IV will be found similar in chemical quality to nearby lakes or streams that have been studied.

Figure 4 shows a general increase in total hardness as one proceeds downstream. As might be expected, Lake Superior, which is fed by rivers rising for the most part in the relatively unpopulated, heavily wooded Laurentian Highlands, has a much softer and clearer water than the other Great Lakes.

Lake Huron shows a marked increase in hardness, water near its outlet being about twice as hard as St. Mary's River water. This is believed partly due to the inflow of harder water from those rivers traversing cultivated, clay land south of the Bruce Peninsula, since most of the rivers entering Georgian Bay are typical soft waters from the Laurentian Highland. It is probable that the large drainage basin of Lake Michigan has a tremendous influence on the quality of lower Lake Huron water.

The entrance of the hard waters of the Thames, Canard, and nearby rivers contributes to the increase in hardness of Detroit River and Lake Erie water. Since the northern shore of Lake Erie is largely clay, and samples were taken near shore, the hardness is no doubt influenced by local conditions of soil, wind, etc. This probably accounts for the hardness of Lake Erie water at Port Stanley.

The inflow from the north of the Grand River, Don River, and many smaller, hard-water streams causes a slight increase in hardness of lower Lake Erie and Lake Ontario water, so far as may be judged by near-shore samples. However, about midway east on Lake Ontario inflow from the north is again largely a soft, clear, highland water which appears to decrease slightly or at least maintain relatively constant the hardness of the St. Lawrence River at its source.

By the time Montreal is reached this preponderance of softer water entering the St. Lawrence continues to cause a slight decrease in total hardness of the river water.

It is difficult to assess all the factors contributing to changes in water quality in this system, primarily because no consideration has been given to the volume of water of varying quality entering the system from the south or United States portion of the basin.

The inflow of industrial waste and pollution into the main river-lake system at certain locations has no doubt considerable effect on the chemical quality of the waters. A recent report[1] has shown the seriousness of the pollution entering the Lake Huron to Lake Erie section; 428 million gallons of municipal waste and 1,191 million gallons of industrial waste including 6,340 lbs. phenols, 3,700 lbs. cyanides, 11,600 lbs. ammonium compounds and 15,590 gals. oil enter this international river and lake section daily. Similar studies elsewhere within both the Canadian and United States portions of the basin would no doubt show considerable pollution, even though efforts to decrease it are being made throughout the area.

Another factor that influences the data of Figure 4 and Table IV is that sampling of lake waters was always close inshore, where local soil and wind conditions and lake currents have considerable effect. Samples collected in the middle of the lakes might therefore be somewhat different in quality from those here reported, but since industries and municipalities must, for economical reasons, draw water from near shore there is little point in studying mid-lake water quality at this time.

The variation in hardness of Great Lakes and St. Lawrence River waters is not very great when the wide variation in hardness of the waters entering the system is considered. This small variation is due to the levelling-out and mixing effect noted in all large lakes. Owing to the importance of these international waters for navigation and power, level or flow conditions are maintained as constant as possible; Figure 3 shows the levels of the Great Lakes since 1860.

Figure 5, which shows the relationship between lake level and mineral content in Lake Huron at Collingwood illustrates the relative constancy of the water with respect to hardness and total mineral content. Because of the large body of water, the effect of control dams in the system, etc., it is probable that a large part of the variation noted, particularly in turbidity, is due to local conditions.

Figure 6 shows that while the variation in mineral content of the Detroit River at Windsor is not great, it follows generally the change in river flow. Hardness and specific conductivity, as expected, follow the same general curve, increasing in the spring with increased flow. Turbidity shows a marked increase in late spring and early summer, no doubt owing to the heavy inflow of turbid water from the Thames, Maitland and other rivers above this point.

In contrast, in Figure 7, which shows the relationship between mineral content and discharge of the Niagara River near Chippawa, the hardness and specific conductance decrease with increasing discharge. The sampling point was located at the Niagara Falls filter plant intake* and the water may therefore be either Niagara River or a mixture of Welland River and Niagara River, depending upon the relative flow in each river and the draw through the power canal. As no detailed data are available as to Welland River flow and water quality and discharge control in the power canal, it is difficult to interpret properly the relationship shown in Figure 7. It would appear, however, that in early March, while Niagara River flow is on the increase, spring floods in the Welland River, which is a much harder and more highly mineralized water, may enter the filter plant and cause the noted high hardness and conductivity. This spring flood is followed by increasing flow of the Niagara River, lowering the hardness even though the flow in the river is increasing. Later relationships are largely dependent upon the direction of flow in the canal (Niagara River water) and the Welland River and on changes in character in both streams.

Figure 8 shows that at Cornwall, Ont., the hardness and conductivity of St. Lawrence River water decreases slightly with increased flow in early spring. While the flow increases, the hardness gradually levels off. This relationship may be explained by the levelling-out effect of the Great Lakes and control dams, and the influence of upstream break-up, varying from early soft waters to later harder waters and finally softer water from the Lake Superior basin.

Figure 9 shows the relationship between flow and mineral content in one of the larger tributary streams, the Grand River at Brantford. This river, which is contaminated with domestic and industrial wastes, influenced by deforestation, and controlled by dams, shows marked variation in both flow and quality. As might be expected, increased flow is coincident with a decrease in hardness and total mineral content. In October, when the flow is very low, the hardness is markedly increased.

Table IV shows that wide fluctuations in flow and quality are found in all the tributary rivers of the south-western portion of the basin, where the flow is through cultivated and deforested land. The inflow from the wooded Laurentian Highlands is only slightly mineralized and does not show very wide variation in flow or quality.

[1] Report of the International Joint Commission on the Pollution of Boundary Waters, Washington; Ottawa, 1951.

* The initial portion of the power canal is the mouth of the Welland River. The canal then roughly parallels the Niagara River to the power plant at Queenston, Ont. The Niagara Falls filter plant is located on the Welland River or initial portion of the power canal, before the canal branches from the bed of the stream.

SUMMARY

This basin has a variety of waters ranging from soft, coloured, highland waters to the very hard, polluted, and turbid waters typical of flow from cultivated and industrialized areas.

The main system, despite this variety of waters entering from both the Canadian and American drainage basins, retains, because of its volume, a relatively constant quality throughout the year, so that on this basis industrial treatment is simplified. It is this fact, together with the large volume available, that has fostered the heavy industrial growth along the main river-lake system.

Unfortunately the smallness of many of the tributary streams and their present poor quality, caused largely by human activities within the basin, have forced a large portion of the central area of the basin to depend upon ground waters for industrial and domestic use. As a result, there is now a lack of suitable water in parts of this area, and future industrial expansion is largely limited to sites along the main river-lake system, or to the Laurentian Highland portion of the basin.

A study of this basin points up the importance of adequate water supplies and the effect on economic growth of the destruction of quantity and quality of surface supplies. It follows that, to maintain the productivity of this area, not only must reclaiming of deteriorated streams be carried out, but every effort must be made to conserve and protect the quality and quantity of surface waters which are still satisfactory for industrial and domestic use.

TABLE IV

Chemical Analyses of Raw Surface Waters in St. Lawrence River-Great Lakes Drainage Basin

(In parts per million)

No.	Date of collection	Sample No.	Storage period (Days)	Stream discharge (Second-feet): On sampling date	Stream discharge (Second-feet): Monthly mean	Water temperature (°F.)	Dissolved oxygen	Carbon dioxide	pH	Colour	Turbidity	Suspended matter: Dried at 105°C.	Suspended matter: Ignited at 550°C.	Specific conductance Micromhos ($K \times 10^6$) at 25°C.	Residue on Evaporation at 105°C. (Dissolved solids): P.P.M.	Residue on Evaporation at 105°C. (Dissolved solids): Tons per acre-foot	Residue on Evaporation at 105°C. (Dissolved solids): Thousand Tons per day	Loss on ignition at 550°C.	Calcium (Ca)
LOWER ST. LAWRENCE																			
STATION No. 1: ST. LAWRENCE																			
1	Feb. 6/48.....	2329	238	6 ft. above normal	253,000	34	.....	.....	8·4	15·	0·8	.....	.....	303	.....	.....	.....	.....	40·5
2	Mar. 30.....	2444	219	In flood	281,000	37	.....	.....	9·1	10	Green algae	.....	.....	227	149	·203	113·1	55·2	30·0
3	June 10.....	2372	125	318,000	311,000	58	.....	.....	8·1	15	4	.....	.....	278	.....	.....	.....	.....	37·0
4	Dec. 22.....	2618	12	252,000	254,000	40	.....	.....	8·0	2	3	.....	.....	285	175	·238	119·7	24·2	36·4
STATION No. 2: ST. LAWRENCE																			
5	June 19/47.....	1528	5	435,000	436,000	61	(8·0)	(2·5)	7·9 (7·9)	40 (60)	10	.....	.....	.....	181	·246	213·0	70·4	33·8
6	Mar. 17/49.....	2387	15	.....	.....	.....	.....	.....	7·9	.....	0·8	.....	.....	281	168	·228	.....	47·2	37·2
STATION No. 3: ST. LAWRENCE																			
7	Jan. 21/50.....	3833	17	.....	.....	.....	.....	.....	7·6	8	6	9·8	7·8	280	168	·228	.....	22·6	36·9
8	June 12*.....	4308	8	*See*		64	.....	.....	8·0	10	5	6·0	4·4	278	171	·232	.....	23·4	36·0
9	June 26.....	4407	31	discharge		68	.....	.....	8·1	7	0·4	.....	.....	280	176	·239	.....	23·8	37·0
10	July 10*.....	4384	7	records		73	.....	.....	8·1	3	7	13	9·8	282	185	·252	.....	40·0	36·0
11	July 26.....	4523	56	at		70	.....	.....	8·0	3	7	5·2	3·4	285	183	·249	.....	30·6	37·1
12	Aug. 14.....	4538	42	Cornwall, Ont.		68	.....	.....	8·2	6	0·9	.....	.....	304	199	·271	.....	41·8	36·4
13	Sept. 6.....	4539	16	Station No. 4		65	.....	.....	8·1	3	2	.....	.....	279	196	·267	.....	36·8	36·8
14	April 10/51.....	5089	50	.....	.....	43	.....	.....	7·9	15	8	17	14	230	159	·216	.....	65·8	29·1
15	16*.....	5018	10	.....	.....	45	.....	.....	8·0	.....	70	.....	.....	208	.....	.....	.....	.....	27·9
16	23.....	5022	7	.....	.....	44	.....	.....	7·7	25	9	54	43	241	167	·227	.....	30·8	32·0
17	30*.....	5083	23	.....	.....	52	.....	.....	8·0	35	15	.....	.....	241	.....	.....	.....	.....	32·1
18	May 14.....	5095	22	.....	.....	49	.....	.....	7·8	15	6	.....	.....	262	.....	.....	.....	.....	35·4
19	May 29*.....	5110	11	.....	.....	62	.....	.....	7·5	5	.....	.....	.....	272	162	·220	.....	36·8	35·5
20	June 12.....	5125	7	.....	.....	64	.....	.....	8·2	15	4	6·4	3·4	265	182	·248	.....	57·4	37·4
21	July 9.....	5169	21	.....	.....	72	.....	.....	7·9	25	0·2	.....	.....	264	175	·238	.....	69·2	35·5
22	Average (10 samples).....		27	.....	.....	60	.....	.....	8·0	10	4	.....	.....	269	178	·242	.....	42·1	35·4

* Not included in average.

TABLE IV

Chemical Analyses of Raw Surface Waters in St. Lawrence River-Great Lakes Drainage Basin

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Iron (Fe): Total	Iron (Fe): Dissolved	Nitrite (NO_2)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Silica (SiO_2): Gravimetric	Silica (SiO_2): Colorimetric	Hardness as $CaCO_3$: Non-carbonate	Hardness as $CaCO_3$: Total	Sum of Constituents	Per cent sodium	Saturation index: +	Saturation index: −	No.
RIVER DRAINAGE BASIN																				
RIVER AT PLANT INTAKE, LONGUEIL, QUE.																				
9·6	8·7	1·6	.....	.....	.....	.....	17·5	.....	.....	112	2·4	.....	7·4	44·7	141	.....	11·7	0·6	.....	1
7·8	6·5	1·6	.....	·05	.....	17·5	12·9	0	·10	72·2	9·6	3·6	1·9	31·7	107	124	11·5	1·0	.....	2
8·2	7·5	1·3	.....	.....	.....	.....	15·8	.....	.....	112	0	.....	2·4	34·7	126	.....	11·3	0·2	.....	3
8·8	8·0	1·4	.....	·15	.....	26·3	18·0	·6	·06	120	0	2·4	1·0	29·0	127	159	11·9	0·03	.....	4
RIVER NEAR ST. LAMBERT, QUE.																				
7·8	6·4	As Na	·73	.....	.....	23·7	9·9	3·5	.....	101 (97·6)	0 (0)	9·6	2·9	33·4	116	139	.....	.....	0·1	5
8·2	7·7	1·2	.....	·07	.....	26·0	17·6	·4	·15	112	0	4·0	3·6	34·6	127	158	11·5	.....	0	6
RIVER NEAR CAUGHNAWAGA, QUE.																				
6·6	8·7	1·9	·46	·04	.....	28·0	17·3	·8	·10	106	0	4·4	2·3	32·5	119	.....	.....	.....	.....	7
7·3	8·0	1·2	·60	·13	.....	24·4	17·3	·5	·10	96·4	6·5	3·6	0·9	30·0	120	.....	.....	.....	.....	8
7·6	8·7	1·2	.....	·10	.....	27·8	18·1	·4	·10	101	4·8	.....	3·3	33·0	124	.....	.....	.....	.....	9
7·5	9·2	1·1	·52	·05	.....	27·7	18·9	·6	·10	97·8	3·6	.....	2·0	34·5	121	.....	.....	.....	.....	10
7·5	9·2	1·2	·56	·06	.....	24·7	19·2	·5	·10	107	2·4	.....	4·2	31·5	124	.....	.....	.....	.....	11
7·8	9·4	1·0	.....	·11	.....	26·3	20·5	·4	·05	98·6	7·2	.....	0·8	30·1	123	.....	.....	.....	.....	12
7·5	8·8	1·1	.....	·15	.....	22·2	18·0	·4	·10	106	2·2	.....	4·0	31·9	123	.....	.....	.....	.....	13
7·6	6·5	1·2	·72	·05	.....	21·8	13·6	·9	·25	94·4	0	.....	1·6	26·5	104	.....	.....	.....	.....	14
7·3	4·4	1·5	.....	.....	.....	24·3	7·9	.....	.....	86·9	0	.....	3·4	28·4	99·6	.....	.....	.....	.....	15
6·6	7·6	1·1	·92	·18	.....	21·6	18·5	0	0	100	0	.....	2·5	25·0	107	.....	.....	.....	.....	16
7·0	6·6	1·3	.....	.....	.....	24·3	13·6	.....	.....	97·6	0	.....	3·2	28·3	109	.....	.....	.....	.....	17
7·4	8·2	1·1	.....	.....	.....	22·6	17·7	·4	.....	106	0	.....	2·1	31·8	119	.....	.....	.....	.....	18
7·8	7·8	1·2	.....	·16	.....	22·5	17·0	0	·10	115	0	.....	2·1	26·7	121	.....	.....	.....	.....	19
7·5	8·1	1·2	·69	·04	.....	22·4	17·9	·5	·10	103	2·6	.....	1·1	35·6	124	.....	.....	.....	.....	20
7·8	8·3	1·3	.....	·05	.....	22·6	17·9	1·8	·23	105	0	.....	3·2	34·7	121	.....	.....	.....	.....	21
7·4	8·4	1·2	.....	·09	.....	24·0	17·9	·6	·11	103	1·9	.....	2·5	31·3	119	150	13·2	0·1	.....	22

TABLE IV—Continued

Chemical Analyses of Raw Surface Waters in St. Lawrence River-Great Lakes Drainage Basin

(In parts per million)

No.	Date of collection	Sample No.	Storage period (Days)	Stream discharge (Second-feet): On sampling date	Stream discharge (Second-feet): Monthly mean	Water temperature (°F.)	Dissolved oxygen	Carbon dioxide	pH	Colour	Turbidity	Suspended matter: Dried at 105°C.	Suspended matter: Ignited at 550°C.	Specific conductance Micromhos ($K \times 10^6$) at 25°C.	Residue on Evaporation at 105°C. (Dissolved solids): P.P.M.	Residue on Evaporation at 105°C. (Dissolved solids): Tons per acre-foot	Residue on Evaporation at 105°C. (Dissolved solids): Thousand Tons per day	Loss on ignition at 550°C.	Calcium (Ca)
	UPPER ST. LAWRENCE RIVER-CENTRAL																		
	STATION No. 4: ST. LAWRENCE																		
1	Feb. 21/47*	1375	4	203,000	215,000	.....	.....	(3·0)	8·0	0	2	.....	.....	.....	168	·229	92·2	.....	40·0
2	Feb. 9/48	2121	156	203,000	206,000	32	.....	.....	8·2	40	2	.....	.....	301	186	·253	101·8	29·2	38·4
3	Mar. 3	2464	250	206,000	225,000	32	.....	.....	8·4	2	1	.....	.....	259	173	·235	95·0	62·6	29·9
4	April 3	2465	219	269,000	271,000	32	.....	.....	8·6	3	0·3	.....	.....	247	163	·222	118·4	46·6	28·8
5	May 2	2120	74	274,000	279,999	43	.....	.....	8·3	25	2	.....	.....	285	176	·239	129·8	24·8	36·4
6	June 3	2371	132	281,000	281,000	53	.....	.....	8·3	15	4	.....	.....	281	.....	.....	.....	.....	37·0
7	July 5	2137	11	279,000	276,000	65	.....	.....	8·1	8	.....	.....	.....	297	182	·248	137·0	24·4	38·8
8	Aug. 3	2322	59	272,000	267,000	68	.....	.....	8·2	5	2	.....	.....	291	.....	.....	.....	.....	38·5
9	Sept. 4	2304	17	258,000	254,000	71	.....	.....	8·1	15	.....	.....	.....	293	.....	.....	.....	.....	38·5
10	Oct. 1	2497	48	249,000	244,000	64	.....	.....	8·1	0	2	.....	.....	289	179	·243	117·4	25·0	37·6
11	Nov. 5	2479	11	237,000	240,000	50	.....	.....	8·1	5	0·8	.....	.....	293	.....	.....	.....	.....	38·4
12	Dec. 3	2617	31	242,000	234,000	44	.....	.....	8·2	0	0	.....	.....	283	171	·233	108·0	22·2	36·0
13	Jan. 7/49	2656	7	227,000	222,000	34	.....	.....	8·1	1	3	.....	.....	288	171	·233	102·6	21·0	33·2
14	Average (12 samples)		85	249,750	250,000	49	.....	.....	8·2	10	2	.....	.....	291	175	·238	113·8	32·0	36·0

* Not included in average.

STATION No. 5: ST. LAWRENCE

15	Feb. 21/47	1373	4	203,000	215,000	.....	.....	(2·1)	8·0	0	1	.....	.....	.....	172	·234	94·2	.....	38·6

† Calculated.

STATION No. 6: ST. LAWRENCE

16	Mar. 20/50	4125	30	.....	.....	37	.....	.....	8·2	2	0·5	.....	.....	294	.....	.....	.....	.....	40·3

STATION No. 7: ST. LAWRENCE

17	Aug. 10/48	2468	90	.....	267,000	70	.....	(2·5)	7·4 (8·2)	5 (5)	2	.....	.....	292	.....	.....	.....	.....	35·8

TABLE IV—Continued

Chemical Analyses of Raw Surface Waters in St. Lawrence River-Great Lakes Drainage Basin

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Iron (Fe): Total	Iron (Fe): Dissolved	Nitrite (NO_2)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Silica (SiO_2): Gravimetric	Silica (SiO_2): Colorimetric	Hardness as $CaCO_3$: Non-carbonate	Hardness as $CaCO_3$: Total	Sum of Constituents	Per cent sodium	Saturation index: +	Saturation index: −	No.
GREAT LAKES DRAINAGE BASIN																				
RIVER AT PLANT INTAKE, CORNWALL, ONT.																				
8·7	9·6	.....	.....	·06	.....	23·1	17·9	3·1	.....	115	0	.....	1·0	41·2	136	.....	.....	.....	.....	1
8·4	9·5	1·5	.....	·05	.....	22·9	19·7	4·4	.....	121	0	3·2	2·8	31·4	130	.....	.....	.....	.....	2
8·6	7·7	1·5	.....	·05	.....	23·7	17·8	0	·10	90·3	2·4	2·2	1·4	32·0	110	.....	.....	.....	.....	3
7·9	7·6	1·5	.....	·05	.....	22·2	18·8	0	·12	83·0	3·6	.....	3·6	28·3	104	.....	.....	.....	.....	4
8·1	9·0	1·0	.....	·03	.....	23·1	17·3	3·9	.....	112	3·8	3·4	7·0	26·2	124	.....	.....	.....	.....	5
8·2	8·3	1·4	.....	.....	.....	.....	16·5	.....	.....	109	2·9	.....	11	31·5	126	.....	.....	.....	.....	6
7·7	10·0	1·5	.....	·05	.....	22·8	19·3	·5	·30	115	0	3·6	1·2	34·6	129	.....	.....	.....	.....	7
9·1	8·5	1·5	.....	.....	.....	.....	18·5	.....	.....	112	0	.....	1·8	41·8	134	.....	.....	.....	.....	8
9·2	8·6	1·4	.....	.....	.....	.....	18·4	.....	.....	110	0	.....	1·7	44·0	134	.....	.....	.....	.....	9
7·9	8·0	1·3	.....	·07	.....	22·2	19·6	·6	·10	115	0	1·6	.....	32·3	126	.....	.....	.....	.....	10
8·1	8·3	1·6	.....	.....	.....	.....	17·9	.....	.....	113	0	.....	0·7	36·4	129	.....	.....	.....	.....	11
8·7	7·7	1·4	.....	·04	.....	25·0	18·0	·5	·06	110	2·4	1·8	1·0	31·6	126	.....	.....	.....	.....	12
9·1	8·0	1·4	.....	·05	.....	25·3	18·0	·5	·05	120	0	1·8	1·4	22·3	120	.....	.....	.....	.....	13
8·5	8·4	1·4	.....	·04	.....	23·4	18·3	1·3	·12	109	1·3	2·3	3·0	32·7	124	155	12·6	0·3	.....	14
RIVER AT MORRISBURG, ONT.																				
9·2	4·4†	.....	.....	·05	.....	20·2	18·2	1·3	.....	117	0	0·5	.....	38·7	134	150	.....	0·1	.....	15
RIVER AT PLANT INTAKE, IROQUOIS, ONT.																				
8·0	9·3	1·4	.....	.....	.....	36·7	19·0	.....	.....	112	2·4	.....	5·0	37·6	134	177	12·9	0·3	.....	16
RIVER AT PLANT INTAKE, PRESCOTT, ONT.																				
7·3	9·0	2·0	.....	.....	.....	.....	20·0	.....	.....	114 (115)	0 (0)	.....	1·0	25·8	119	.....	13·9	.....	0·5	17

TABLE IV—Continued

Chemical Analyses of Raw Surface Waters in St. Lawrence River-Great Lakes Drainage Basin

(In parts per million)

No.	Date of collection	Sample No.	Storage period (Days)	Stream discharge (Second-feet): On sampling date	Stream discharge (Second-feet): Monthly mean	Water temperature (°F.)	Dissolved oxygen	Carbon dioxide	pH	Colour	Turbidity	Suspended matter: Dried at 105°C.	Suspended matter: Ignited at 550°C.	Specific conductance Micromhos (K x 10^3) at 25°C.	Residue on Evaporation at 105°C. (Dissolved solids): P.P.M.	Residue on Evaporation at 105°C. (Dissolved solids): Tons per acre-foot	Residue on Evaporation at 105°C. (Dissolved solids): Thousand Tons per day	Loss on ignition at 550°C.	Calcium (Ca)
	UPPER ST. LAWRENCE RIVER-CENTRAL																		
	STATION No. 8: ST. LAWRENCE RIVER																		
1	Feb. 21/47	1374	4	203,000	215,000	61	.....	(1·5)	8·1	0	1	.....	.....	.....	181	·246	99·0	.....	39·3
2	June 10/48	2467	151	280,000	290,000	66	.....	(1·5)	8·4 (7·8)	3 (5)	algae (<7)	.....	.....	278	.....	.....	.....	.....	37·0
	STATION No. 9: ST. LAWRENCE RIVER																		
3	Feb. 10/48	2422	259	203,000	206,000	35	.....	.....	8·4	<5	2	.....	.....	286	.....	.....	.....	.....	37·0
4	Mar. 4	2426	238	205,000	225,000	34	.....	.....	8·6	<5	5	7·6	5·2	281	185	·252	102·4	27·0	37·0
5	April 3	2383	195	269,000	271,000	37	.....	.....	8·8	5	1	.....	.....	261	.....	.....	.....	.....	34·6
6	May 4	2391	165	275,000	279,000	44	.....	.....	8·4	2	25	.....	.....	272	.....	.....	.....	.....	38·5
7	June 4	2132	42	283,000	281,000	52	.....	.....	8·3	11	2	.....	.....	238	153	·208	116·8	26·6	33·2
8	July 3	2379	104	280,000	276,000	64	.....	.....	8·0	5	3	.....	.....	297	.....	.....	.....	.....	39·0
9	Aug. 4	2409	79	270,000	267,000	68	.....	.....	8·0	10	2	.....	.....	312	.....	.....	.....	.....	38·6
10	Sept. 7	2296	13	258,000	254,000	69	.....	.....	7·9	15	6	3·4	1·2	288	191	·255	130·4	50·0	37·0
11	Oct. 3	2354	5	240,000	244,000	64	.....	.....	8·1	0	4	.....	.....	291	.....	.....	.....	.....	37·5
12	Nov. 3	2466	5	238,000	240,000	52	.....	.....	8·1	3	0·8	.....	.....	284	.....	.....	.....	.....	37·0
13	Dec. 3	2591	14	224,000	234,000	44	.....	.....	8·2	2	1	.....	.....	292	.....	.....	.....	.....	39·8
14	Jan. 4/49	2800	57	213,000	222,000	34	.....	.....	7·9	0	0·8	.....	.....	287	169	·230	97·2	50·0	37·0
15	Average (12 samples)		98	246,500	250,000	50	.....	.....	8·2	5	4	.....	.....	282	.....	.....	.....	.....	37·2
	STATION No. 10: LAKE ONTARIO																		
16	Feb. 21/47	1372	4	245·24†	246·07†	.....	.....	1·9	8·1	0	1	.....	.....	.....	179	·243	.....	.....	42·9
17	July /48	2147	15	246·94†	247·90†	.....	.....	.....	8·0	8	.....	.....	.....	295	188	·256	.....	17·0	39·8
	STATION No. 11: BAY OF QUINTE																		
18	July 7/48	2477	132	.....	247·90†	70	(9·2)	(8·0)	8·1 (8·3)	15 (35)	9 (<7)	.....	.....	227	.....	.....	.....	.....	38·6
19	June 17/52	5730	8	.....	High	68	.....	.....	7·8	25	1	.....	.....	230	162	·221	.....	24·8	39·2

† Water levels, elevations in feet above Mean Sea Level at B.M. "Steel Rivet" at Kingston, Ont.; elevation 252·710 feet (Canadian Hydrographic Service).

TABLE IV—Continued

Chemical Analyses of Raw Surface Waters in St. Lawrence River-Great Lakes Drainage Basin

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Iron (Fe): Total	Iron (Fe): Dissolved	Nitrite (NO_2)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Silica (SiO_2): Gravimetric	Silica (SiO_2): Colorimetric	Hardness as $CaCO_3$: Non-carbonate	Hardness as $CaCO_3$: Total	Sum of Constituents	Per cent sodium	Saturation index: +	Saturation index:		Saturation index: −	No.
GREAT LAKES DRAINAGE BASIN—Continued																						
AT PLANT INTAKE, BROCKVILLE, ONT.																						
8·7	10·3 as Na		.....	·07	.....	23·5	18·0	·8	.....	116	0	0·5	.....	39·1	134	158	.....	0·3	.....			1
6·6	8·3	1·9	.....	.....	.....	.....	18·1	.....	.....	102 (112)	6·2 (0)	.....	8·3	15·6	110 (112)	.....	12·9	0·5	.....			2
AT PLANT INTAKE, GANANOQUE, ONT.																						
8·0	9·5	1·5	.....	.....	.....	.....	45·4	.....	.....	107	4·8	.....	11	29·4	125	.....	.....	.....	.....			3
9·0	9·3	1·5	·09	·03	.....	24·7	17·5	·2	·10	110	1·2	4·0	4·8	35·5	130	.....	.....	.....	.....			4
7·8	7·5	1·5	.....	.....	.....	.....	15·0	.....	.....	90·3	7·2	.....	1·4	32·6	119	.....	.....	.....	.....			5
6·5	6·5	1·5	.....	.....	.....	.....	13·5	.....	.....	117	0	.....	1·2	27·1	123	.....	.....	.....	.....			6
6·2	6·0	1·0	.....	·05	.....	16·5	13·6	·4	·20	80·5	4·8	4·2	4·0	35·4	109	.....	.....	.....	.....			7
7·9	8·3	1·4	.....	.....	.....	.....	18·7	.....	.....	115	0	.....	1·8	36·0	130	.....	.....	.....	.....			8
8·0	8·3	1·5	.....	.....	.....	.....	20·6	.....	.....	120	0	.....	2·1	31·4	129	.....	.....	.....	.....			9
10·5	8·3	1·5	.....	·01	.....	21·0	18·5	·3	·10	115	0	.....	2·2	41·6	136	.....	.....	.....	.....			10
9·0	7·5	1·3	.....	.....	.....	.....	18·2	.....	.....	117	0	.....	1·2	34·7	131	.....	.....	.....	.....			11
7·1	8·1	1·5	.....	.....	.....	.....	20·0	.....	.....	117	0	.....	1·3	25·6	122	.....	.....	.....	.....			12
8·0	8·4	1·4	.....	.....	.....	.....	20·6	.....	.....	117	0	.....	1·4	36·3	132	.....	.....	.....	.....			13
9·3	7·8	1·6	.....	·06	.....	26·6	16·6	4·4	·10	122	0	1·8	1·2	30·4	130	.....	.....	.....	.....			14
8·1	8·0	1·4	.....	.....	.....	.....	19·9	.....	.....	111	1·5	.....	2·8	33·0	126	134	12·0	0·3	.....			15
AT PLANT INTAKE, KINGSTON, ONT.																						
12·0	7·6 as Na		.....	·05	.....	25·1	19·1	·9	.....	117	0	5·0	.....	60·6	156	170	.....	0·3	.....			16
8·9	10·1	1·4	.....	0	.....	47·9	18·9	7·9	.....	120	4·8	2·0	1·4	37·8	136	200	13·7	0·2	.....			17
AT PLANT INTAKE, DESERONTO, ONT.																						
5·2	3·0	1·7	.....	.....	.....	.....	1·0	.....	.....	120 (124)	0 (0)	.....	3·8	19·6	118 (120)	.....	5·3	0·3	.....			18
4·1	2·5	1·2	.....	·17	.....	10·5	3·4	·1	0·20	126	0	.....	1·4	11·6	115	125	4·5	0	.....			19

71579—2½

TABLE IV—Continued

Chemical Analyses of Raw Surface Waters in St. Lawrence River-Great Lakes Drainage Basin

(In parts per million)

No.	Date of collection	Sample No.	Storage period (Days)	Stream discharge (Second-feet): On sampling date	Stream discharge (Second-feet): Monthly mean	Water temperature (°F.)	Dissolved oxygen	Carbon dioxide	pH	Colour	Turbidity	Suspended matter: Dried at 105°C.	Suspended matter: Ignited at 550°C.	Specific conductance Micromhos ($K \times 10^6$) at 25°C.	Residue on Evaporation at 105°C. (Dissolved solids): P.P.M.	Residue on Evaporation at 105°C. (Dissolved solids): Tons per acre-foot	Residue on Evaporation at 105°C. (Dissolved solids): Thousand Tons per day	Loss on ignition at 550°C.	Calcium (Ca)
	UPPER ST. LAWRENCE RIVER-CENTRAL																		
	STATION No. 12: LAKE ONTARIO																		
1	Mar. 21/50.....	4128	29	.....	245·88†	35	.....	.....	8·3	0	5	.....	.....	296	.....	.....	.....	.....	42·3
2	May 29/52.....	5709	8	.....	.....	47	.....	.....	8·1	3	2	.....	.....	299	189	·257	.....	38·6	38·6
	STATION No. 13: LAKE ONTARIO																		
3	Feb. 11/48.....	2451	268	.....	246·07†	32	.....	.....	8·4	0	6	.....	.....	301	.....	.....	.....	.....	42·0
4	Mar. 6††.....	2411	233	.....	246·06	32	.....	.....	8·7	5	0·2	.....	.....	252	153	·208	.....	43·2	26·8
5	April 5.....	2565	248	.....	246·88	31	.....	.....	8·1	5	18	20	12	322	191	·260	.....	27·4	43·2
6	May 5.....	2381	163	.....	247·59	34	.....	.....	8·3	5	3	.....	.....	297	.....	.....	.....	.....	39·0
7	June 5.....	2388	133	.....	248·71	38	.....	.....	8·2	3	5	.....	.....	307	.....	.....	.....	.....	39·0
8	July 5.....	2542	147	.....	248·81	48	.....	.....	8·3	0	1	.....	.....	295	181	·246	.....	33·8	38·8
9	Aug. 5.....	2340	61	.....	248·56	50	.....	.....	8·4	3	0·8	.....	.....	302	.....	.....	.....	.....	39·2
10	Sept. 5.....	2303	16	.....	248·00	68	.....	.....	8·0	5	.....	.....	.....	299	.....	.....	.....	.....	38·0
11	Oct. 7.....	2499	42	.....	247·20	60	.....	.....	7·7	5	0·4	.....	.....	292	185	·252	.....	24·4	38·2
12	Nov. 8.....	2502	11	.....	246·73	50	.....	.....	7·6	3	9	.....	.....	300	.....	.....	.....	.....	39·1
13	Dec. 9.....	2592	8	.....	246·44	32	.....	.....	8·0	2	15	.....	.....	302	.....	.....	.....	.....	39·5
14	Jan. 10/49.....	2652	4	.....	245·82	35	.....	.....	8·1	2	6	13	11	302	181	·246	.....	20·2	41·0
15	Jan. 31*.....	2782	23	.....	245·82	32	.....	.....	7·9	5	3	.....	.....	307	179	·243	.....	33·6	40·4
16	Average (12 samples).....		111	.....	247·13	43	.....	.....	8·2	3	6	.....	.....	298	.....	.....	.....	.....	38·7
	STATION No. 14: LAKE ONTARIO																		
17	Feb. 24/47.....	1378	11	245·247†	246·07†	.....	.....	.....	8·1	5	0·7	.....	.....	.....	178	·242	.....	.....	39·3
	STATION No. 15: LAKE ONTARIO AT																		
18	Mar. 22/50.....	4171	41	.....	246·06†	39	.....	.....	7·9	0	7	31	29	296	182	·248	.....	21·4	39·2

* Not included in average.

† Water levels; elevations in feet above Mean Sea Level at B.M. "Steel Rivet" at Kingston, Ont., elevation 252·710 feet (Canadian Hydrographic Service).

†† Sample may have lost calcium owing to long storage, thus lowering average for hardness, specific conductance, etc.

TABLE IV—Continued

Chemical Analyses of Raw Surface Waters in St. Lawrence River-Great Lakes Drainage Basin

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Iron (Fe): Total	Iron (Fe): Dissolved	Nitrite (NO_2)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Silica (SiO_2): Gravimetric	Silica (SiO_2): Colorimetric	Hardness as $CaCO_3$: Non-carbonate	Hardness as $CaCO_3$: Total	Sum of Constituents	Per cent sodium	Saturation index: +	Saturation index: −	No.
GREAT LAKES DRAINAGE BASIN—Continued																				
AT PLANT INTAKE, COBOURG, ONT.																				
8·3	8·7	1·3	.....	.....	.....	40·0	19·5	.....	.....	111	3·6	.....	1·6	42·6	140	180	11·8	0·5	.....	1
7·9	9·0	1·6	.....	·10	.....	25·0	21·2	0·6	0·20	116	0·7	.....	1·6	32·2	128	164	.....	0·2	.....	2
AT PLANT INTAKE, PORT HOPE, ONT.																				
8·0	10·3	1·7	.....	.....	.....	.....	17·8	.....	.....	111	4·8	.....	8·0	38·9	138	.....	.....	.....	.....	3
8·8	10·0	1·7	.....	·05	.....	23·0	27·7	0	·15	75·6	4·8	1·8	0·8	33·1	103	.....	.....	.....	.....	4
8·7	10·3	1·8	·46	·03	.....	23·7	16·7	2·7	·05	142	1·0	2·8	4·4	25·6	144	.....	.....	.....	.....	5
8·4	8·0	1·5	.....	.....	.....	.....	17·8	.....	.....	117	0	.....	2·8	36·2	132	.....	.....	.....	.....	6
7·4	10·5	1·9	.....	.....	.....	.....	17·8	.....	.....	120	0	.....	0·6	33·4	131	.....	.....	.....	.....	7
8·9	8·0	1·6	.....	·10	.....	22·6	18·0	0·9	·10	117	2·9	3·0	2·6	34·4	133	.....	.....	.....	.....	8
9·1	9·4	1·5	.....	.....	.....	.....	19·2	.....	.....	122	0	.....	1·8	35·3	135	.....	.....	.....	.....	9
7·9	10·0	1·9	.....	.....	.....	.....	18·6	.....	.....	115	0	.....	2·3	33·3	127	.....	.....	.....	.....	10
8·2	8·5	1·7	.....	·11	.....	23·7	20·1	0·7	·10	115	0	1·8	0·2	35·0	129	.....	.....	.....	.....	11
8·2	9·3	2·0	.....	.....	.....	.....	19·2	.....	.....	119	0	.....	1·8	33·7	132	.....	.....	.....	.....	12
8·1	8·5	1·5	.....	.....	.....	.....	18·1	.....	.....	124	0	.....	1·2	30·2	132	.....	.....	.....	.....	13
8·4	8·0	1·5	·26	·02	.....	23·4	15·5	1·8	·10	131	2·4	6·0	5·2	25·9	137	.....	.....	.....	.....	14
9·5	7·8	1·2	.....	·04	.....	28·5	18·5	0·6	·15	127	0	2·0	1·6	36·0	140	.....	.....	.....	.....	15
8·3	9·2	1·5	.....	.....	.....	.....	18·9	.....	.....	116	1·3	.....	3·0	33·9	131	138	13·1	0·4	.....	16
AT PLANT INTAKE, OSHAWA, ONT.																				
8·3	11·6 as Na		.....	·02	.....	23·9	17·6	2·7	.....	118	0	0·5	.....	35·3	132	162	.....	0·3	.....	17
PLANT INTAKE, SCARBOROUGH TOWNSHIP, ONT.																				
8·0	8·5	1·1	1·8	·07	.....	26·0	18·6	1·3	·05	116	0	5·6	2·0	35·7	131	164	12·3	0·2	.....	18

TABLE IV—Continued

Chemical Analyses of Raw Surface Waters in St. Lawrence River-Great Lakes Drainage Basin

(In parts per million)

No.	Date of collection	Sample No.	Storage period (Days)	Stream discharge (Second-feet)		Water temperature (°F.)	Dissolved oxygen	Carbon dioxide	pH	Colour	Turbidity	Suspended matter		Specific conductance Micromhos ($K \times 10^6$) at 25°C.	Residue on Evaporation at 105°C. (Dissolved solids)			Loss on ignition at 550°C.	Calcium (Ca)
				On sampling date	Monthly mean							Dried at 105°C.	Ignited at 550°C.		P.P.M.	Tons per acre-foot	Thousand Tons per day		
UPPER ST. LAWRENCE RIVER-CENTRAL																			
STATION No. 16: LAKE ONTARIO AT																			
(Data from munici																			
				Free NH_3		Albuminoid NH_3													
1	1944 Maximum	.....	.....	0·165	.....	0·128	.....	8·3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
2	1944 Minimum	.....	.....	0	.....	0·060	.....	7·7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
3	1944 Average	.....	.....	0·0014	.....	0·090	.....	7·8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
4	1945 Maximum	.....	.....	0·140	.....	0·120	.....	8·2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
5	1945 Minimum	.....	.....	0	.....	0·064	.....	7·7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
6	1945 Average	.....	.....	0·002	.....	0·086	.....	7·9	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
7	1946 Maximum	.....	.....	0·202	.....	0·112	.....	8·2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
8	1946 Minimum	.....	.....	0	.....	0·060	.....	7·5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
9	1946 Average	.....	.....	0·002	.....	0·083	.....	7·85	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
10	1947 Maximum	.....	.....	0·048	.....	0·120	.....	8·1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
11	1947 Minimum	.....	.....	0	.....	0·064	.....	7·7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
12	1947 Average	.....	.....	0·0004	.....	0·084	.....	7·86	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
13	1948 Maximum	.....	.....	0·170	.....	0·102	.....	8·2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
14	1948 Minimum	.....	.....	0	.....	0·054	.....	7·7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
15	1948 Average	.....	.....	0·001	.....	0·080	.....	7·87	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
STATION No. 17: LAKE ONTARIO AT																			
10	Mar. 1/47.....	1380	6	245·57†	246·06†	.....	.....	.....	8·1	5	0·5	.....	.....	.....	176	·239	.....	.....	39·3
STATION No. 18: LAKE ONTARIO AT																			
17	July 8/48.....	2623	181	.....	247·90†	48	.....	(3·5)	8·3 (8·2)	10 (8)	4	4·0	2·0	297	178	·242	.....	29·8	39·0

† Water level readings at Kingston, Ont.

TABLE IV—Continued

Chemical Analyses of Raw Surface Waters in St. Lawrence River-Great Lakes Drainage Basin

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Iron (Fe): Total	Iron (Fe): Dissolved	Nitrite (NO_2)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Silica (SiO_2): Gravimetric	Silica (SiO_2): Colorimetric	Hardness as $CaCO_3$: Non-carbonate	Hardness as $CaCO_3$: Total	Sum of Constituents	Per cent sodium	Saturation index: +	Saturation index: −	No.
GREAT LAKES DRAINAGE BASIN—Continued																				
AT PLANT INTAKE, TORONTO, ONT.																				
pal plant records)																				
.....	.....	.....	.....	.....	0·36	.....	16·8	.....	.....	.....	.....	.....	.....	39·2	133	.....	.....	.....	.....	1
.....	.....	.....	.....	.....	0·22	.....	16·0	.....	.....	.....	.....	.....	.....	21·7	122	.....	.....	.....	.....	2
.....	.....	.....	.....	.....	0·29	.....	16·3	.....	.....	.....	.....	.....	.....	34·3	127	.....	.....	.....	.....	3
.....	.....	.....	.....	.....	0·36	.....	16·9	.....	.....	.....	.....	.....	.....	34·7	129	.....	.....	.....	.....	4
.....	.....	.....	.....	.....	0·24	.....	16·2	.....	.....	.....	.....	.....	.....	29·7	121	.....	.....	.....	.....	5
.....	.....	.....	.....	.....	0·29	.....	16·5	.....	.....	.....	.....	.....	.....	32·1	125	.....	.....	.....	.....	6
.....	.....	.....	.....	.....	0·36	.....	17·5	.....	.....	.....	.....	.....	.....	38·2	132	.....	.....	.....	.....	7
.....	.....	.....	.....	.....	0·20	.....	16·8	.....	.....	.....	.....	.....	.....	28·2	119	.....	.....	.....	.....	8
.....	.....	.....	.....	.....	0·27	.....	17·1	.....	.....	.....	.....	.....	.....	33·2	126	.....	.....	.....	.....	9
.....	.....	.....	.....	.....	0·32	.....	18·1	.....	.....	.....	.....	.....	.....	39·7	135	.....	.....	.....	.....	10
.....	.....	.....	.....	.....	0·20	.....	17·3	.....	.....	.....	.....	.....	.....	34·7	123	.....	.....	.....	.....	11
.....	.....	.....	.....	.....	0·24	.....	17·6	.....	.....	.....	.....	.....	.....	36·3	129	.....	.....	.....	.....	12
.....	.....	.....	.....	.....	0·44	.....	18·5	.....	.....	.....	.....	.....	.....	41·2	135	.....	.....	.....	.....	13
.....	.....	.....	.....	.....	0·20	.....	17·9	.....	.....	.....	.....	.....	.....	37·7	128	.....	.....	.....	.....	14
.....	.....	.....	.....	.....	0·30	.....	18·1	.....	.....	.....	.....	.....	.....	38·2	131	.....	.....	.....	.....	15
PLANT INTAKE, NEW TORONTO, ONT.																				
7·2	11·1 as Na	.....	·03		0	21·0	18·5	3·5	.....	118	0	4·5	.....	30·7	128	163	.....	0·3	.....	16
PLANT INTAKE, PORT CREDIT, ONT.																				
8·5	8·0	1·6	·32	·03	.....	24·0	18·2	1·3	·10	114 (117)	1·9 (0)	1·2	3·4	35·5	132	163	11·5	0·5	.....	17

TABLE IV—Continued

Chemical Analyses of Raw Surface Waters in St. Lawrence River-Great Lakes Drainage Basin

(In parts per million)

No.	Date of collection	Sample No.	Storage period (Days)	Stream discharge (Second-feet): On sampling date	Stream discharge (Second-feet): Monthly mean	Water temperature (°F.)	Dissolved oxygen	Carbon dioxide	pH	Colour	Turbidity	Suspended matter: Dried at 105°C.	Suspended matter: Ignited at 550°C.	Specific conductance Micromhos (K x 10^6) at 25°C.	Residue on Evaporation at 105°C. (Dissolved solids): P.P.M.	Residue on Evaporation at 105°C. (Dissolved solids): Tons per acre-foot	Residue on Evaporation at 105°C. (Dissolved solids): Thousand Tons per day	Loss on ignition at 550°C.	Calcium (Ca)
	UPPER ST. LAWRENCE RIVER-CENTRAL																		
	STATION No. 19: LAKE ONTARIO AT																		
1	Mar. 3/47.....	1381	4	245·57†	246·06†	.....	.....	.....	8·0	5	0·5	.....	.....	.....	182	·248	.....	.....	38·6
	† Water levels at Kingston, Ont.; see Station 13.																		
	STATION No. 20: LAKE ONTARIO AT																		
2	Feb. 14/48.....	2389	245	.....	246·14‡	34	.....	.....	8·1	4	1	.....	.....	306	.....	.....	.....	.....	41·5
3	Mar. 6†.....	2446	243	.....	246·67	.....	.....	.....	8·5	5	Algae	72	54	260	162	·220	.....	38·0	31·8†
4	April 6.....	2462	216	.....	247·67	38	.....	.....	8·2	3	2	.....	.....	291	201	·273	.....	51·8	37·4
5	May 6.....	2450	183	.....	248·04	44	.....	.....	8·2	0	7	.....	.....	290	.....	.....	.....	.....	39·0
6	June 7.....	2359	123	.....	248·17	56	.....	.....	8·3	0	10	.....	.....	300	.....	.....	.....	.....	39·0
7	July 6.....	2494	94	.....	247·90	60	.....	.....	8·2	0	2	.....	.....	297	191	·260	.....	34·8	38·8
8	Aug. 7.....	2360	62	.....	247·45	62	.....	.....	8·3	0	5	.....	.....	301	.....	.....	.....	.....	40·0
9	Sept. 6.....	2302	15	.....	246·79	68	.....	.....	7·9	8	.....	.....	.....	302	.....	.....	.....	.....	39·0
10	" 16*.....	2461	53	.....	246·79	66	.....	.....	7·9	4	3	.....	.....	304	234	·318	.....	54·8	39·4
11	Oct. 6.....	2432	22	.....	246·25	60	.....	.....	8·1	0	3	.....	.....	295	185	·252	.....	32·1	36·0
12	Nov. 6.....	2503	13	.....	246·02	50	.....	.....	7·5	5	5	.....	.....	300	.....	.....	.....	.....	38·6
13	Dec. 6.....	2581	10	.....	245·79	40	.....	.....	8·0	5	8	.....	.....	297	.....	.....	.....	.....	41·3
14	Jan. 6/49.....	2653	8	.....	245·82	36	.....	.....	7·6	0	10	42	38	309	185	·252	.....	24·2	39·4
15	Average (12 samples).....		103	.....	246·88	50	.....	.....	8·1	2	6	.....	.....	296	.....	.....	.....	.....	38·5
	* Not included in average: No. 2461 represents low water sample. † Sample may have lost some calcium carbonate by precipitation on long storage. ‡ Water levels at Kingston; see Station No. 13.																		
	STATION No. 21: NIAGARA RIVER																		
16	July 12/48.....	2474	127	218,000†	219,700†	72	(11·2)	(1·8)	8·2 (8·5)	5 (5)	3 (<7)	.....	.....	291	.....	.....	.....	.....	37·8
	STATION No. 22: NIAGARA RIVER AT PLANT																		
17	Feb. 16/48.....	2358	235	194,000†	200,700†	.....	.....	.....	8·2	0	4	.....	.....	303	.....	.....	.....	.....	40·5
18	Mar. 8*.....	2355	214	215,000	206,400	36	.....	.....	8·2	2	8	.....	.....	556	.....	.....	.....	.....	76·8
19	April 5.....	2417	203	219,000	220,600	36	.....	.....	8·4	0	Algae	.....	.....	252	149	·203	88·0	31·6	29·0
20	May 10.....	2455	179	223,000	229,200	47	.....	.....	8·3	0	5	.....	.....	257	.....	.....	.....	.....	30·0
	† Discharge at Queenston, Ont.																		

TABLE IV—Continued

Chemical Analyses of Raw Surface Waters in St. Lawrence River-Great Lakes Drainage Basin

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Iron (Fe): Total	Iron (Fe): Dissolved	Nitrite (NO_2)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Silica (SiO_2): Gravimetric	Silica (SiO_2): Colorimetric	Hardness as $CaCO_3$: Non-carbonate	Hardness as $CaCO_3$: Total	Sum of Constituents	Per cent sodium	Saturation index: +	Saturation index: −	No.
GREAT LAKES DRAINAGE BASIN—Continued																				
PLANT INTAKE, HAMILTON, ONT.																				
8·3	11·6 as Na	.....	·02	.....		22·2	18·8	3·0	.....	119	0	1·5	.....	33·4	131	163	.....	0·2	.....	1
PLANT INTAKE, GRIMSBY, ONT.																				
8·0	7·8	1·7	.....	.....	.....	.....	18·0	.....	.....	122	0	.....	1·0	36·7	137	.....	.....	.....	.....	2
9·5	8·6	1·8	2·5	·04	.....	23·7	17·7	0	·20	88·3	2·4	1·2	0	42·1	119†	.....	.....	.....	.....	3
9·1	7·5	1·5	.....	·32	.....	26·2	17·4	·4	·13	112	0	6·4	0·4	38·8	131	.....	.....	.....	.....	4
7·9	9·0	2·0	.....	.....	.....	.....	17·5	.....	.....	112	2·4	.....	1·6	34·0	130	.....	.....	.....	.....	5
9·4	8·3	1·7	.....	.....	.....	.....	17·3	.....	.....	117	0	.....	1·1	40·0	136	.....	.....	.....	.....	6
8·3	8·5	1·7	.....	·08	.....	26·8	18·7	·9	·10	117	0	1·4	0·1	35·0	131	.....	.....	.....	.....	7
9·1	7·8	1·6	.....	.....	.....	.....	18·2	.....	.....	117	0	.....	1·0	41·3	137	.....	.....	.....	.....	8
9·2	8·6	1·9	.....	.....	.....	.....	18·6	.....	.....	112	0	.....	1·4	43·2	135	.....	.....	.....	.....	9
9·4	8·5	1·6	.....	1·1	.....	24·4	18·5	1·8	·10	117	0	.....	1·4	41·2	137	.....	.....	.....	.....	10
9·4	9·0	2·1	.....	·15	.....	27·3	18·3	·1	0	115	0	3·2	1·2	34·5	129	.....	.....	.....	.....	11
8·3	8·0	2·0	.....	.....	.....	.....	18·8	.....	.....	119	0	.....	1·4	33·3	131	.....	.....	.....	.....	12
8·8	8·0	1·9	.....	.....	.....	24·3	19·6	.....	.....	124	0	.....	0·9	38·0	139	.....	.....	.....	.....	13
8·5	8·0	1·6	·60	·01	.....	28·5	18·0	·9	·10	110	0	1·6	1·2	43·3	133	.....	.....	.....	.....	14
8·8	8·3	1·8	.....	.....	.....	25·9	18·2	.....	.....	114	0·4	.....	0·9	39·2	132	160	12·0	0·3	.....	15
AT NIAGARA-ON-THE-LAKE, ONT.																				
8·2	8·5	1·6	.....	.....	.....	.....	19·2 (17·9)	.....	.....	112 (115)	0 (0)	.....	1·2	36·5	128	.....	12·2	0·3	.....	16
INTAKE, CHIPPAWA, ONT. Drainage area, 255,000 sq. miles.																				
10·3	8·3	1·5	.....	.....	.....	.....	18·2	.....	.....	127	0	.....	6·2	39·5	144	.....	.....	.....	.....	17
10·8	8·3	1·6	.....	.....	.....	.....	116·3	.....	.....	70·8	0	.....	0	178	236	.....	.....	.....	.....	18
7·7	8·8	1·7	·04	.....	.....	20·2	16·3	0	·10	87·4	2·6	3·4	2·4	28·1	104	.....	.....	.....	.....	19
7·7	8·8	2·1	.....	.....	.....	.....	18·3	.....	.....	95·2	0	.....	0·4	28·6	107	.....	.....	.....	.....	20

TABLE IV—Continued

Chemical Analyses of Raw Surface Waters in St. Lawrence River-Great Lakes Drainage Basin

(In parts per million)

No.	Date of collection	Sample No.	Storage-period (Days)	Stream discharge (Second-feet): On sampling date	Stream discharge (Second-feet): Monthly mean	Water temperature (°F.)	Dissolved oxygen	Carbon dioxide	pH	Colour	Turbidity	Suspended matter: Dried at 105°C.	Suspended matter: Ignited at 550°C.	Specific conductance Micromhos (K x 10⁶) at 25°C.	Residue on Evaporation at 105°C. (Dissolved solids): P.P.M.	Residue on Evaporation at 105°C. (Dissolved solids): Tons per acre-foot	Residue on Evaporation at 105°C. (Dissolved solids): Thousand Tons per day	Loss on ignition at 550°C.	Calcium (Ca)
	UPPER ST. LAWRENCE RIVER-CENTRAL																		
	STATION No. 22: NIAGARA RIVER AT																		
1	June 8.....	2375	127	234,000†	225,700†	.....	.....	.....	8·6	2	13	.....	.....	257	.....	.....	.....	.....	32·5
2	July 4.....	2498	137	222,000	219,700	67	.....	.....	8·5	10	3	7·2	4·0	275	168	·229	101·0	23·0	34·9
3	Aug. 9.....	2370	65	212,000	214,700	70	.....	.....	8·4	10	5	.....	.....	291	.....	.....	.....	.....	35·0
4	Sept. 7.....	2300	14	209,000	205,100	69	.....	.....	8·4	2	.....	.....	.....	291	.....	.....	.....	.....	38·4
5	Oct. 5.....	2399	14	192,000	199,200	58	.....	.....	8·0	0	2	.....	.....	291	173	·235	89·0	48·2	36·8
6	Nov. 8.....	2504	11	198,000	201,000	54	.....	.....	8·0	3	5	.....	.....	287	.....	.....	.....	.....	38·1
7	Dec. 6.....	2594	11	226,000	197,000	46	.....	.....	8·0	2	20	.....	.....	303	.....	.....	.....	.....	37·5
8	Jan. 10/49.....	2654	4	196,000	200,500	38	.....	.....	8·1	7	20	34	31	288	171	·233	91·0	26·2	36·8
9	Feb. 7.....	2779	16	214,000	203,200	36	.....	.....	8·0	5	15	24	18	298	177	·241	102·0	56·0	38·8
10	Average (12 samples).....		85	211,500	209,700	52	.....	.....	8·2	3	9	.....	.....	282	.....	.....	.....	.....	35·7

* No. 2355 not included in average; this sample is probably a mixture of Welland River and Niagara River water, the former being in flood.
† Discharge at Queenston, Ont.

	STATION No. 23: WELLAND CANAL AT																		
11	July 12/48.....	2580	150	.....	5,000	79	.....	(2·2)	8·1 (8·1)	7 (9)	1 (<7)	.....	.....	293	171	·233	.....	28·4	35·2
	STATION No. 24—WELLAND CANAL AT																		
12	July 10/48.....	2644	186	.....	5,000	77	(9·6)	(2·6)	8·2 (8·3)	5 (10)	6 (15)	.....	.....	273	.....	.....	.....	.....	33·0
	STATION No. 25: NIAGARA RIVER AT PLANT																		
13	July 13/48.....	2478	126	217,000	219,700	78	.....	(1·8)	8·1 (8·3)	5 (8)	4 (<7)	.....	.....	283	.....	.....	.....	.....	36·5
	STATION No. 26: LAKE ERIE AT PLANT																		
14	July 13/48.....	2578	149	.....	573·58†	72	.....	(2·6)	7·6	2 (7)	2 (<7)	.....	.....	292	168	·229	.....	27·4	35·6
	STATION No. 27: LAKE ERIE AT PLANT																		
15	Feb. 17/48.....	2376	239	571·39*	571·95†	36	.....	.....	8·1	7	8	.....	.....	320	.....	.....	.....	.....	40·5
16	Mar. 9.....	2493	254	571·56	572·45	32	.....	.....	8·3	10	15	18	13	301	197	·268	.....	38·6	40·2
17	April 9.....	2488	222	572·17	573·23	33	.....	.....	8·4	0	Algae	Slight sediment	.....	349	218	·297	.....	43·0	46·4

* Mean levels, 1939-48 inclusive.
† Water level; elevation in feet above Mean Sea Level, at B.M. "Steel Rivet" at Port Colborne, 584·657 feet elevation. (Canadian Hydrographic Service.)

TABLE IV—Continued

Chemical Analyses of Raw Surface Waters in St. Lawrence River-Great Lakes Drainage Basin

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Iron (Fe): Total	Iron (Fe): Dissolved	Nitrite (NO_2)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Silica (SiO_2): Gravimetric	Silica (SiO_2): Colorimetric	Hardness as $CaCO_3$: Non-carbonate	Hardness as $CaCO_3$: Total	Sum of Constituents	Per cent sodium	Saturation index: +	Saturation index: −	No.
GREAT LAKES DRAINAGE BASIN—Continued																				
PLANT INTAKE, CHIPPAWA, ONT.—*Concluded*																				
8·3	9·1	1·5	.....	.....	.....	.....	18·0	.....	.....	90·3	7·2	.....	.....	29·5	116	.....	.....	.....	.....	1
8·2	8·5	1·5	·25	·04	.....	21·1	20·1	0	·05	105	1·9	1·4	0·2	32·8	121	.....	.....	.....	.....	2
8·7	8·0	1·4	.....	.....	.....	.....	18·5	.....	.....	107	2·4	.....	2·4	31·3	123	.....	.....	.....	.....	3
9·6	8·6	1·8	.....	.....	.....	.....	18·0	.....	.....	112	0	.....	2·7	43·3	135	.....	.....	.....	.....	4
8·6	7·8	1·5	.....	·07	.....	22·2	17·8	·2	·08	120	0	1·8	1·6	28·2	127	.....	.....	.....	.....	5
8·2	7·0	1·3	.....	.....	.....	.....	18·4	.....	.....	118	0	.....	2·6	32·1	129	.....	.....	.....	.....	6
8·3	8·2	1·5	.....	.....	.....	.....	17·7	.....	.....	117	0	.....	1·4	31·8	128	.....	.....	.....	.....	7
7·8	8·3	1·4	·73	·04	.....	22·7	18·5	·4	·10	117	0	1·0	0·8	27·9	124	.....	.....	.....	.....	8
9·5	7·5	1·2	·14	·04	.....	26·5	19·0	·5	0	120	0	3·0	1·2	37·8	136	.....	.....	.....	.....	9
8·6	8·2	1·5	.....	.....	.....	.....	18·2	.....	.....	110	1·2	.....	2·0	32·8	125	.....	12·8	0·3	.....	10
PLANT INTAKE, ST. CATHARINES, ONT.																				
9·0	8·5	1·6	.....	·02	.....	30·3	16·5 (16·4)	·4	·12	115 (112)	0 (0)	1·8	3·0	30·8	125	161	12·7	0·2	.....	11
PLANT INTAKE, THOROLD, ONT.																				
7·9	8·8	1·5	.....	.....	.....	.....	18·5 (18·7)	.....	.....	107 (117)	0 (0)	.....	7·6	26·9	115 (116)	.....	14·1	0·3	.....	12
INTAKE, FORT ERIE NORTH, ONT.																				
8·1	8·8	1·6	.....	.....	.....	.....	18·0 (17·9)	.....	.....	110 (117)	0 (0)	.....	1·4	34·7	125	.....	13·1	0·2	.....	13
INTAKE, FORT ERIE SOUTH, ONT.																				
8·2	9·3	1·6	.....	·02	.....	23·7	18·5 (17·9)	·4	·11	120 (112)	0 (0)	1·6	3·4	24·5	123 (118)	160	13·9	.....	·0·3	14
INTAKE, PORT STANLEY, ONT.																				
7·5	8·8	1·4	.....	.....	.....	.....	18·5	.....	.....	112	0	.....	1·8	40·5	133	.....	.....	.....	.....	15
8·5	7·0	1·8	·84	·005	.....	25·0	17·8	2·2	·10	122	0	2·8	3·4	35·3	135	.....	.....	.....	.....	16
9·8	7·3	1·5	.....	·05	.....	64·5	17·0	1·3	0	106	2·9	.....	0·2	63·9	156	.....	.....	.....	.....	17

TABLE IV—Continued

Chemical Analyses of Raw Surface Waters in St. Lawrence River-Great Lakes Drainage Basin

(In parts per million)

No.	Date of collection	Sample No.	Storage period (Days)	Stream discharge (Second-feet)		Water temperature (°F.)	Dissolved oxygen	Carbon dioxide	pH	Colour	Turbidity	Suspended matter		Specific conductance Micromhos (K x 10^6) at 25°C.	Residue on Evaporation at 105°C. (Dissolved solids)			Loss on ignition at 550°C.	Calcium (Ca)
				On sampling date	Monthly mean							Dried at 105°C.	Ignited at 550°C.		P.P.M.	Tons per acre-foot	Thousand Tons per day		
UPPER ST. LAWRENCE RIVER-CENTRAL																			
STATION No. 27: LAKE ERIE AT PLANT																			
1	May 9	2390	160	572·62	573·66	38	.....	.....	8·4	4	40	.....	.....	322	.....	.....	.....	.....	42·3
2	June 9	2373	126	572·94	573·67	40	.....	.....	8·1	8	9	.....	.....	302	.....	.....	.....	.....	39·0
3	July 9	2485	131	572·91	573·58	60	.....	.....	8·2	0	5	16	14	301	189	·257	.....	38·2	38·4
4	Aug. 9	2342	57	572·67	573·19	65	.....	.....	8·0	0	10	.....	.....	299	.....	.....	.....	.....	39·0
5	Sept. 9	2299	12	572·36	572·69	60	.....	.....	7·2	5	.....	.....	.....	307	.....	.....	.....	.....	38·0
6	Oct. 9	2395	10	572·09	572·28	47	.....	.....	7·3	0	30	51	39	322	198	·269	.....	31·0	40·8
7	Nov. 9	2501	10	572·02	572·24	53	.....	.....	8·2	7	1	.....	.....	313	.....	.....	.....	.....	42·3
8	Dec. 6	2582	10	571·93	572·01	44	.....	.....	7·3	3	65	.....	.....	307	.....	.....	.....	.....	39·6
9	Jan. 10/49	Sample lost in transit.			572·10	39	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
10	Feb. 1	2743	19	.....	572·32	38	.....	.....	7·7	5	125	174	156	330	199	·271	.....	30·0	44·6
11	Average (12 samples)		141	572·24	572·77	46	.....	.....	7·9	4	30	.....	.....	314	.....	.....	.....	.....	40·9
STATION No. 28: LAKE ERIE AT																			
12	June 15/48	2469	146	572·94	573·67†	53	(11·0)	(1·5)	8·2 (8·1)	17 (20)	25	.....	.....	297	.....	.....	.....	.....	38·0
STATION No. 29: DETROIT RIVER AT																			
13	Mar. 13/48†	2463	240	.....	189,000	34	.....	.....	8·9	1	3	.....	.....	160	107	·146	54·8	29·2	14·0†
14	April 13	2447	205	.....	196,000	45	.....	.....	8·8	0	Algae	Slight sediment	.....	201	118	·161	62·6	26·6	23·5
15	May 15	2380	153	.....	202,000	55	.....	.....	8·2	10	35	.....	.....	278	.....	.....	.....	.....	31·2
16	June 12	2382	125	.....	198,000	63	.....	.....	8·2	5	35	.....	.....	295	.....	.....	.....	.....	31·7
17	June 17*	2470*	144	.....	198,000	65	(10·2)	(1·5)	8·7 (8·0)	0	Algae	Medium Sediment	.....	301	.....	.....	.....	.....	25·5
18	July 15	2293	67	.....	198,000	72	.....	.....	7·8	25	30	59	46	306	181	·246	96·6	25·5	29·0
19	Aug. 12	2457	85	.....	198,000	70	.....	.....	8·3	10	30	.....	.....	261	.....	.....	.....	.....	30·0
20	Sept. 11	2314	79	.....	192,000	68	.....	.....	7·9	17	7	.....	.....	309	.....	.....	.....	.....	28·0
21	Oct. 15	2428	44	.....	182,000	50	.....	.....	8·0	0	9	18	16	235	135	·184	66·4	17·2	27·6

† Water levels at Port Colborne.

* Field sample not included in average.

† Calcium may have been precipitated in storage.

TABLE IV—Continued

Chemical Analyses of Raw Surface Waters in St. Lawrence River-Great Lakes Drainage Basin

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Iron (Fe): Total	Iron (Fe): Dissolved	Nitrite (NO_2)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Silica (SiO_2): Gravimetric	Silica (SiO_2): Colorimetric	Hardness as $CaCO_3$: Non-carbonate	Hardness as $CaCO_3$: Total	Sum of Constituents	Per cent sodium	Saturation index: +	Saturation index:		Saturation index: −	No.
GREAT LAKES DRAINAGE BASIN—Continued																						
INTAKE, PORT STANLEY, ONT.—*Concluded*																						
7·7	8·5	1·7	.....	.....	.....	.....	16·3	.....	.....	105	2·4	.....	2·6	47·4	137	.....	.....	.....	.....		.....	1
8·1	7·8	1·3	.....	.....	.....	.....	17·8	.....	.....	96·1	0	.....	0·8	52·1	131	.....	.....	.....	.....		.....	2
8·6	7·3	1·3	·04	·02	.....	38·6	17·7	1·3	·10	103	0	0·2	1·0	47·0	131	.....	.....	.....	.....		.....	3
9·2	7·0	1·4	.....	.....	.....	.....	18·5	.....	.....	105	0	.....	1·6	49·2	135	.....	.....	.....	.....		.....	4
9·9	8·5	1·4	.....	.....	.....	.....	16·9	.....	.....	95·2	0	.....	1·8	57·5	136	.....	.....	.....	.....		.....	5
8·9	7·8	1·7	1·0	·02	.....	46·9	16·7	·18	·09	104	0	1·2	1·0	53·6	139	.....	.....	.....	.....		.....	6
8·4	7·3	1·5	.....	.....	.....	.....	18·0	.....	.....	108	0	.....	0·6	52·0	140	.....	.....	.....	.....		.....	7
8·8	7·0	1·2	.....	.....	.....	42·8	19·8	.....	.....	107	0	.....	0·1	47·7	135	.....	.....	.....	.....		.....	8
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		.....	9
10·9	7·8	1·5	4·0	·02	.....	36·9	18·0	·7	0	126	0	1·0	0·6	53·2	156	.....	.....	.....	.....		.....	10
8·9	7·7	1·5	.....	.....	.....	42·4	17·8	.....	.....	107	·4	.....	1·3	50·0	139	174	10·7	0·1	.....		.....	11
PLANT INTAKE, WEST LORNE, ONT.																						
7·7	9·3	1·7	.....	.....	.....	.....	20·0	.....	.....	102 (117)	0 (0)	.....	4·6	42·8	127	.....	13·6	0·3	.....		.....	12
PLANT INTAKE, AMHERSTBURG, ONT.																						
7·7	8·0	1·3	.....	·20	.....	15·8	11·3	0	·10	28·1	7·2	7·4	4·4	25·6	66·6†	.....	.....	.....	.....		.....	13
8·8	6·7	1·2	.....	·06	.....	13·3	9·5	0	·10	78·6	4·3	2·2	0·3	23·4	95·0	.....	.....	.....	.....		.....	14
8·8	12·0	1·5	.....	.....	.....	.....	17·2	.....	.....	100	0	.....	14	32·1	114	.....	.....	.....	.....		.....	15
8·7	17·0	1·1	.....	.....	.....	.....	26·5	.....	.....	107	0	.....	4·2	27·1	115	.....	.....	.....	.....		.....	16
7·0	21·8	1·4	.....	.....	.....	.....	30·0	.....	.....	81·5 (103)	3·8 (0)	.....	2·6	19·3	92·5 (102)	.....	.....	.....	.....		.....	17
8·7	18·3	1·9	2·4	·05	.....	16·5	31·5	·4	·15	110	0	.....	4·8	18·2	108	.....	.....	.....	.....		.....	18
7·7	12·0	1·6	.....	.....	.....	.....	18·5	.....	.....	98·8	4·8	.....	4·6	17·7	107	.....	.....	.....	.....		.....	19
8·3	20·5	1·2	.....	.....	.....	.....	33·5	.....	.....	105	0	.....	11	18·2	104	.....	.....	.....	.....		.....	20
8·7	9·3	1·1	·08	·02	.....	12·7	14·2	·4	·05	103	0	2·8	2·2	20·6	105	.....	.....	.....	.....		.....	21

TABLE IV—Continued

Chemical Analyses of Raw Surface Waters in St. Lawrence River-Great Lakes Drainage Basin

(In parts per million)

No.	Date of collection	Sample No.	Storage period (Days)	Stream discharge (Second-feet): On sampling date	Stream discharge (Second-feet): Monthly mean	Water temperature (°F.)	Dissolved oxygen	Carbon dioxide	pH	Colour	Turbidity	Suspended matter: Dried at 105°C.	Suspended matter: Ignited at 550°C.	Specific conductance Micromhos (K x 10^6) at 25°C.	Residue on Evaporation at 105°C. (Dissolved solids): P.P.M.	Residue on Evaporation at 105°C. (Dissolved solids): Tons per acre-foot	Residue on Evaporation at 105°C. (Dissolved solids): Thousand Tons per day	Loss on ignition at 550°C.	Calcium (Ca)
	UPPER ST. LAWRENCE RIVER-CENTRAL																		
	STATION No. 29: DETROIT RIVER AT PLANT																		
1	Nov. 13.....	2505	6	.....	177,000	46	.....	.....	7·8	10	6	.....	.....	359	.....	.....	.....	.....	29·2
2	Dec. 13.....	2596	4	.....	180,000	36	.....	.....	8·0	7	18	.....	.....	294	.....	.....	.....	.....	34·4
3	Jan. 13/49.....	2717	21	.....	181,000	32	.....	.....	8·1	9	17	8·6	4·8	297	170	·231	83·0	22·6	30·2
4	Average (11 samples).....		94	.....	190,000	52	.....	.....	8·2	9	20	.....	.....	272	.....	.....	.....	.....	27·4
	STATION No. 30: DETROIT RIVER																		
5	Feb. 18/48.....	2127	147	.....	164,000	33	.....	.....	7·6	40	0	.....	.....	236	126	·171	55·6	11·8	28·8
6	Mar. 13.....	2251	171	.....	189,000	33	.....	.....	8·0	5	2	.....	.....	222	132	·179	67·2	25·6	29·0
7	April 12.....	2487	219	.....	196,000	45	.....	.....	8·2	2	Algae	Slight sediment		211	120	·163	63·4	28·0	27·6
8	May 14.....	2285	125	.....	202,000	54	.....	.....	8·5	20	10	.....	.....	246	.....	.....	.....	.....	33·0
9	June 11.....	2460	150	.....	198,000	62	.....	.....	8·2	10	30	52	48	220	140	·190	74·6	31·6	30·2
10	July 15.....	2436	105	.....	198,000	70	.....	.....	8·1	10	30	.....	.....	213	.....	.....	.....	.....	29·0
11	Aug. 13.....	2326	49	.....	198,000	71	.....	.....	8·3	5	10	.....	.....	211	.....	.....	.....	.....	28·5
12	Sept. 13.....	2297	7	.....	192,000	71	.....	.....	7·9	15	10	44	32	209	140	·190	72·2	34·5	28·0
13	Oct. 14.....	2420	12	.....	182,000	52	.....	.....	8·1	4	15	.....	.....	200	.....	.....	.....	.....	26·0
14	Nov. 13.....	2500	6	.....	177,000	48	.....	.....	8·1	3	8	.....	.....	198	.....	.....	.....	.....	26·2
15	Dec. 14.....	2614	20	.....	180,000	36	.....	.....	8·1	9	20	34	31	215	128	·174	62·1	19·8	27·4
16	Jan. 14/49.....	2677	10	.....	181,000	33	.....	.....	8·0	0	5	.....	.....	202	.....	.....	.....	.....	22·5
17	Feb. 14*.....	2780	9	.....	177,000	33	.....	.....	8·0	10	10	13	7·4	217	128	·174	61·1	42·6	28·8
18	Average (12 samples).....		85	.....	188,000	51	.....	.....	8·1	11	12	.....	.....	215	131	·178	65·8	25·2	28·0
	* Not included in average.																		
	STATION No. 31: LAKE ST. CLAIR AT																		
19	June 18/48.....	3011	295	.....	198,000	75	.....	(1·5)	8·3 (8·3)	5 (25)	13	15	12	248	143	·195	76·6	38·4	32·3
	STATION No. 32: LAKE ST. CLAIR AT																		
20	June 21/48.....	2822	261	.....	198,000	64	.....	(2·0)	8·2 (7·7)	0 (30)	3 (15)	.....	.....	218	131	·178	70·0	31·4	28·6

TABLE IV—Continued

Chemical Analyses of Raw Surface Waters in St. Lawrence River-Great Lakes Drainage Basin

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Iron (Fe): Total	Iron (Fe): Dissolved	Nitrite (NO_2)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Silica (SiO_2): Gravimetric	Silica (SiO_2): Colorimetric	Hardness as $CaCO_3$: Non-carbonate	Hardness as $CaCO_3$: Total	Sum of Constituents	Per cent sodium	Saturation index: +	Saturation index:		Saturation index: −	No.
GREAT LAKES DRAINAGE BASIN—Continued																						
INTAKE, AMHERSTBURG, ONT.—*Concluded*																						
7·6	30·2	1·6	.....	.....	.....	.....	49·4	.....	.....	107	0	.....	4·2	16·0	104	.....	.....	.....	.....		.....	1
8·3	16·5	1·4	.....	.....	.....	.....	25·4	.....	.....	112	0	.....	2·8	28·0	120	.....	.....	.....	.....		.....	2
8·3	16·2	1·5	1·1	·20	.....	21·2	28·7	1·8	·04	106	0	2·6	1·8	22·6	110	.....	.....	.....	.....		.....	3
8·3	15·2	1·5	.....	.....	.....	.....	24·2	.....	.....	87·2	1·5	.....	5·0	22·7	104	.....	24·1	0·1	.....		.....	4
AT PLANT INTAKE, WINDSOR, ONT.																						
8·5	4·0	1·5	.....	·03	.....	13·3	6·1	3·5	.....	104	0	1·6	3·6	21·7	107	.....	.....	.....	.....		.....	5
7·3	3·9	1·2	.....	·02	.....	18·4	3·8	2·4	.....	92·7	4·8	.....	4·0	18·4	102	.....	.....	.....	.....		.....	6
8·0	2·8	1·0	.....	·01	.....	20·8	5·0	·5	0	107	0	1·6	2·8	13·6	102	.....	.....	.....	.....		.....	7
9·0	4·3	1·8	.....	.....	.....	.....	6·1	.....	.....	109	3·6	.....	5·2	24·3	119	.....	.....	.....	.....		.....	8
7·9	3·3	1·2	·49	·10	.....	18·8	6·3	·8	·08	108	0	4·2	4·4	19·8	108	.....	.....	.....	.....		.....	9
8·0	4·3	1·3	.....	.....	.....	.....	7·5	.....	.....	100	4·8	.....	4·4	15·1	105	.....	.....	.....	.....		.....	10
8·2	3·3	1·0	.....	.....	.....	.....	6·0	.....	.....	100	0	.....	3·4	22·9	105	.....	.....	.....	.....		.....	11
10·0	3·8	1·1	1·6	·05	.....	13·6	5·7	·3	·05	105	0	.....	3·0	25·1	111	.....	.....	.....	.....		.....	12
7·2	4·3	1·3	.....	.....	.....	.....	10·4	.....	.....	100	0	.....	6·5	12·5	94·5	.....	.....	.....	.....		.....	13
6·8	2·8	1·2	.....	.....	.....	.....	5·2	.....	.....	103	0	.....	3·0	9·0	93·4	.....	.....	.....	.....		.....	14
8·3	3·8	1·1	·74	·06	.....	19·7	9·0	·9	·05	95·6	3·6	2·2	2·6	18·2	103	.....	.....	.....	.....		.....	15
6·9	3·1	0·9	.....	.....	.....	.....	7·0	.....	.....	105	0	.....	2·2	0	84·5	.....	.....	.....	.....		.....	16
8·4	3·3	0·9	·17	·07	.....	19·1	6·4	1·8	·10	102	0	3·2	2·0	22·4	106	.....	.....	.....	.....		.....	17
8·0	3·6	1·2	.....	·04	.....	17·4	6·5	1·4	.....	103	1·4	.....	3·8	16·7	103	121	7·0	0·1	.....		.....	18
PLANT INTAKE, BELLE RIVER, ONT.																						
8·6	5·8	1·2	·50	·07	.....	15·8	6·4	1·3	·03	114 (115)	2·9 (0)	4·8	6·0	17·6	116 (115)	185	9·7	0·4	.....		.....	19
PLANT INTAKE, TILBURY, ONT.																						
8·6	4·0	1·0	.....	·21	.....	18·0	7·2	·8	·05	97·4 (107)	4·3 (0)	5·0	3·6	19·8	107 (102)	124	7·5	0·2	.....		.....	20

TABLE IV—Continued

Chemical Analyses of Raw Surface Waters in St. Lawrence River-Great Lakes Drainage Basin

(In parts per million)

No.	Date of collection	Sample No.	Storage period (Days)	Stream discharge (Second-feet): On sampling date	Stream discharge (Second-feet): Monthly mean	Water temperature (°F.)	Dissolved oxygen	Carbon dioxide	pH	Colour	Turbidity	Suspended matter: Dried at 105°C.	Suspended matter: Ignited at 550°C.	Specific conductance Micromhos (K x 10^6) at 25°C.	Residue on Evaporation at 105°C. (Dissolved solids): P.P.M.	Residue on Evaporation at 105°C. (Dissolved solids): Tons per acre-foot	Residue on Evaporation at 105°C. (Dissolved solids): Thousand Tons per day	Loss on ignition at 550°C.	Calcium (Ca)
	UPPER ST. LAWRENCE RIVER-CENTRAL																		
	STATION No. 33: ST. CLAIR RIVER (SNYE RIVER)																		
1	June 22/48	2626	197	.....	198,000	62	.....	(5·3)	8·2 (7·8)	10 (15)	5 (5)	3·8	0·8	223	122	0·166	65·3	21·8	27·5
2	April 6/49	3050	10	.....	.....	.....	.....	.....	8·0	0	10	11	10	204	117	·159	.....	39·4	26·0
3	Dec. 14/49	3751	27	.....	.....	.....	.....	.....	7·5	65	280	.....	.....	244	.....	.....	.....	.....	.....
	STATION No. 34: ST. CLAIR RIVER																		
4	Mar. 16/48	2435	226	.....	189,000	36	.....	.....	8·7	0	Algae	Slight sediment		194	.....	.....	.....	.....	25·2
5	April 16	2496	216	.....	196,000	39	.....	.....	8·3	0	6	9·0	5·2	200	118	·160	62·1	12·2	26·9
6	May 16	2345	143	.....	202,000	46	.....	.....	8·2	3	20	.....	.....	204	.....	.....	.....	.....	27·4
7	June 17	2434	133	.....	198,000	55	.....	.....	8·4	3	2	.....	.....	219	.....	.....	.....	.....	28·7
8	June 23*	2475	145	.....	198,000	65	.....	(17·6)	8·3 (6·9)	0 (5)	4 (8)	.....	.....	218	.....	.....	.....	.....	29·2
9	July 15	2290	67	.....	198,000	64	.....	.....	8·2	8	0·6	.....	.....	203	126	·171	67·1	22·5	26·0
10	Aug. 14	2387	63	.....	198,000	66	.....	.....	8·2	4	5	.....	.....	200	.....	.....	.....	.....	28·0
11	Sept. 15	2318	13	.....	192,000	60	.....	.....	7·3	8	0·6	.....	.....	206	.....	.....	.....	.....	26·0
12	Oct. 15	2419	11	.....	182,000	60	.....	.....	8·2	2	3	.....	.....	192	.....	.....	.....	.....	26·0
13	Nov. 16	2506	3	.....	177,000	52	.....	.....	7·9	3	1	.....	.....	192	.....	.....	.....	.....	25·5
14	Dec. 18	2646	25	.....	180,000	43	.....	.....	8·2	2	0	.....	.....	193	.....	.....	.....	.....	21·0
15	Jan. 15/49	2719	19	.....	181,000	36	.....	.....	8·0	3	1	.....	.....	199	112	·152	54·6	16·6	25·6
16	Feb. 18	2802	12	.....	177,000	34	.....	.....	8·2	0	0·7	.....	.....	190	110	·150	52·6	41·6	25·6
17	Average (12 samples)		78	.....	189,000	49	.....	.....	8·2	4	4	.....	.....	199	.....	.....	.....	.....	26·0
	STATION No. 35: LAKE HURON AT																		
18	June 24/48	2476	145	.....	580·80‡	.....	.....	(7·0)	8·1 (7·9)	0 (10)	6 (<7)	.....	.....	212	.....	.....	.....	.....	28·6
19	Feb. 25/50	3945	3	.....	.....	.....	.....	.....	7·6	20	25	.....	.....	212	130	·177	.....	22·6	29·3

* Field sample not included in average.

‡ Water levels in feet above Mean Sea Level referred to B.M. "Steel Rivet" at Goderich, Ont. elevation 588·579 ft. (Canadian Hydrographic Service.)

TABLE IV—Continued

Chemical Analyses of Raw Surface Waters in St. Lawrence River-Great Lakes Drainage Basin

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Iron (Fe): Total	Iron (Fe): Dissolved	Nitrite (NO_2)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Silica (SiO_2): Gravimetric	Silica (SiO_2): Colorimetric	Hardness as $CaCO_3$: Non-carbonate	Hardness as $CaCO_3$: Total	Sum of Constituents	Per cent sodium	Saturation index: +	Saturation index:		Saturation index: −	No.
GREAT LAKES DRAINAGE BASIN—Continued																						
AT PLANT INTAKE, WALLACEBURG, ONT.																						
8·3	3·5	1·4	·35	·02	.....	14·2	9·4	·4	0	101 (101)	0 (0)	3·4	6·1	20·4	103 (102)	121	6·8	0·2	.....			1
8·0	3·0	1·0	·40	·04	.....	15·6	6·0	·6	·10	100	0	1·8	3·6	15·8	97·8	113	6·2	0	.....			2
.....	.....	.....	.....	·36	.....	30·0	8·4	.....	.....	99·6	0	.....	.....	33·4	115	.....	.....	.....	.....			3
AT PLANT INTAKE, SARNIA, ONT.																						
7·0	3·7	1·2	.....	.....	.....	.....	4·8	.....	.....	88·9	10·1	.....	7·8	2·1	91·7	.....	.....	.....	.....			4
7·3	2·0	1·1	·29	·04	.....	11·7	5·4	·6	·10	103	0	4·4	5·0	13·1	97·1	.....	.....	.....	.....			5
8·6	3·3	1·2	.....	.....	.....	.....	5·0	.....	.....	100	0	.....	5·3	21·8	104	.....	.....	.....	.....			6
7·3	5·3	1·6	.....	.....	.....	.....	8·8	.....	.....	99·8	7·7	.....	5·6	7·1	102	.....	.....	.....	.....			7
7·7	3·3	1·3	.....	.....	.....	.....	6·3	.....	.....	105 (105)	0 (0)	.....	5·5	18·2	105	.....	.....	.....	.....			8
9·0	3·8	1·8	.....	·08	.....	11·5	6·5	·8	0	88·1	0	.....	4·6	30·0	102	.....	.....	.....	.....			9
6·8	3·0	1·1	.....	.....	.....	.....	5·2	.....	.....	98·8	0	.....	1·6	16·9	97·9	.....	.....	.....	.....			10
7·3	2·8	1·1	.....	.....	.....	.....	4·5	.....	.....	97·6	0	.....	3·0	14·9	94·9	.....	.....	.....	.....			11
8·2	3·5	1·1	.....	.....	.....	.....	8·2	.....	.....	97·6	0	.....	8·5	18·9	98·9	.....	.....	.....	.....			12
7·1	2·8	1·1	.....	.....	.....	.....	4·8	.....	.....	99·1	0	.....	3·4	11·7	92·9	.....	.....	.....	.....			13
7·0	2·8	1·1	.....	.....	.....	.....	4·2	.....	.....	100	0	.....	2·2	0	81·2	.....	.....	.....	.....			14
7·7	2·8	1·2	.....	·05	.....	14·2	5·4	·5	·10	98·8	0	3·8	2·4	14·5	95·5	.....	.....	.....	.....			15
8·0	2·8	0·8	.....	·03	.....	15·0	4·0	4·0	·12	100	0	2·8	3·6	14·7	96·7	.....	.....	.....	.....			16
7·6	3·2	1·2	.....	.....	.....	.....	5·6	.....	.....	98	1·5	.....	4·4	13·8	96·2	.....	6·8	0·2	.....			17
PLANT INTAKE, PETROLIA, ONT.																						
7·3	3·7	1·3	.....	.....	.....	.....	6·2	.....	.....	100 (97·6)	0 (0)	.....	5·0	19·5	102	.....	7·3	0	.....			18
7·1	3·7	1·0	·63	·12	.....	16·5	4·7	1·1	·10	107	0	4·2	2·2	14·7	102	119	7·2	0·5	.....			19

TABLE IV—Continued

Chemical Analyses of Raw Surface Waters in St. Lawrence River-Great Lakes Drainage Basin

(In parts per million)

No.	Date of collection	Sample No.	Storage period (Days)	Stream discharge (Second-feet): On sampling date	Stream discharge (Second-feet): Monthly mean	Water temperature (°F.)	Dissolved oxygen	Carbon dioxide	pH	Colour	Turbidity	Suspended matter: Dried at 105°C.	Suspended matter: Ignited at 550°C.	Specific conductance Micromhos ($K \times 10^6$) at 25°C.	Residue on Evaporation at 105°C. (Dissolved solids): P.P.M.	Residue on Evaporation at 105°C. (Dissolved solids): Tons per acre-foot	Residue on Evaporation at 105°C. (Dissolved solids): Thousand Tons per day	Loss on ignition at 550°C.	Calcium (Ca)
	UPPER ST. LAWRENCE RIVER-CENTRAL																		
	STATION No. 36: LAKE HURON AT																		
1	Feb. 23/48	2096	133	579·42†	579·83‡				8·5	15	0·6			265	159	·216		25·8	34·4
2	Mar. 21*	2449*	228	579·44	579·94	36			9·0	15	Algae	Slight sediment		167	110	·150		25·8	20·7
3	April 19	2416	189	579·86	580·41	47			8·7	7	Algae			253	148	·201		29·4	32·2
4	May 19	2361	142	579·96	580·83	50			8·6	0	Algae			226					30·0
5	June 20	2356	110	580·26	580·80	54			8·6	2	Algae			195					24·6
6	July 19	2545	133	580·43	580·84	64			8·0	15	2			209	125	·170		19·0	27·7
7	Aug. 21	2339	45	580·37	580·69	72			8·1	5	8			226					29·0
8	Sept. 20	2319	8	580·23	580·27	67			8·2	15	4			198					28·5
9	Oct. —	No sample taken		580·03	579·78														
10	Nov. 19	2616	45	579·87	579·51	46			8·0	0	6	12	11	210	125	·170		38·2	26·8
11	Dec. 20	2649	23	579·81	579·41	35			8·0	3	7			255					30·0
12	Jan. 20/49	3021	81		579·14	32			8·3	10	60			264					40·5
13	Feb. 19	2796	11		579·13	33			8·0	15	30	36	28	231	155	·211		42·6	31·6
14	Average (12 samples)		77		580·12	49			8·3	9	14			225	135	·184		30·1	29·7
	STATION No. 37—LAKE HURON (COLPOY																		
15	Mar. 10/51	4994	24			33			7·9	0	2			195					27·0
	STATION No. 38—LAKE HURON (GEORGIAN																		
16	Feb. 24/48	2123	141	579·42†	579·83‡	36			8·2	6	0			187	108	·147		12·8	24·8
17	Mar. 27	2544	247	579·44	579·94	40			8·7	10	15	24	17	167	102	·139		15·8	21·5
18	April 15	2541	228	579·66	580·41	42			8·6	5	5	9·4	4·4	203	121	·163		23·6	28·1
19	May 17	2357	144	579·96	580·83	40			7·7	4	3			181					25·6
20	June 16	2134	30	580·26	580·80	44			8·1	4				179	102	·139		7·0	25·0
21	July 15	2408	99	580·43	580·84	52			8·5	7	0·3			185					26·5
22	Aug. 16	2308	42	580·37	580·69	68			8·2	5	1			193	112	·152		22·4	26·6

* Maitland River in flood with high turbidity or change may be due to loss of calcium on storage.
† Mean monthly elevation for period 1939 to 1948 inclusive.
‡ Water levels elevation in feet above Mean Sea Level referred to B.M. "Steel Rivet" at Goderich, Ont. elevation 588·579 ft. (Canadian Hydrographic Service.)
** Alkalis calculated as sodium.

TABLE IV—Continued

Chemical Analyses of Raw Surface Waters in St. Lawrence River-Great Lakes Drainage Basin

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Iron (Fe): Total	Iron (Fe): Dissolved	Nitrite (NO_2)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Silica (SiO_2): Gravimetric	Silica (SiO_2): Colorimetric	Hardness as $CaCO_3$: Non-carbonate	Hardness as $CaCO_3$: Total	Sum of Constituents	Per cent sodium	Saturation index: +	Saturation index: −	No.
GREAT LAKES DRAINAGE BASIN—Continued																				
PLANT INTAKE, GODERICH, ONT.																				
10·0	5·5**		.....	·03	.....	21·3	9·7	3·9	.....	111	5·3	.....	6·2	27·2	127	.....	.....	.....	.....	1
8·2	2·5	1·8	.....	·27	.....	11·7	1·9	1·3	·20	65·9	7·2	3·6	0·7	19·5	85·5	.....	.....	.....	.....	2
10·8	5·0	1·5	.....	·04	.....	21·1	5·3	1·8	·23	107	7·2	2·2	0·6	24·0	125	.....	.....	.....	.....	3
9·5	3·0	1·6	.....	.....	.....	.....	4·5	.....	.....	91·5	9·6	.....	3·9	23·0	111	.....	.....	.....	.....	4
9·9	3·7	1·1	.....	.....	.....	.....	5·2	.....	.....	78·1	4·8	.....	1·2	30·1	102	.....	.....	.....	.....	5
8·2	3·3	0·9	.....	·07	.....	15·5	4·9	·7	0	104	0	4·6	4·4	17·4	103	.....	.....	.....	.....	6
8·9	4·3	1·0	.....	.....	.....	.....	8·2	.....	.....	102	0	.....	3·9	25·0	109	.....	.....	.....	.....	7
8·6	3·5	1·1	.....	.....	.....	.....	6·0	.....	.....	100	0	.....	3·0	24·6	107	.....	.....	.....	.....	8
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	9
8·1	3·7	1·1	·08	·03	.....	18·4	5·5	·9	·07	106	0	3·2	2·2	13·0	100	.....	.....	.....	.....	10
8·2	7·0	1·2	.....	.....	.....	.....	10·6	.....	.....	110	0		2·6	18·6	109	.....	.....	.....	.....	11
9·5	4·0	1·7	.....	.....	.....	21·6	6·0	.....	.....	116	4·8	.....	7·6	37·3	140	.....	.....	.....	.....	12
8·7	3·8	1·1	·24	·16	.....	27·8	5·6	3·5	·10	115	0	4·0	2·4	20·6	115	.....	.....	.....	.....	13
9·1	4·0	1·3	.....	.....	.....	19·5	6·1	2·0	.....	101	3·2	.....	3·2	23·4	111	126	7·1	0·3	.....	14
BAY) AT PLANT INTAKE, WIARTON, ONT.																				
6·8	2·0	0·8	.....	.....	.....	10·3	10·0	0·7	.....	101	0	3·8	.....	14·3	97·3	111	4·3	.....	0·1	15
BAY) AT PLANT INTAKE, COLLINGWOOD, ONT:																				
7·2	3·0	1·0	.....	·03	.....	12·6	4·2	4·4	0	93·1	0	2·6	5·0	15·1	91·5	.....	.....	.....	.....	16
7·2	2·5	1·0	·84	·03	.....	10·5	2·9	·4	·15	72·5	6·2	5·4	6·1	13·4	83·2	.....	.....	.....	.....	17
8·3	2·9	1·2	·33	·03	.....	10·2	3·1	·7	·10	107	2·4	3·0	3·6	12·3	104	.....	.....	.....	.....	18
7·9	2·3	1·0	.....	.....	.....	.....	2·3	.....	.....	92·8	0	.....	4·0	20·4	96·4	.....	.....	.....	.....	19
6·6	2·5	1·0	.....	·03	.....	11·3	2·7	·4	·10	87·8	0	2·4	1·8	17·6	89·6	.....	.....	.....	.....	20
7·1	2·2	1·0	.....	.....	.....	.....	3·3	.....	.....	85·9	6·7	.....	2·3	13·9	95·5	.....	.....	.....	.....	21
7·1	2·6	0·8	.....	·06	.....	29·0	2·4	·6	0	89·5	0	3·6	2·4	22·2	95·6	.....	.....	.....	.....	22

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TABLE IV—Continued

Chemical Analyses of Raw Surface Waters in St. Lawrence River-Great Lakes Drainage Basin

(In parts per million)

No.	Date of collection	Sample No.	Storage period (Days)	Stream discharge (Second-feet) On sampling date	Stream discharge (Second-feet) Monthly mean	Water temperature (°F.)	Dissolved oxygen	Carbon dioxide	pH	Colour	Turbidity	Suspended matter Dried at 105°C.	Suspended matter Ignited at 550°C.	Specific conductance Micromhos ($K \times 10^6$) at 25°C.	Residue on Evaporation at 105°C. (Dissolved solids) P.P.M.	Residue on Evaporation at 105°C. (Dissolved solids) Tons per acre-foot	Residue on Evaporation at 105°C. (Dissolved solids) Thousand Tons per day	Loss on ignition at 550°C.	Calcium (Ca)
	UPPER ST. LAWRENCE RIVER-CENTRAL																		
	STATION No. 38: LAKE HURON (GEORGIAN BAY)																		
1	Sept. 15.....	2317	13	580·23†	580·27†	60	.....	.....	7·7	20	0·4	.....	.....	222	.....	.....	.....	.....	24·0
2	Oct. 16.....	2421	10	580·03	579·78	47	.....	.....	8·2	0	0·5	.....	.....	175	.....	.....	.....	.....	24·0
3	Nov. 15.....	2529	9	579·87	579·51	44	.....	.....	7·9	0	3	.....	.....	179	113	·154	.....	27·8	24·0
4	Dec. 13.....	2595	4	579·81	579·41	32	.....	.....	8·0	2	0·9	.....	.....	183	.....	.....	.....	.....	23·5
5	Jan. 11/49.....	2721	23	.....	579·14	34	.....	.....	8·1	0	3	.....	.....	183	117	·159	.....	40·2	24·4
6	Mar. 9/51*....	4992	32	.....	.....	33	.....	.....	7·7	5	5	.....	.....	187	.....	.....	.....	.....	22·8
7	Average (12 samples).....		83	.....	580·12	45	.....	.....	8·2	5	3	.....	.....	186	111	·151	.....	21·4	24·9
	STATION No. 39: LAKE HURON (GEORGIAN BAY)																		
8	Mar. 8/51.....	4991	33	.....	.....	38	.....	.....	7·6	35	6	.....	.....	184	.....	.....	.....	.....	27·2
	STATION No. 40: LAKE HURON (GEORGIAN BAY)																		
9	Feb. 26/51*....	4937	17	.....	.....	33	.....	.....	7·0	4	3	.....	.....	59·3	49·4	·067	.....	20·6	6·2
10	— **....	.....	.....	.....	.....	.....	10·3		8·0	.....	.....	.....	.....	.....	102	.....	.....	.....	22·8
11	April 20/48.....	2122	85	.....	75,000†	.....	.....	.....	7·9	5	0	.....	.....	97·8	56·6	·077	11·4	9·6	13·2
12	May 22.....	2402	153	.....	74,000	.....	.....	.....	8·1	7	0·6	.....	.....	95·2	.....	.....	.....	.....	13·2
13	June 22.....	2136	24	.....	69,000	.....	.....	.....	8·0	7	0·8	.....	.....	96·4	56·0	·076	10·4	5·4	14·3
14	July 22.....	2309	67	.....	65,000	.....	.....	.....	7·9	10	2	.....	.....	98·2	58·4	·079	10·2	9·8	15·0
15	Aug. 24.....	2403	59	.....	63,000	.....	.....	.....	7·8	5	3	.....	.....	95·9	.....	.....	.....	.....	14·4
16	Sept. 24.....	2321	4	.....	58,000	.....	.....	.....	7·8	6	0·8	.....	.....	93·9	.....	.....	.....	.....	13·5
17	Oct. 22.....	2445	13	.....	59,000	.....	.....	.....	7·8	5	0·7	.....	.....	98·4	56·8	·077	9·0	12·8	14·2
18	Nov. 22.....	2585	24	.....	59,000	.....	.....	.....	8·2	10	15	.....	.....	106	.....	.....	.....	.....	15·5
19	Dec. 22.....	2647	21	.....	57,000	.....	.....	.....	7·9	0	0·6	.....	.....	93·3	.....	.....	.....	.....	11·7
20	Jan. 21/49.....	2773	32	.....	57,000	.....	.....	.....	7·8	0	1	.....	.....	96·5	54·6	·074	8·4	9·6	13·2
21	Feb. 22.....	3019	48	.....	57,000	.....	.....	.....	8·0	8	0	.....	.....	94·2	.....	.....	.....	.....	13·0
22	Mar. 23.....	3052	24	.....	57,000	.....	.....	.....	7·9	0	0·3	.....	.....	100	58·0	·079	8·9	11·6	13·2
23	Average (12 samples).....		46	.....	62,500	.....	.....	.....	7·9	5	2	.....	.....	97·3	56·7	·077	9·7	9·8	13·7

* Not included in average.

† Water levels elevation in feet above Mean Sea Level, referred to B.M. "Steel Rivet" at Goderich, elevation 588·579 ft. (Canadian Hydrographic Service.)

** Lake water mixed with Sequin River which was in flood.

** Analysis supplied by Public Utilities Commission, Parry Sound.

STATION No. 41: ST. MARY'S RIVER

† Water levels elevation in feet above Mean Sea Level from B.M. "Steel Rivet" at Port Arthur, elevation 616·154 feet (Canadian Hydrographic Service.)

TABLE IV—Continued

Chemical Analyses of Raw Surface Waters in St. Lawrence River-Great Lakes Drainage Basin

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Iron (Fe): Total	Iron (Fe): Dissolved	Nitrite (NO_2)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Silica (SiO_2): Gravimetric	Silica (SiO_2): Colorimetric	Hardness as $CaCO_3$: Non-carbonate	Hardness as $CaCO_3$: Total	Sum of Constituents	Per cent sodium	Saturation index: +	Saturation index: −	No.
GREAT LAKES DRAINAGE BASIN—Continued																				
PLANT INTAKE, COLLINGWOOD, ONT.—*Continued*																				
7·3	2·5	1·1	.....	.....	.....	.....	5·3	.....	.....	92·7	0	.....	1·6	14·0	90·0	.....	.....	.....	.....	1
7·3	2·5	1·1	.....	.....	.....	.....	5·6	.....	.....	90·3	0	.....	5·5	16·0	90·0	.....	.....	.....	.....	2
7·9	1·8	1·0	.....	·05	.....	19·7	1·5	·7	·12	97·6	0	6·0	2·6	12·4	92·4	.....	.....	.....	.....	3
6·7	2·5	1·0	.....	.....	.....	.....	2·5	.....	.....	97·6	0	.....	2·3	6·2	86·2	.....	.....	.....	.....	4
7·1	2·4	1·1	.....	·24	.....	14·5	2·7	·6	0	95·1	0	9·8	6·0	12·0	90·0	.....	.....	.....	.....	5
6·8	1·8	0·9	.....	.....	.....	9·5	1·0	·9	.....	93·7	0	.....	2·8	8·0	84·8	.....	.....	.....	.....	6
7·3	2·5	1·0	.....	·07	.....	15·4	3·2	1·1	.....	91·8	1·3	4·7	3·6	14·6	92·1	106	5·5	.....	0	7
AT PLANT INTAKE, VICTORIA HARBOUR, ONT.																				
4·7	3·5	1·1	.....	.....	.....	10·3	5·1	·9	.....	91·3	0	.....	4·9	12·4	87·2	103	7·9	.....	0·5	8
AT PLANT INTAKE, PARRY SOUND, ONT.																				
1·5	0·8	0·4	.....	·15	.....	10·4	0·5	0·9	.....	14·6	0	3·8	3·7	9·6	21·6	31·7	7·3	.....	2·5	9
6·4	.....	.....	.....	·02	.....	13·2	2·9	·6	.....	76·3	0	5·2	.....	20·7	83·2	.....	.....	.....	0·4	10
AT CANAL, SAULT STE. MARIE, ONT.																				
3·5	1·5	0·7	.....	·11	.....	4·1	0·9	7·9	.....	53·2	0	4·4	4·0	3·9	47·5	.....	.....	.....	.....	11
3·5	1·3	1·0	.....	.....	.....	.....	0	.....	.....	56·6	0	.....	3·2	1·1	47·4	.....	.....	.....	.....	12
2·2	1·5	1·0	.....	·04	.....	2·4	0·5	·9	·20	53·7	0	3·2	3·4	0·8	44·8	.....	.....	.....	.....	13
3·3	2·0	1·1	.....	·08	.....	3·8	0·1	1·3	·05	52·7	0	4·0	2·6	7·8	51·0	.....	.....	.....	.....	14
3·6	1·1	0·9	.....	.....	.....	.....	0	.....	.....	57·8	0	.....	6·4	3·4	50·8	.....	.....	.....	.....	15
3·7	1·3	0·7	.....	.....	.....	.....	0	.....	.....	53·7	0	.....	2·6	5·0	49·0	.....	.....	.....	.....	16
4·5	1·5	0·8	.....	·08	.....	2·1	0	·8	·05	55·9	0	3·4	.....	8·0	53·8	.....	.....	.....	.....	17
3·4	1·5	0·6	.....	.....	.....	4·5	0·2	.....	.....	64·9	0	.....	3·0	0	52·7	.....	.....	.....	.....	18
3·0	1·5	0·8	.....	.....	.....	.....	0	.....	.....	54·9	0	.....	2·6	0	41·5	.....	.....	.....	.....	19
3·6	1·5	0·5	.....	·03	.....	5·9	0·8	·7	·10	59·3	0	2·0	2·4	0	47·7	.....	.....	.....	.....	20
2·8	1·1	0·5	.....	.....	.....	7·0	0·9	.....	.....	56·1	0	.....	3·4	0	44·0	.....	.....	.....	.....	21
3·2	1·8	0·7	.....	·04	.....	9·0	0	·6	·05	56·1	0	2·0	4·2	0	36·1	.....	.....	.....	.....	22
3·4	1·5	0·8	.....	·06	.....	4·9	0·3	2·0	.....	56·3	0	3·2	3·4	2·5	47·2	57·7	6·2	.....	0·7	23

TABLE IV—Continued

Chemical Analyses of Raw Surface Waters in St. Lawrence River-Great Lakes Drainage Basin

(In parts per million)

No.	Date of collection	Sample No.	Storage period (Days)	Stream discharge (Second-feet): On sampling date	Stream discharge (Second-feet): Monthly mean	Water temperature (°F.)	Dissolved oxygen	Carbon dioxide	pH	Colour	Turbidity	Suspended matter: Dried at 105°C.	Suspended matter: Ignited at 550°C.	Specific conductance Micromhos (K x 10^6) at 25°C.	Residue on Evaporation at 105°C. (Dissolved solids): P.P.M.	Residue on Evaporation at 105°C. (Dissolved solids): Tons per acre-foot	Residue on Evaporation at 105°C. (Dissolved solids): Thousand Tons per day	Loss on ignition at 550°C.	Calcium (Ca)
UPPER ST. LAWRENCE RIVER-CENTRAL																			
STATION No. 42: LAKE SUPERIOR AT																			
1	Mar. 30/48*....	2543*	244	601·88†	601·59†	34	.....	.....	9·1	15	3	.....	.....	111	69·0	·087	.....	12·2	15·5
2	April 23.....	2546	250	601·99	601·78	34	.....	.....	7·9	5	0·2	.....	.....	98·0	59·4	·081	.....	9·2	13·5
3	May 25.....	2125	50	602·35	602·21	40	.....	.....	8·1	25	0·6	.....	.....	96·6	57·0	·078	.....	5·8	13·2
4	June 24.....	2407	120	602·73	602·26	52	.....	.....	7·6	0	Algae	.....	.....	96·9	.....	.....	.....	.....	15·0
5	July 24.....	2539	128	602·96	602·37	47	.....	.....	7·6	5	2	.....	.....	100	66·2	·090	.....	10·4	13·9
6	Aug. 24.....	2325	38	603·01	602·53	59	.....	.....	7·5	5	10	.....	.....	99·2	.....	.....	.....	.....	15·0
7	Sept. 24.....	2320	4	603·05	602·61	59	.....	.....	7·5	15	1	.....	.....	102	.....	.....	.....	.....	14·5
8	Oct. 24.....	2531	31	602·89	602·31	48	.....	.....	7·5	0	2	.....	.....	100	60·4	·082	.....	18·0	13·2
9	Nov. 24.....	2583	22	602·70	602·24	41	.....	.....	7·4	5	0·6	.....	.....	99·7	.....	.....	.....	.....	14·0
10	Dec. 24.....	2650	19	602·46	602·15	35	.....	.....	7·6	4	0·5	.....	.....	97·7	.....	.....	.....	.....	12·5
11	Jan. 28/49.....	2781	26	.....	601·90	33	.....	.....	7·6	5	0	.....	.....	99·2	60·0	·082	.....	20·4	13·2
12	Feb. 24.....	3018	46	.....	601·72	33	.....	.....	8·0	5	0·5	.....	.....	97·2	.....	.....	.....	.....	16·0
13	Mar. 24.....	3048	23	.....	601·54	35	.....	.....	7·6	0	0	.....	.....	95·9	57·4	·078	.....	15·6	13·2
14	Average (12 samples).....		63	.....	602·14	43	.....	.....	7·7	5	2	.....	.....	98·5	60·1	·082	.....	.....	13·9
STATION No. 43: DELISLE RIVER AT																			
15	June 9/49.....	3224	19	.....	.....	64	.....	(4·0)	8·1 (8·3)	110 (110)	2	.....	.....	395	258	·381	.....	120	67·6
STATION No. 44: LOCH GARRY																			
16	June 10/49.....	3220	18	200 yds. from shore, 4 ft. depth.		64	(9·3)	(2·0)	7·2 (8·3)	15 (30)	Algae	.....	.....	234	.....	.....	.....	.....	38·0
17	June 10/49.....	3252	33	10 ft. from shore, just below surface.		66	.....	.....	7·5	10	3	4·8	1·0	206	133	·181	.....	27·0	34·8
STATION No. 45: NAPANEE																			
18	Mar. 6/47.....	1383	7	240	520	.....	.....	.....	7·5	30	2	.....	.....	.....	196	·266	·127	.....	47·2
19	Dec. 15/49.....	3684	19	51	148	59	.....	.....	8·0	10	4	1·2	0·6	327	213	·289	·029	17·6	56·6

NOTE: Station Nos. 41 and 42, although in the Upper Great Lakes Drainage Basin are included here for comparison purposes.

* Not included in average.

† Water levels in elevation in feet above Mean Sea Level from B.M. "Steel Rivet" at Port Arthur, elevation 616·154 feet. (Canadian Hydrographic Service.)

TABLE IV—Continued

Chemical Analyses of Raw Surface Waters in St. Lawrence River-Great Lakes Drainage Basin

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Iron (Fe): Total	Iron (Fe): Dissolved	Nitrite (NO_2)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Silica (SiO_2): Gravimetric	Silica (SiO_2): Colorimetric	Hardness as $CaCO_3$: Non-carbonate	Hardness as $CaCO_3$: Total	Sum of Constituents	Per cent sodium	Saturation index: +	Saturation index: −	No.
GREAT LAKES DRAINAGE BASIN—Continued																				
PLANT INTAKE, PORT ARTHUR, ONT.																				
3·8	1·5	1·0	.....	·20	.....	2·0	2·5	·5	0	29·5	17·6	3·2	1·0	0·5	54·3	.....	.....	.....	.....	1
3·8	1·5	0·8	.....	·04	.....	1·3	0·8	·4	0	56·1	0	3·8	4·1	3·3	49·3	.....	.....	.....	.....	2
3·8	2·0	0·5	.....	·04	.....	2·9	0·9	3·1	.....	53·7	0	2·6	4·6	4·6	48·6	.....	.....	.....	.....	3
3·6	1·3	0·9	.....	.....	.....	.....	0·7	.....	.....	56·9	0	.....	2·6	5·7	52·3	.....	.....	.....	.....	4
3·8	2·1	1·3	.....	·09	.....	2·0	1·7	·9	0	58·6	0	6·8	4·1	2·3	50·3	.....	.....	.....	.....	5
4·4	2·0	0·9	.....	.....	.....	.....	0	.....	.....	53·7	0	.....	3·2	11·5	55·6	.....	.....	.....	.....	6
3·2	1·3	1·3	.....	.....	.....	.....	0	.....	.....	56·1	0	.....	2·2	3·4	49·4	.....	.....	.....	.....	7
3·8	1·5	0·9	.....	·04	.....	9·4	0	·2	0	61·0	0	2·2	3·0	0	48·5	.....	.....	.....	.....	8
3·2	1·8	0·8	.....	.....	.....	3·9	1·8	.....	.....	59·8	0	.....	2·8	0	48·1	.....	.....	.....	.....	9
2·8	1·5	0·9	.....	.....	.....	.....	0	.....	.....	56·1	0	.....	2·0	0	42·7	.....	.....	.....	.....	10
4·1	1·3	0·5	.....	·04	.....	6·1	0	·5	0	56·1	0	2·6	2·2	3·8	49·8	.....	.....	.....	.....	11
3·0	1·3	0·7	.....	.....	.....	4·5	0	.....	.....	56·1	0	.....	3·8	16·3	62·3	.....	.....	.....	.....	12
3·5	1·5	0·9	.....	·03	.....	8·6	0·9	·8	·15	56·1	0	2·6	4·8	1·4	47·4	.....	.....	.....	.....	13
3·6	1·6	0·9	.....	·05	.....	4·8	0·6	.....	.....	56·7	0	.....	3·3	4·4	50·4	57·7	6·5	.....	0·9	14
PLANT INTAKE, ALEXANDRIA, ONT.																				
8·1	3·0	0·6	.....	·01	.....	19·6	0 (0)	3·9	.....	220 (200)	0 (0)	3·4	2·1	21·4	202	203	3·3	0·8	.....	15
NEAR ALEXANDRIA, ONT.																				
3·3	1·1	0·8	.....	.....	.....	11·5	1·7	.....	.....	120 (110)	0 (0)	.....	2·2	10·1	109	118	2·1	.....	0·6	16
3·2	1·7	1·1	·19	·02	.....	10·9	0	2·2	·15	112	0	3·0	2·9	8·4	100	112	3·5	.....	0·4	17
RIVER AT NAPANEE, ONT.																				
10·5	8·1 as Na		.....	·09	.....	32·1	4·2	3·1	.....	139	0	6·0	.....	47·7	161	180	.....	.....	0·2	18
6·3	3·9	1·6	·14	·02	.....	32·5	4·0	7·1	·10	153	2·4	4·6	4·6	37·5	167	194	4·8	0·4	.....	19

TABLE IV—Continued

Chemical Analyses of Raw Surface Waters in St. Lawrence River-Great Lakes Drainage Basin

(In parts per million)

No.	Date of collection	Sample No.	Storage period (Days)	Stream discharge (Second-feet): On sampling date	Stream discharge (Second-feet): Monthly mean	Water temperature (°F.)	Dissolved oxygen	Carbon dioxide	pH	Colour	Turbidity	Suspended matter: Dried at 105°C.	Suspended matter: Ignited at 550°C.	Specific conductance Micromhos (K x 10^6) at 25°C.	Residue on Evaporation at 105°C. (Dissolved solids): P.P.M.	Residue on Evaporation at 105°C. (Dissolved solids): Tons per acre-foot	Residue on Evaporation at 105°C. (Dissolved solids): Thousand Tons per day	Loss on ignition at 550°C.	Calcium (Ca)
UPPER ST. LAWRENCE RIVER-CENTRAL																			
STATION No. 46: SALMON																			
1	Mar. 20/50.....	4126	30	.....	.....	33	.....	.....	7·8	30	4	.....	.....	258	.....	.....	.....	.....	44·0
STATION No. 47: SKOOTAMATTA																			
2	Mar. 7/51.....	4988	34	.....	.....	32	.....	.....	7·1	90	2	.....	.....	69·6	.....	.....	.....	.....	8·7
STATION No. 48: BLACK RIVER AT No. 7																			
3	Sept. 25/47.....	2023	252	.....	.....	55	(9·6)	(2·0)	7·7 (7·5)	110 (135)	..... (<7)	.....	.....	86·7	75·0	·102	.....	35·0	13·2
STATION No. 49: MOIRA RIVER NEAR																			
4	June 11/48.....	2548	173	934	955	65	(9·6)	(2·0)	8·3 (7·7)	50 (85)	0 (<7)	.....	.....	195	133	·181	·335	22·4	32·8
STATION No. 50: MARMORA																			
5	Mar. 7/51.....	4989	34	.....	.....	35	.....	.....	7·5	35	2	.....	.....	104	.....	.....	.....	.....	28·3
STATION No. 51: TRENT RIVER AT PLANT																			
6	Aug. 12/48.....	2770	194	.....	.....	73	.....	(2·6)	8·0 (8·0)	10 (40)	4 (<7)	6·8	2·0	190	122	·165	.....	24·6	30·8
STATION No. 52: TRENT RIVER ABOVE																			
7	July 7/48.....	3020	278	.....	.....	74	(9·7)	(2·2)	8·2 (8·4)	15 (45)	14 (11)	.....	.....	184	.....	.....	.....	.....	30·0
STATION No. 53: TRENTON																			
8	Aug. 11/48.....	2658	156	.....	.....	66	.....	(2·6)	8·0 (8·3)	8 (15)	3 (<7)	.....	.....	370	228	·309	.....	16·8	64·0

TABLE IV—Continued

Chemical Analyses of Raw Surface Waters in St. Lawrence River-Great Lakes Drainage Basin

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Iron (Fe): Total	Iron (Fe): Dissolved	Nitrite (NO_2)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Silica (SiO_2): Gravimetric	Silica (SiO_2): Colorimetric	Hardness as $CaCO_3$: Non-carbonate	Hardness as $CaCO_3$: Total	Sum of Constituents	Per cent sodium	Saturation index: +	Saturation index: −	No.
GREAT LAKES DRAINAGE BASIN—Continued																				
RIVER AT SHANNONVILLE, ONT.																				
5·3	2·2	1·0	.....	.....	.....	37·7	0	.....	.....	122	0	.....	5·2	31·5	132	155	3·6	0	.....	1
RIVER NEAR ACTINOLITE, ONT.																				
1·6	1·0	0·8	.....	.....	.....	13·8	1·8	0·5	.....	21·5	0	.....	6·3	13·2	30·8	45·0	6·4	.....	2·1	2
HIGHWAY BRIDGE NEAR ACTINOLITE, ONT.																				
3·0	1·6 as Na		·15	.....	.....	9·0	1·0	2·2	.....	43·9 (39·0)	0 0	.....	4·6	9·3	45·3	56·3	.....	.....	1·0	3
BELLEVILLE, ONT.—Length of river—60 miles																				
3·0	2·3	1·7	·13	.....	.....	13·2	0	·6	.....	112 (105)	0 (0)	3·0	4·2	2·2	94·2	113	4·9	0·2	.....	4
RIVER AT MARMORA, ONT.																				
2·8	0·8	0·8	.....	.....	.....	13·9	1·4	·5	.....	80·5	0	.....	5·0	16·1	82·1	92·6	2·1	.....	0·6	5
INTAKE, CAMPBELLFORD, ONT.																				
4·2	1·8	1·0	·25	·03	.....	16·0	3·2	·7	·30	97·6 (97·6)	0 (0)	4·0	5·2	14·1	94·1	111	3·9	.....	0·1	7
TRENTON, ONT. Length of Trent River—150 miles																				
3·7	2·8	1·4	.....	.....	.....	13·8	0	.....	.....	96·4 (113)	2·4 (0)	.....	3·8 (5·0)	7·2	90·2	105	6·2	0·2	.....	7
CREEK NEAR TRENTON, ONT.																				
8·7	3·3	1·4	.....	·10	.....	15·1	0	1·8	·05	224 (224)	0 (0)	8·6	9·0	11·6	196	214	3·6	0·6	.....	8

TABLE IV—Continued

Chemical Analyses of Raw Surface Waters in St. Lawrence River-Great Lakes Drainage Basin

(In parts per million)

No.	Date of collection	Sample No.	Storage period (Days)	Stream discharge (Second-feet): On sampling date	Stream discharge (Second-feet): Monthly mean	Water temperature (°F.)	Dissolved oxygen	Carbon dioxide	pH	Colour	Turbidity	Suspended matter: Dried at 105°C.	Suspended matter: Ignited at 550°C.	Specific conductance Micromhos ($K \times 10^6$) at 25°C.	Residue on Evaporation at 105°C. (Dissolved solids): P.P.M.	Residue on Evaporation at 105°C. (Dissolved solids): Tons per acre-foot	Residue on Evaporation at 105°C. (Dissolved solids): Thousand Tons per day	Loss on ignition at 550°C.	Calcium (Ca)
	UPPER ST. LAWRENCE RIVER-CENTRAL																		
	STATION No. 54: CROW RIVER AT No. 7																		
1	July 22/48	2776	215			76	(9·4)	(6·2)	8·0 (8·1)	25 (55)	3 (<7)	5·2	2·2	156	102	·138		20·0	26·5
	STATION No. 55: RICE																		
2	Aug. 12/48	2481	96			73	(11·2)	(0)	7·7 (8·8)	20 (50)	5 (10)			187					31·0
	STATION No. 56: OTONABEE RIVER AT																		
	Monthly averages—data supplied by Peterborough Public Utilities Commission																		
3	Jan. /47					33·0			8·0	16·0									
4	Feb.					33·0			7·9	17·3									
5	Mar.					33·3			7·9	19·6									
6	April					37·0			7·87	20·1									
7	May					51·2			7·75	28·2									
8	June					65·2			7·95	30·8									
9	July					72·1			8·0	37·5									
10	Aug.					76·0			8·1	32·4									
11	Sept.					69·1			8·1	31·5									
12	Oct.					61·2			8·0	30·1									
13	Nov.					43·1			7·67	25·1									
14	Dec.					32·0			7·9	16·6									
15	Yearly average (1947)					50·6			7·9	25·4									
16	July 22/48	3022	263			73	(8·9)	(4·4)	8·2 (8·0)	15 (35)	0·4 (<7)			173					30·0
17	Aug. 26/48	2311	32			79		(0·9)	7·7 (8·2)	20 (20)	5	10	6·4	178	116	·158		49·0	31·8
18	Av. Aug./48, plant data					72·0			8·1	25·2									
19	" Sept. " "					68·2			8·2	30·9									
20	" Oct. " "					55·1			8·1	35·1									
21	" Nov. " "					44·2			8·0	24·9									
22	" Dec. " "					35·2			8·1	22·5									

TABLE IV—Continued

Chemical Analyses of Raw Surface Waters in St. Lawrence River-Great Lakes Drainage Basin

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Iron (Fe): Total	Iron (Fe): Dissolved	Nitrite (NO_2)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Silica (SiO_2): Gravimetric	Silica (SiO_2): Colorimetric	Hardness as $CaCO_3$: Non-carbonate	Hardness as $CaCO_3$: Total	Sum of Constituents	Per cent sodium	Saturation index: +	Saturation index: −	No.
GREAT LAKES DRAINAGE BASIN—Continued																				
HIGHWAY BRIDGE, NEAR NORWOOD, ONT.																				
3·3	1·6	1·1	·14	·03	.....	12·0	0	·4	0·25	87·6 (81·7)	0 (0)	3·2	3·8 (3·8)	7·9	79·7 (76·0)	91·6	4·1	.....	0·2	1
LAKE NEAR HIAWATHA, ONT.																				
4·1	2·0	1·3	.....	.....	.....	.....	0	.....	.....	94·9 (168)	0 (9·6)	.....	4·2	16·5	94·3	.....	4·8	.....	0·3	2
PLANT INTAKE, PETERBOROUGH, ONT.																				
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	110	0	.....	.....	.....	.....	.....	.....	.....	.....	3
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	108	0	.....	.....	.....	.....	.....	.....	.....	.....	4
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	113	0	.....	.....	.....	.....	.....	.....	.....	.....	5
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	98·5	0	.....	.....	.....	.....	.....	.....	.....	.....	6
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	103	0	.....	.....	.....	.....	.....	.....	.....	.....	7
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	97·4	0	.....	.....	.....	.....	.....	.....	.....	.....	8
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	109	0	.....	.....	.....	.....	.....	.....	.....	.....	9
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	113	0	.....	.....	.....	.....	.....	.....	.....	.....	10
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	99·8	0	.....	.....	.....	.....	.....	.....	.....	.....	11
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	97·6	0	.....	.....	.....	.....	.....	.....	.....	.....	12
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	91·6	0	.....	.....	.....	.....	.....	.....	.....	.....	13
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	102	0	.....	.....	.....	.....	.....	.....	.....	.....	14
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	97·2	0	.....	.....	.....	.....	.....	.....	.....	.....	15
3·1	2·3	1·0	.....	.....	.....	20·6	0	.....	.....	92·7 (89·1)	0 (0)	.....	5·6	13·5	89·5	108	5·3	0·2	.....	16
3·1	1·8	0·9	·10	·07	.....	11·5	0	·9	0·20	90·3 (92·7)	0 (0)	5·6	4·6	18·1	92·1	99·2	4·0	.....	0·3	17
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	108	0	.....	.....	11·5	100	.....	.....	.....	.....	18
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	116	0	.....	.....	0	88·7	.....	.....	.....	.....	19
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	115	0	.....	.....	0	94·0	.....	.....	.....	.....	20
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	102	0	.....	.....	11·7	95·0	.....	.....	.....	.....	21
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	109	0	.....	.....	3·5	92·5	.....	.....	.....	.....	22

TABLE IV—Continued

Chemical Analyses of Raw Surface Waters in St. Lawrence River-Great Lakes Drainage Basin

(In parts per million)

No.	Date of collection	Sample No.	Storage period (Days)	Stream discharge (Second-feet): On sampling date	Stream discharge (Second-feet): Monthly mean	Water temperature (°F.)	Dissolved oxygen	Carbon dioxide	pH	Colour	Turbidity	Suspended matter: Dried at 105°C.	Suspended matter: Ignited at 550°C.	Specific conductance Micromhos ($K \times 10^6$) at 25°C.	Residue on Evaporation at 105°C. (Dissolved solids): P.P.M.	Residue on Evaporation at 105°C. (Dissolved solids): Tons per acre-foot	Residue on Evaporation at 105°C. (Dissolved solids): Thousand Tons per day	Loss on ignition at 550°C.	Calcium (Ca)
	UPPER ST. LAWRENCE RIVER-CENTRAL																		
	STATION No. 56: OTONABEE RIVER AT PLANT																		
1	Av. Jan./49, plant data					32			8·0	20									
2	Jan. 19/49	2723	15			33			7·6	15	0·9			173	110	·150		42·2	29·2
3	Dec. 15/49	3639	19						7·7	25	0·5			163	108	·147		11·2	28·0
4	Sept. 18/50	4529	2			60			8·0		6	7·0	1·0	169	117	·159		15·8	30·1
	STATION No. 57: STONEY LAKE																		
5	Aug. 13/48	3017	241			70	(10·4)	(1·2)	8·2 (8·1)	15 (50)	4 (<7)			165					27·5
	STATION No. 58: STURGEON																		
6	Aug. 13/48	3016	241			72	(10·2)	(0)	8·2 (8·5)	18 (35)	3 (<7)			153					23·0
	STATION No. 59: SCUGOG RIVER AT PLANT																		
7	April 4/48			1466	1039														
8	July 21/48	2471	110	0	3	81	(10·4)	(1·3)	7·3 (8·6)	30 (70)	5 (15)			238					37·7
9	Oct. 19/48	2425	7	0	0				7·8	25	6			309					43·0
	STATION No. 60: CAMERON																		
10	Aug. 13/48	2569	118			70	(10·7)	(0·9)	7·1 (8·0)	10 (30)	0·9			115	77·6	·105		20·8	17·3
	STATION No. 61: BALSAM LAKE																		
11	Sept. 24/47	2085	276			62	(9·2)	(2·0)	7·6 (7·4)	6 (20)	(<7)			56·5	43·6	·059		9·0	7·2
	STATION No. 62: GANARASKA																		
12	June 11/48	2568	181	87	94	67	(10·9)	(1·5)	8·3 (8·4)	0 (25)	9 (<7)	31	18	241	142	·193	·033	16·6	30·6

TABLE IV—Continued

Chemical Analyses of Raw Surface Waters in St. Lawrence River-Great Lakes Drainage Basin

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Iron (Fe): Total	Iron (Fe): Dissolved	Nitrite (NO_2)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Silica (SiO_2): Gravimetric	Silica (SiO_2): Colorimetric	Hardness as $CaCO_3$: Non-carbonate	Hardness as $CaCO_3$: Total	Sum of Constituents	Per cent sodium	Saturation index: +	Saturation index: −	No.
GREAT LAKES DRAINAGE BASIN—Continued																				
INTAKE, PETERBOROUGH, ONT.—*Continued*																				
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	110	0	.....	.....	6·0	96·0	.....	.....	.....	.....	1
4·0	1·6	1·4	.....	·10	.....	14·6	0	·2	0	91·5	0	2·6	1·4	14·3	89·3	98·8	3·7	.....	0·5	2
2·5	1·4	0·8	.....	·03	.....	12·2	0	1·8	·10	83·0	0	2·8	3·4	12·2	80·2	90·5	3·6	.....	0·6	3
2·8	1·6	0·8	·38	·03	.....	12·8	0	0	·20	86·9	2·9	.....	7·5	10·6	86·6	99·0	3·8	.....	0·1	4
NEAR BURLEIGH FALLS, ONT.																				
2·9	2·2	0·7	.....	.....	.....	13·4	0 (0)	.....	.....	83·0 (85·4)	2·4 (0)	.....	8·7	8·7	80·7	98·6	5·6	0·1	.....	5
LAKE AT BOBCAYGEON, ONT.																				
2·6	1·8	1·0	.....	.....	.....	11·3	0 (0)	.....	.....	78·1 (63·4)	0 (6·0)	.....	4·4	4·2	68·2 (64·0)	82·5	5·3	0	.....	6
INTAKE, LINDSAY, ONT.—Drainage area, 391 sq. miles.																				
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	7
6·7	3·0	1·2	.....	.....	.....	.....	0·5	.....	.....	130 (132)	0 0	.....	2·3	15·0	122	.....	5·0	.....	0·5	8
9·7	4·9	2·4	.....	.....	.....	.....	1·0	.....	.....	176	0	.....	4·5	3·5	148	.....	6·6	0·2	.....	9
LAKE AT FENELON FALLS, ONT.																				
2·4	1·8	1·1	.....	0·6	.....	14·3	0·8	·7	·20	49·0 (51·2)	0 (0)	2·0	4·2	12·9	53·1 (52·0)	66·9	6·7	.....	1·4	10
(GULL RIVER) AT COBOCONK, ONT.																				
2·0	1·1 as Na		.....	·06	.....	9·8	0 (0)	1·7	.....	20·7 (17·1)	0 (0)	.....	4·4	9·2	26·2	36·3	8·4	.....	1·6	11
RIVER ABOVE PORT HOPE, ONT.																				
11·0	3·5	1·2	·09	·02	.....	12·5	0·7 (0·5)	1·8	·15	134 (220)	2·4 (0)	7·2	9·4 (6·8)	7·6	122 (128)	139	5·8	0·4	.....	12

TABLE IV—Continued

Chemical Analyses of Raw Surface Waters in St. Lawrence River-Great Lakes Drainage Basin

(In parts per million)

No.	Date of collection	Sample No.	Storage period (Days)	Stream discharge (Second-feet): On sampling date	Stream discharge (Second-feet): Monthly mean	Water temperature (°F.)	Dissolved oxygen	Carbon dioxide	pH	Colour	Turbidity	Suspended matter: Dried at 105°C.	Suspended matter: Ignited at 550°C.	Specific conductance Micromhos (K x 10⁶) at 25°C.	Residue on Evaporation at 105°C. (Dissolved solids): P.P.M.	Residue on Evaporation at 105°C. (Dissolved solids): Tons per acre-foot	Residue on Evaporation at 105°C. (Dissolved solids): Thousand Tons per day	Loss on ignition at 550°C.	Calcium (Ca)
	UPPER ST. LAWRENCE RIVER-CENTRAL																		
	STATION No. 63: SPENCER																		
1	Mar. 28/50.....	4240	56	.....	.....	.....	.....	.....	7·6	10	15	28	25	221	144	·196	.....	15·0	31·8
2	June 16/52.....	5732	9	.....	.....	76	.....	.....	8·0	30	7	7·3	5·4	483	304	·410	.....	60·6	70·8
	STATION No. 64: WELLAND RIVER																		
3	July 15/48.....	2820	237	.....	.....	80	(7·7)	(8·8)	8·1 (8·1)	20 (100)	15 (30)	41	30	565	480	·654	.....	100	80·4
	STATION No. 65: GRAND RIVER AT																		
4	Feb. 16/48.....	2252	197	1,410†	1,410†	.....	.....	.....	8·2	24	.....	.....	.....	595	425	·578	1,615	82·0	70·0
5	Mar. 6*.....	2443	243	2,050	10,460	.....	.....	.....	8·8	10	Algae	Slight sediment		252	168	·229	932·7	55·6	27·8
6	April 8.....	2484	223	2,140	2,620	.....	.....	.....	7·6	10	25	26	24	449	291	·396	1,680	52·2	66·4
7	May 7.....	2284	126	837	680	.....	.....	.....	8·1	40	7	.....	.....	546	.....	.....	.....	.....	83·0
8	June 6.....	2453	152	325	623	.....	.....	.....	8·0	15	30	.....	.....	569	.....	.....	.....	.....	82·0
9	July 8.....	2459	123	612	794	.....	.....	.....	8·0	15	8	14·4	13·8	479	332	·450	546·2	75·4	62·0
10	Aug. 12.....	2323	50	520‡	522‡	.....	.....	.....	8·4	20	10	.....	.....	555	.....	.....	.....	.....	76·0
11	Sept. 9.....	2301	12	455‡	455‡	.....	.....	.....	7·8	30	.....	.....	.....	591	.....	.....	.....	.....	78·5
12	Oct. 8.....	2396	11	242	281	.....	.....	.....	7·8	15	7	21	12	623	447	·608	292·0	66·6	87·0
13	Nov. 5.....	2480	11	325	816	.....	.....	.....	7·9	10	15	.....	.....	739	.....	.....	.....	.....	103
14	Dec. 8.....	2590	9	727	530	.....	.....	.....	8·0	30	45	.....	.....	624	.....	.....	.....	.....	92·5
15	Jan. 7/49.....	2659	7	.....	.....	.....	.....	.....	7·7	20	3	.....	.....	731	501	·682	.....	72·6	104
16	Average (12 samples).....		97	876	1,835	.....	.....	.....	8·0	20	17	.....	.....	563	361	·490	.....	67·4	77·7

* Doubtful analysis: possible loss of $CaCO_3$ due to storage and algae growth.
† Discharge at Brantford, Ont.
‡ Estimated.

STATION No. 66: GRAND RIVER

17	July 16/48.....	2472	115	455†	794†	76	(6·9)	(7·0)	7·6 (8·2)	20 (50)	4 (15)	.....	.....	565	.....	.....	.....	.....	78·6

† Discharge at Brantford.

TABLE IV—Continued

Chemical Analyses of Raw Surface Waters in St. Lawrence River-Great Lakes Drainage Basin

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Iron (Fe): Total	Iron (Fe): Dissolved	Nitrite (NO_2)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Silica (SiO_2): Gravimetric	Silica (SiO_2): Colorimetric	Hardness as $CaCO_3$: Non-carbonate	Hardness as $CaCO_3$: Total	Sum of Constituents	Per cent sodium	Saturation index: +	Saturation index: −	No.
GREAT LAKES DRAINAGE BASIN—Continued																				
CREEK AT DUNDAS, ONT.																				
7·0	0·8	1·1	1·8	·04	.....	24·1	0	4·4	·20	100	0	4·2	3·8	26·1	108	122	1·3	.....	·04	1
23·4	3·0	1·1	·78	·07	.....	23·6	2·8	·1	0·60	290	1·2	.....	5·0	32·8	273	275	2·3	0·8	.....	2
NEAR PORT DAVIDSON, ONT.																				
25·6	29·0	5·0	1·6	·03	.....	145	56·7	·8	·30	173 (178)	0 (0)	3·2	3·4	163	305	431	16·9	0·6	.....	3
PLANT INTAKE, DUNNVILLE, ONT.—Length of river, 165 miles.																				
25·4	18·6	3·1	.....	·01	.....	151	20·2	35·4	.....	129	7·2	.....	17	161	279	.....	.....	.....	.....	4
13·2	4·3	3·4	.....	·06	.....	46·4	6·1	1·8	·15	64·9	7·0	1·0	0	58·9	124*	.....	.....	.....	.....	6
16·1	4·5	2·5	·60	·02	.....	74·7	7·0	5·3	·17	183	0	0	0·2	81·9	232	.....	.....	.....	.....	5
19·4	8·0	2·2	.....	.....	.....	.....	10·4	.....	.....	234	0	.....	2·2	94·9	287	.....	.....	.....	.....	7
22·1	10·5	2·3	.....	.....	.....	.....	12·2	.....	.....	188	0	.....	2·1	142	296	.....	.....	.....	.....	8
20·0	8·5	2·2	·15	·04	.....	85·9	10·5	·9	·25	180	0	2·6	1·4	89·9	237	.....	.....	.....	.....	9
22·5	9·5	2·0	.....	.....	.....	.....	13·5	.....	.....	173	0	.....	1·6	141	282	.....	.....	.....	.....	10
23·6	14·0	2·7	.....	.....	.....	.....	16·6	.....	.....	181	0	.....	2·7	145	293	.....	.....	.....	.....	11
23·0	16·8	2·7	1·2	·02	.....	158	20·8	·08	·30	194	0	0·8	0·4	152	311	.....	.....	.....	.....	12
24·5	18·5	2·8	.....	.....	.....	.....	23·4	.....	.....	221	0	.....	0	176	357	.....	.....	.....	.....	13
22·4	10·0	2·9	.....	.....	.....	.....	14·5	.....	.....	217	0	.....	6·0	145	323	.....	.....	.....	.....	14
25·2	15·3	3·3	.....	·08	.....	160	20·7	4·4	·22	237	0	2·0	2·0	170	364	.....	.....	.....	.....	15
21·5	11·5	2·7	.....	.....	.....	113	14·6	.....	.....	192	0	.....	3·0	130	282	339	8·1	0·7	.....	16
AT HIGHWAY BRIDGE, CAYUGA, ONT.																				
19·5	11·5	2·2	.....	.....	.....	.....	14·5	.....	.....	201 (202)	0 (0)	.....	2·8	112	277	.....	8·3	0·3	.....	17

TABLE IV—Continued

Chemical Analyses of Raw Surface Waters in St. Lawrence River-Great Lakes Drainage Basin

(In parts per million)

No.	Date of collection	Sample No.	Storage period (Days)	Stream discharge (Second-feet): On sampling date	Stream discharge (Second-feet): Monthly mean	Water temperature (°F.)	Dissolved oxygen	Carbon dioxide	pH	Colour	Turbidity	Suspended matter: Dried at 105°C.	Suspended matter: Ignited at 550°C.	Specific conductance Micromhos (K x 10⁶) at 25°C.	Residue on Evaporation at 105°C. (Dissolved solids): P.P.M.	Residue on Evaporation at 105°C. (Dissolved solids): Tons per acre-foot	Residue on Evaporation at 105°C. (Dissolved solids): Thousand Tons per day	Loss on ignition at 550°C.	Calcium (Ca)
	UPPER ST. LAWRENCE RIVER-CENTRAL																		
	STATION No. 67: GRAND RIVER AT																		
1	Mar. 1/48.....	2254	183	3·640	10,460	.....	.....	.....	8·4	25	.....	.....	.....	283	166	·226	1,630	31·4	26·8
2	Mar. 20*.....	2281	174	47,800†	10,460	36	.....	.....	8·1	25	.....	.....	.....	266	166	·226	21,440	71·1	41·6
3	April 12.....	2344	176	2,030	2,620	43	.....	.....	7·7	15	10	.....	.....	503	.....	.....	.....	.....	73·5
4	May 12.....	2427	169	3,220	1,080	54	.....	.....	8·3	25	8	19	16	470	306	·416	2,650	48·6	65·6
5	June 12.....	2438	138	659	623	65	.....	.....	8·4	10	2	.....	.....	564	.....	.....	.....	.....	77·0
6	July 12.....	2282	66	727	794	79	.....	.....	7·9	40	3	.....	.....	513	.....	.....	.....	.....	72·0
7	Aug. 12.....	2294	39	520‡	522‡	71	.....	.....	7·6	30	15	14	1·4	531	359	·488	500	69·5	70·0
8	Sept. 12.....	2315	17	455‡	455‡	68	.....	.....	8·1	35	2	.....	.....	564	.....	.....	.....	.....	73·5
9	Oct. 12.....	2404	10	65	281	48	.....	.....	8·0	10	2	.....	.....	658	.....	.....	.....	.....	89·4
10	Oct. 17*.....	2424*	9	325	281	48	.....	.....	8·0	10	2	.....	.....	658	.....	.....	.....	.....	95·0
11	Nov. 12.....	2532	12	534	816	46	.....	.....	8·1	15	3	.....	.....	654	447	·608	645	91·0	96·8
12	Dec. 13.....	2593	3	659	530	36	.....	.....	8·0	20	3	.....	.....	689	.....	.....	.....	.....	99·0
13	Jan. 12/49.....	2678	12	1,510	2,400	34	.....	.....	7·8	30	3	.....	.....	537	.....	.....	.....	.....	80·0
14	Feb. 12.....	2784	11	782	3,530	34	.....	.....	7·8	20	2	.....	.....	654	435	·592	920	117	94·8
15	Dec. 14*.....	3688*	20	4,370	3,530	34	.....	.....	7·6	30	210	136	122	360	244	·332	2,880	37·4	51·4
16	July 3/50*....	4352*	3	603	691	69	.....	.....	8·2	10	6	.....	.....	538	.....	.....	.....	.....	78·9
17	Average (12 samples).....		70	1,233	2,059	53	.....	.....	8·0	23	5	.....	.....	552	.....	.....	.....	.....	76·5

* Not included in average.
† Flood peak.
‡ Estimated.

STATION No. 68: GRAND RIVER AT

18	Feb. 25/48.....	2249	188	Ice conditions	781	68	.....	8·0	25	.....	.....	.....	521	329	·448	.....	95·0	68·4
19	Mar. 10*.....	2439*	232	905	7,180	32	.....	7·9	8	Algae	Medium sediment		403	.....	.....	.....	.....	33·4
20	Mar. 17*.....	2458	236	14,100	7,180	34	.....	7·8	30	45	124	106	209	158	·215	6,010	44·8	30·8
21	Mar. 25.....	2276	169	5,170	7,180	38	.....	8·0	50	9	12	6·2	329	207	·282	2,900	81·4	46·0
22	April 12.....	2377	184	2,360	1,830	44	.....	8·3	15	9	.....	.....	389	.....	.....	.....	.....	48·0
23	May 3*.....	2124*	72	724	1,070	56	.....	8·0	30	0·5	.....	.....	446	272	·370	530	29·0	60·4
24	May 28.....	2431	153	772	1,070	64	.....	8·6	30	2	.....	.....	477	309	·420	642	48·8	59·6

* Not included in average.

TABLE IV—Continued

Chemical Analyses of Raw Surface Waters in St. Lawrence River-Great Lakes Drainage Basin

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Iron (Fe): Total	Iron (Fe): Dissolved	Nitrite (NO_2)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Silica (SiO_2): Gravimetric	Silica (SiO_2): Colorimetric	Hardness as $CaCO_3$: Non-carbonate	Hardness as $CaCO_3$: Total	Sum of Constituents	Per cent sodium	Saturation index: +	Saturation index: −	No.
GREAT LAKES DRAINAGE BASIN—Continued																				
PLANT INTAKE, BRANTFORD, ONT.—Drainage area, 2,030 sq. miles.																				
14·9	5·0	3·0	.....	·01	.....	48·1	3·6	17·7	.....	85·9	5·8	.....	1·6	48·2	128	.....	.....	.....	.....	1
6·6	3·0	2·9	.....	·08	.....	16·4	3·5	9·8	·20	123	3·6	4·6	4·4	24·0	131	.....	.....	.....	.....	2
18·8	6·0	2·3	.....	.....	.....	.....	7·8	.....	.....	237	0	.....	5·0	66·9	261	.....	.....	.....	.....	3
19·7	6·8	1·8	·60	·04	.....	54·2	7·8	1·8	·15	232	1·2	3·4	3·0	50·5	245	.....	.....	.....	.....	4
23·0	13·5	2·4	.....	.....	.....	.....	15·8	.....	.....	212	12·0	.....	5·8	93·4	287	.....	.....	.....	.....	5
20·4	9·5	2·1	.....	.....	.....	.....	10·5	.....	.....	212	0	.....	6·0	89·6	264	.....	.....	.....	.....	6
23·0	11·3	2·9	1·6	·12	.....	88·1	12·5	1·6	.....	206	0	.....	3·0	101	269	.....	.....	.....	.....	7
22·7	11·7	2·4	.....	.....	.....	.....	15·5	.....	.....	212	0	.....	4·0	103	277	.....	.....	.....	.....	8
23·5	15·6	2·7	.....	.....	.....	.....	19·3	.....	.....	227	0	.....	2·1	134	320	.....	.....	.....	.....	9
26·3	18·0	2·7	.....	.....	.....	.....	20·6	.....	.....	229	0	.....	6·0	157	345	.....	.....	.....	.....	10
25·8	11·3	2·6	.....	·06	.....	134	13·5	2·7	·20	249	0	4·4	6·0	144	348	.....	.....	.....	.....	11
25·0	13·7	2·2	.....	.....	.....	.....	16·8	.....	.....	259	0	.....	5·8	138	350	.....	.....	.....	.....	12
19·8	6·0	1·9	.....	.....	.....	.....	8·8	.....	.....	234	0	.....	5·2	88·9	281	.....	.....	.....	.....	13
24·2	10·7	1·7	.....	·03	.....	111	14·0	·4	·30	256	0	8·6	6·6	126	336	.....	.....	.....	.....	14
11·5	5·1	2·8	10·4	·62	.....	47·0	6·5	19·9	·20	154	0	10	7·4	49·5	176	.....	.....	.....	.....	15
15·0	11·7	2·2	.....	.....	.....	76·1	13·2	.....	.....	200	0	.....	4·4	81·8	259	.....	.....	.....	.....	16
21·7	10·1	2·3	.....	.....	.....	.....	12·2	.....	.....	219	1·6	.....	4·5	98·5	281	.....	7·2	0·7	.....	17
GALT, ONT.—Drainage area, 1,360 sq. miles.																				
20·7	12·1	3·1	.....	.....	.....	50·4	13·6	22·1	.....	235	6·5	.....	0·8	52·5	256	.....	.....	.....	.....	18
23·4	11·5	3·0	.....	.....	.....	.....	15·7	.....	.....	172	0	.....	0·4	39·3	180	.....	.....	.....	.....	19
7·0	2·5	2·5	·60	·03	.....	19·9	1·7	4·4	·15	100	0	1·8	.....	23·6	106	.....	.....	.....	.....	20
12·5	4·0	2·4	·44	·16	.....	24·6	3·4	6·2	.....	164	0	9·0	11	32·2	166	.....	.....	.....	.....	21
15·0	5·8	2·1	.....	.....	.....	.....	6·5	.....	.....	181	4·8	.....	.....	25·8	182	.....	.....	.....	.....	22
18·2	7·0	2·0	.....	·04	.....	38·0	8·2	6·2	.....	226	0	1·4	3·0	40·4	226	.....	.....	.....	.....	23
20·8	12·0	2·0	.....	·18	.....	50·0	14·5	2·2	·05	205	12·0	7·2	6·0	46·2	234	.....	.....	.....	.....	24

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TABLE IV—Continued

Chemical Analyses of Raw Surface Waters in St. Lawrence River-Great Lakes Drainage Basin

(In parts per million)

No.	Date of collection	Sample No.	Storage period (Days)	Stream discharge (Second-feet): On sampling date	Stream discharge (Second-feet): Monthly mean	Water temperature (°F.)	Dissolved oxygen	Carbon dioxide	pH	Colour	Turbidity	Suspended matter: Dried at 105°C.	Suspended matter: Ignited at 550°C.	Specific conductance Micromhos ($K \times 10^6$) at 25°C.	Residue on Evaporation at 105°C. (Dissolved solids): P.P.M.	Residue on Evaporation at 105°C. (Dissolved solids): Tons per acre-foot	Residue on Evaporation at 105°C. (Dissolved solids): Thousand Tons per day	Loss on ignition at 550°C.	Calcium (Ca)
	UPPER ST. LAWRENCE RIVER-CENTRAL																		
	STATION No. 68: GRAND RIVER AT PLANT INTAKE,																		
1	June 28.....	2126	16	598	441	72	.....	.....	8·1	40	0·2	.....	.....	442	277	·377	447	41·0	57·6
2	July 23.....	2341	74	410	520	72	.....	.....	8·3	45	1	.....	.....	468	.....	.....	.....	.....	59·2
3	Aug. 26.....	2433	63	350	343	76	.....	.....	8·0	25	3	.....	.....	460	297	·404	280	49·2	52·0
4	Sept. 29.....	2526	56	140	252	64	.....	.....	7·4	30	6	11	2·8	574	362	·492	137	66·2	63·6
5	Oct. 29.....	2473	10	148	148	46	.....	.....	7·9	20	2	.....	.....	670	.....	.....	.....	.....	77·7
6	Nov. 26.....	2588	20	485	476	42	.....	.....	7·5	45	6	.....	.....	542	.....	.....	.....	.....	72·5
7	Dec. 28.....	2625	8	173	250	33	.....	.....	7·7	25	3	3·6	1·0	746	483	·657	226	79·8	95·7
8	Jan. 21/49†....	2720	13	1,060	3,450	38	.....	.....	7·8	35	3	.....	.....	319	216	·294	618	55·6	44·2
9	Average (12 samples).....		80	1,060	1,385	55	.....	.....	8·0	30	4	.....	.....	495	310	·422	750	64·6	62·0
	† Flood sample.																		
	STATION No. 69: GRAND RIVER AT																		
10	Aug. 17/48.....	2613	170	.....	.....	74	(11·4)	(0)	8·2 (8·7)	30 (65)	10	4·0	3·6	371	244	·332	.....	39·2	52·4
	STATION No. 70: GRAND																		
11	Feb. 25/48.....	2385	233	75†	75†	.....	.....	.....	8·4	25	10	.....	.....	480	.....	.....	.....	.....	74·5
12	Mar. 13.....	2392	217	115	152	.....	.....	.....	8·0	25	7	.....	.....	509	.....	.....	.....	.....	80·0
13	" 21*.....	2413*	218	12,050	152	.....	.....	.....	8·9	20	Algae	Slight sediment		111	87·2	·118	2,820	21·2	16·6
14	April 29.....	2274	134	250	613	.....	.....	.....	8·2	55	9	13	7·8	304	199	·271	466	84·0	46·4
15	May — No sample taken				203														
16	June 10.....	2343	117	40	129	.....	.....	.....	8·7	25	Algae	.....	.....	325	.....	.....	.....	.....	50·0
17	July 12.....	2456	116	350	300	.....	.....	.....	7·7	40	1	.....	.....	351	.....	.....	.....	.....	54·0
18	Aug. 9.....	2482	100	300	293	.....	.....	.....	8·2	50	10	12	10	342	224	·305	182	42·4	52·4
19	Sept. 10.....	2298	11	110	104	.....	.....	.....	7·9	25	.....	.....	.....	363	.....	.....	.....	.....	56·1
20	Oct. 9.....	2378	6	30	36	.....	.....	.....	8·0	35	7	.....	.....	431	.....	.....	.....	.....	65·0
21	Nov. 11.....	2540	18	20	32	.....	.....	.....	7·8	30	9	17	11	443	265	·361	14	67·4	58·4
22	Dec. 10.....	2589	6	80	85	.....	.....	.....	8·2	50	6	.....	.....	441	.....	.....	.....	.....	67·3
23	Jan. 13/49.....	2718	21	50	50	.....	.....	.....	8·2	35	3	.....	.....	480	322	·438	44	50·4	74·0
24	Average (11 samples).....		89	129	170	.....	.....	.....	8·2	35	7	.....	.....	390	.....	.....	.....	.....	61·8

* Not included in average; may have lost $CaCO_3$ on storage.
† Discharge records at Grand Valley Dam.

TABLE IV—Continued

Chemical Analyses of Raw Surface Waters in St. Lawrence River-Great Lakes Drainage Basin

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Iron (Fe): Total	Iron (Fe): Dissolved	Nitrite (NO_2)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Silica (SiO_2): Gravimetric	Silica (SiO_2): Colorimetric	Hardness as $CaCO_3$: Non-carbonate	Hardness as $CaCO_3$: Total	Sum of Constituents	Per cent sodium	Saturation index: +	Saturation index: −	No.
GREAT LAKES DRAINAGE BASIN—Continued																				
GALT, ONT.—*Concluded*—Drainage area, 1,360 sq. miles.																				
17·9	10·0	2·5	.....	·03	.....	40·6	9·9	7·9	.....	210	0	2·4	4·6	45·6	217	.....	.....	.....	.....	1
17·0	11·3	2·3	.....	.....	.....	.....	15·4	.....	.....	207	0	.....	3·8	47·7	218	.....	.....	.....	.....	2
18·1	13·8	2·6	.....	·22	.....	46·4	16·4	1·8	·15	210	0	3·6	2·6	32·5	205	.....	.....	.....	.....	3
22·1	23·3	3·0	·08	·02	.....	64·6	29·7	5·3	·12	227	0	1·0	1·4	63·6	250	.....	.....	.....	.....	4
22·0	27·0	3·4	.....	.....	.....	.....	36·5	.....	.....	248	0	.....	2·3	81·5	285	.....	.....	.....	.....	5
19·8	13·3	2·6	.....	.....	.....	79·2	17·5	.....	.....	217	0	.....	6·1	84·5	262	.....	.....	.....	.....	6
28·7	21·0	3·1	·29	·04	.....	102	27·6	4·4	·20	300	0	3·6	5·8	112	357	.....	.....	.....	.....	7
13·1	3·2	2·1	.....	·44	.....	39·8	3·8	4·4	.....	146	0	8·6	3·2	44·4	164	.....	.....	.....	.....	8
19·0	13·1	2·6	.....	.....	.....	56·4	16·2	6·8	.....	213	1·9	5·1	4·3	55·6	233	287	10·8	0·6	.....	9
HIGHWAY BRIDGE NEAR BRESLAU, ONT.																				
15·2	5·6	1·9	·08	·07	.....	38·2	5·8	3·5	·15	187 (173)	2·4 (9·6)	1·4	2·0	35·7	193 (196)	219	5·9	0·7	.....	10
RIVER AT FERGUS, ONT.																				
19·2	3·8	1·7	.....	.....	.....	.....	1·0	.....	.....	256	7·2	.....	7·0	43·4	265	.....	.....	.....	.....	11
19·3	3·5	2·0	.....	.....	.....	.....	1·4	.....	.....	273	0	.....	4·2	55·5	279	.....	.....	.....	.....	12
5·5	2·7	2·2	.....	·06	.....	11·9	0	0	·25	43·7	10·3	7·2	6·4	11·0	64·0	.....	.....	.....	.....	13
11·3	2·3	2·4	·69	·03	.....	24·8	0	3·5	.....	156	2·4	5·8	7·8	30·3	162	.....	.....	.....	.....	14
																				15
13·0	2·5	1·8	.....	.....	.....	.....	0	.....	.....	193	16·8	.....	1·9	0	178	.....	.....	.....	.....	16
13·5	2·8	2·3	.....	.....	.....	.....	0	.....	.....	190	0	.....	1·4	34·6	190	.....	.....	.....	.....	17
13·7	2·3	1·9	·24	·02	.....	28·6	0	1·8	·05	193	0	1·0	2·6	29·2	187	.....	.....	.....	.....	18
15·1	3·0	2·0	.....	.....	.....	.....	0	.....	.....	205	0	.....	2·8	34·1	202	.....	.....	.....	.....	19
17·8	3·3	1·7	.....	.....	.....	.....	0	.....	.....	246	0	.....	0	33·8	236	.....	.....	.....	.....	20
19·8	4·0	2·0	·04	·03	.....	30·9	7·8	3·1	0	217	0	0·4	0·5	49·2	227	.....	.....	.....	.....	21
17·9	3·0	2·2	.....	.....	.....	.....	1·5	.....	.....	198	0	.....	5·4	79·6	242	.....	.....	.....	.....	22
20·2	3·0	1·8	.....	·24	.....	59·0	1·7	2·7	0	248	.....	5·8	3·8	65·1	268	.....	.....	.....	.....	23
16·3	3·0	2·0	.....	.....	.....	.....	1·2	.....	.....	216	.....	.....	3·9	41·5	222	.....	2·8	0·9	.....	24

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TABLE IV—Continued

Chemical Analyses of Raw Surface Waters in St. Lawrence River-Great Lakes Drainage Basin

(In parts per million)

No.	Date of collection	Sample No.	Storage period (Days)	Stream discharge (Second-feet) On sampling date	Stream discharge (Second-feet) Monthly mean	Water temperature (°F.)	Dissolved oxygen	Carbon dioxide	pH	Colour	Turbidity	Suspended matter Dried at 105°C.	Suspended matter Ignited at 550°C.	Specific conductance Micromhos (K x 10⁶) at 25°C.	Residue on Evaporation at 105°C. (Dissolved solids) P.P.M.	Residue on Evaporation at 105°C. (Dissolved solids) Tons per acre-foot	Residue on Evaporation at 105°C. (Dissolved solids) Thousand Tons per day	Loss on ignition at 550°C.	Calcium (Ca)
	UPPER ST. LAWRENCE RIVER-CENTRAL																		
	STATION No. 71: SPEED RIVER AT																		
1	Mar. 12/48	2423	228	198	1,110	40	.....	.....	7·8	8	.....	.....	.....	367	.....	.....	.....	.....	36·0
2	April 12	2442	206	518	341	45	.....	.....	8·3	20	7	14	3·8	413	272	·370	380	100	57·7
3	May 11	2289	128	325	242	55	.....	.....	8·4	40	9	.....	.....	406	.....	.....	.....	.....	52·0
4	June — sample lost in transit.				113														
5	July 12	2495	129	74	136	79	.....	.....	7·8	40	6	8·6	2·6	533	327	·445	65	35·4	65·0
6	Aug. 17	2384	59	18	37	75	.....	.....	8·4	25	8	.....	.....	575	.....	.....	.....	.....	67·5
7	Sept. — No sample taken	.....	.....	.....	29														
8	Oct. 12	2430	16	54	57	59	.....	.....	7·7	10	3	.....	.....	604	381	·518	55	47·4	68·4
9	Nov. — No sample taken	.....	.....	.....	133														
10	Dec. 14	2619	20	88	95	41	.....	.....	8·1	20	0	.....	.....	549	356	·484	85	57·8	73·2
11	Jan. 10/49	2657	4	.....	.....	41	.....	.....	8·0	25	3	.....	.....	498	318	·432	.....	47·8	67·6
12	Feb. 14	2783	9	.....	.....	39	.....	.....	7·5	15	3	.....	.....	342	206	·280	.....	63·6	43·6
13	Average (9 samples)		89	.....	229	53	.....	.....	8·0	23	5	.....	.....	476	310	·422	.....	58·7	59·0
	STATION No. 72: ERAMOSA																		
14	Aug. 17/48	2774	189	.....	.....	68	(13·0)	(0)	7·9 (8·4)	5 (35)	4	5·6	0·6	447	273	·372	.....	40·8	60·9
	STATION No. 73: CONESTOGO RIVER AT																		
15	Aug. 21/48	3013	231	250	438	73	(9·8)	(1·8)	7·9 (8·3)	5 (30)	10 (10)	13	10	456	291	·396	196	70·2	49·9
	STATION No. 74: NITH RIVER																		
16	Feb. 6/51	4898	7	.....	.....	32	.....	.....	7·6	30	3	.....	.....	483	.....	.....	.....	.....	74·0
	STATION No. 75: IRWIN RIVER																		
17	Aug. 20/48*	2778	187	.....	.....	71	(9·6)	(0·9)	8·4 (8·4)	10 (40)	6 (<7)	13	8·2	329	198*	·269	.....	67·2	39·6*

* Some calcium may have been precipitated.

TABLE IV—Continued

Chemical Analyses of Raw Surface Waters in St. Lawrence River-Great Lakes Drainage Basin

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Iron (Fe): Total	Iron (Fe): Dissolved	Nitrite (NO_2)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Silica (SiO_2): Gravimetric	Silica (SiO_2): Colorimetric	Hardness as $CaCO_3$: Non-carbonate	Hardness as $CaCO_3$: Total	Sum of Constituents	Per cent sodium	Saturation index: +	Saturation index: −	No.
GREAT LAKES DRAINAGE BASIN—Continued																				
AT HESPELER, ONT.—Drainage area, 250 sq. miles.																				
19·3	10·2	2·2	.....	.....	.....	.....	20·8	.....	.....	178	0	.....	0	23·5	170	.....	.....	.....	.....	1
19·1	4·1	2·0	·44	·06	.....	25·7	4·8	8·9	·20	217	5·0	2·6	0	36·1	222	.....	.....	.....	.....	2
20·1	6·7	2·1	.....	.....	.....	.....	8·0	.....	.....	216	5·3	.....	1·2	26·4	212	.....	.....	.....	.....	3
																				4
21·8	15·3	2·0	·52	·01	.....	34·4	21·8	·8	0	271	0	5·4	5·8	29·9	252	.....	.....	.....	.....	5
22·9	22·0	2·5	.....	.....	.....	.....	29·1	.....	.....	251	4·8	.....	3·2	49·2	263	.....	.....	.....	.....	6
																				7
25·2	22·3	3·1	.....	·58	.....	61·4	33·0	4·4	·17	254	0	7·4	6·2	66·2	274	.....	.....	.....	.....	8
																				9
23·2	11·8	2·0	.....	·06	.....	63·7	15·8	10·6	·09	247	4·6	4·8	5·0	68·1	278	.....	.....	.....	.....	10
21·5	7·8	1·9	.....	·07	.....	57·2	9·2	3·5	·19	242	0	6·2	6·2	59·2	257	.....	.....	.....	.....	11
14·6	4·3	1·3	.....	·04	.....	33·3	6·7	3·5	·20	156	0	4·6	4·2	40·8	169	.....	.....	.....	.....	12
20·8	11·6	2·1	.....	·13	.....	45·9	16·5	5·2	·14	225	2·1	5·1	4·5	44·3	233	278	9·7	0·8	.....	13
RIVER AT GUELPH, ONT.																				
21·3	3·5	1·5	·13	·03	.....	35·1	3·8	4·4	·15	250 (237)	0 (7·2)	8·6	5·0	34·5	240	258	3·1	0·6	.....	14
HIGHWAY BRIDGE, ST. JACOBS, ONT.																				
25·7	6·8	2·1	·63	·04	.....	79·7	3·0 (2·7)	1·8	·15	190 (178)	0 (0)	3·4	5·2	74·8	231 (236)	267	6·0	0·3	.....	15
AT NEW HAMBURG, ONT.																				
17·3	3·7	1·7	.....	.....	.....	37·3	0	.....	.....	281	0	.....	5·2	25·4	256	277	3·1	0·4	.....	16
AT HIGHWAY BRIDGE, SALEM, ONT.																				
18·7	3·7	1·8	·04	·02	.....	20·6	1·3	1·8	0	183 (182)	4·8 (0)	7·8	4·6	17·7	176*	187	4·3	0·8	.....	17

TABLE IV—Continued

Chemical Analyses of Raw Surface Waters in St. Lawrence River-Great Lakes Drainage Basin

(In parts per million)

No.	Date of collection	Sample No.	Storage period (Days)	Stream discharge (Second-feet): On sampling date	Stream discharge (Second-feet): Monthly mean	Water temperature (°F.)	Dissolved oxygen	Carbon dioxide	pH	Colour	Turbidity	Suspended matter: Dried at 105°C.	Suspended matter: Ignited at 550°C.	Specific conductance Micromhos (K x 10⁶) at 25°C.	Residue on Evaporation at 105°C. (Dissolved solids): P.P.M.	Residue on Evaporation at 105°C. (Dissolved solids): Tons per acre-foot	Residue on Evaporation at 105°C. (Dissolved solids): Thousand Tons per day	Loss on ignition at 550°C.	Calcium (Ca)
	UPPER ST. LAWRENCE RIVER-CENTRAL																		
	STATION No. 76: KETTLE CREEK AT																		
1	June 14/48*	2572	178	.....	.....	68	(10·9)	(1·5)	8·4 (8·2)	30 (50)	30 (15)	33	19	352	215*	·293	.....	43·0	43·1*
2	May 8/52	5691	7	.....	.....	58	.....	.....	8·0	10	0·4	.....	.....	410	254	·346	.....	32·6	60·5
	* Calcium apparently precipitated during storage causing changes in other values.																		
	STATION No. 77: CANARD																		
3	June 17/48	2307	102	.....	.....	72	(10·6)	(1·5)	8·0 (8·2)	15	40 (40)	31	24	1069	588	·800	.....	45·4	43·6
	STATION No. 78: BELLE RIVER AT No. 2																		
4	June 21/48	2655	207	.....	.....	69	(10·3)	(1·0)	8·5 (8·1)	25 (30)	Brown algae, slight sediment (35)			472	313	·426	.....	51·4	57·1
	STATION No. 79: THAMES RIVER																		
5	June 22/48	2742	234	.....	.....	71	(8·2)	(14·1)	8·4 (8·0)	15 (30)	75 (50)	28	21	506	312	·424	.....	47·2	60·2
	STATION No. 80: THAMES RIVER AT																		
6	Feb. 19/48†	2247	194	.....*	.....	.....	.....	.....	8·9	30	.....	.....	.....	255	170	·230	.....	51·2	40·0
7	Mar. 15	2414	224	574·50	.....	32	.....	.....	8·5	15	9	30	21	450	314	·427	.....	51·0	74·4
8	April 15	2279	148	576·58	.....	45	.....	.....	7·8	25	.....	.....	.....	336	202	·275	.....	76·6	40·0
9	May 17	2283	122	576·50	.....	62	.....	.....	8·3	30	20	.....	.....	456	.....	.....	.....	.....	73·5
10	June 15	2440	135	575·58	.....	70	.....	.....	8·3	10	Algae	Slight sediment		547	.....	.....	.....	.....	71·0
11	July 15	2412	102	575·58	.....	79	.....	.....	8·2	15	130	62	49	482	302	·411	.....	64·4	57·2
12	Aug. 16	2316	43	576·58	.....	74	.....	.....	8·5	30	25	.....	.....	524	.....	.....	.....	.....	68·0
13	Sept. 20	2483	58	575·16	.....	72	.....	.....	8·3	20	15	42	32	591	377	·513	.....	67·4	62·0
14	Oct. 16	2418	10	579·33	.....	53	.....	.....	8·0	10	25	.....	.....	673	.....	.....	.....	.....	73·0
15	Nov. 15	2507	4	574·25	.....	47	.....	.....	7·8	25	4	.....	.....	590	.....	.....	.....	.....	79·8
16	Dec. 15	2615	19	573·83	.....	35	.....	.....	8·2	15	15	28	26	628	410	·558	.....	58·0	92·6
17	Jan. 15/49	2716	19	574·50	.....	33	.....	.....	8·1	20	35	39	30	461	299	·407	.....	46·2	71·2
18	Average (12 samples)		84	575·67	.....	54	.....	.....	8·2	20	30	.....	.....	449	297	·404	.....	59·2	67·3

* Water levels in feet.

† Doubtful analysis; water may have lost $CaCO_3$ owing to long storage, resulting in high pH, and low hardness values, specific conductance, etc.

TABLE IV—Continued

Chemical Analyses of Raw Surface Waters in St. Lawrence River-Great Lakes Drainage Basin

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Iron (Fe): Total	Iron (Fe): Dissolved	Nitrite (NO_2)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Silica (SiO_2): Gravimetric	Silica (SiO_2): Colorimetric	Hardness as $CaCO_3$: Non-carbonate	Hardness as $CaCO_3$: Total	Sum of Constituents	Per cent sodium	Saturation index: +	Saturation index: −	No.
GREAT LAKES DRAINAGE BASIN—Continued																				
PLANT INTAKE, ST. THOMAS, ONT.																				
14·9	9·0	2·2	·32	·62	.....	32·9	9·3	1·3	0	182* (232)	6·7 (0)	2·6	..... (2·5)	9·1	169*	212	.....	0·8	.....	1
12·9	7·8	2·6	.....	·05	.....	30·0	6·0	0	·10	225	0	.....	4·2	20·0	204	235	.....	0·5	.....	2
RIVER NEAR MOUTH																				
10·1	141	2·0	·50	·001	.....	27·5	246	·6	·20	131 (132)	0 (0)	3·4	3·0	43·4	150	540	66·8	0·2	.....	3
HIGHWAY BRIDGE NEAR BELLE RIVER, ONT.																				
22·8	8·6	4·5	.....	·02	.....	89·1	11·0	2·2	·18	157 (185)	10·8 0	2·6	2·8	89·2	230	286	7·2	0·6	.....	4
AT PRAIRIE SIDING, ONT.—Length of River, 163 miles																				
22·4	16·2	2·7	1·0	·05	.....	55·5	24·8	6·2	·25	195 (251)	7·0 (0)	3·4	2·8	71·4	242	294	4·8	1·0	.....	5
PLANT INTAKE, CHATHAM, ONT.																				
10·9	8·6	3·5	.....	·08	.....	52·7	9·0	22·1	.....	58·6	14·4	.....	15	72·7	145	.....	.....	.....	.....	6
15·1	8·8	2·7	·04	·03	.....	48·1	10·8	11·5	·20	223	5·0	7·2	5·6	46·7	238	.....	.....	.....	.....	7
11·7	4·8	2·7	.....	·06	.....	36·8	5·5	4·0	·30	149	0	1·0	1·6	40·9	163	.....	.....	.....	.....	8
14·0	5·0	2·4	.....	.....	.....	.....	5·8	.....	.....	237	0	.....	5·8	47·0	241	.....	.....	.....	.....	9
20·3	16·5	2·9	.....	.....	.....	.....	27·2	.....	.....	225	10·6	.....	1·4	60·0	261	.....	.....	.....	.....	10
18·8	17·0	3·4	1·7	·05	.....	49·2	26·6	2·2	·30	189	4·8	3·4	2·6	57·1	220	.....	.....	.....	.....	11
18·3	16·0	3·3	.....	.....	.....	.....	28·5	.....	.....	222	0	.....	9·4	63·3	245	.....	.....	.....	.....	12
21·9	28·0	3·7	·29	·03	.....	69·2	46·5	·8	·15	214	2·4	10	10	65·8	245	.....	.....	.....	.....	13
24·1	37·0	4·3	.....	.....	.....	.....	108	.....	.....	239	0	.....	3·5	85·6	282	.....	.....	.....	.....	14
17·8	16·0	4·0	.....	.....	.....	.....	29·2	.....	.....	238	0	.....	6·4	77·7	273	.....	.....	.....	.....	14
21·0	15·8	2·7	·10	·02	.....	75·5	27·5	5·3	·19	250	7·9	1·4	2·0	98·6	317	.....	.....	.....	.....	15
14·2	5·8	2·6	1·2	·11	.....	51·4	9·6	4·4	·20	206	0	4·0	3·8	67·3	236	.....	.....	.....	.....	16
18·5	20·1	3·1	.....	.....	.....	54·5	27·8	.....	.....	204	3·7	.....	5·5	65·2	241	300	15·0	0·8	.....	17

TABLE IV—Continued

Chemical Analyses of Raw Surface Waters in St. Lawrence River-Great Lakes Drainage Basin

(In parts per million)

No.	Date of collection	Sample No.	Storage period (Days)	Stream discharge (Second-feet): On sampling date	Stream discharge (Second-feet): Monthly mean	Water temperature (°F.)	Dissolved oxygen	Carbon dioxide	pH	Colour	Turbidity	Suspended matter: Dried at 105°C.	Suspended matter: Ignited at 550°C.	Specific conductance Micromhos (K x 10²) at 25°C.	Residue on Evaporation at 105°C. (Dissolved solids): P.P.M.	Residue on Evaporation at 105°C. (Dissolved solids): Tons per acre-foot	Residue on Evaporation at 105°C. (Dissolved solids): Thousand Tons per day	Loss on ignition at 550°C.	Calcium (Ca)
	UPPER ST. LAWRENCE RIVER-CENTRAL																		
	STATION No. 81—THAMES RIVER (SOUTH BRANCH)																		
1	Feb. 24/48.....	2441	247	855*	683*	40	.....	.....	8·2	25	Algae	Slight sediment		305	.....	.....	.....	.....	36·4
2	Mar. 18†.....	2277	176	4,120	1,990	40	.....	.....	10·0	35	Algae	Slight sediment		150	102	·139	1,135	28·2	17·2
3	April 19.....	2448	199	500	721	.....	.....	.....	7·9	10	Algae	Slight sediment		382	242	·329	326	55·2	51·1
4	May 18.....	2405	157	1,380	777	65	.....	.....	8·2	15	Algae	Sediment	.....	355	.....	.....	.....	.....	50·4
5	June 23.....	2328	100	180	184	74	.....	.....	8·5	35	1	.....	.....	454	.....	.....	.....	.....	56·5
6	July 19.....	2410	98	255	303	65	.....	.....	8·2	10	10	26	17	451	287	·390	197	59·2	60·0
7	Aug. 18.....	2386	59	160	152	.....	.....	.....	8·1	15	4	.....	.....	481	.....	.....	.....	.....	63·7
8	Sept. 18.....	2454	48	103	103	62	.....	.....	7·9	15	0·3	.....	.....	489	.....	.....	.....	.....	55·0
9	Oct. 19.....	2533	36	133	116	42	.....	.....	8·2	3	2	.....	.....	535	355	·483	127	66·2	72·0
10	Nov. 23.....	2586	23	353	243	40	.....	.....	7·9	25	6	.....	.....	558	.....	.....	.....	.....	85·8
11	Dec. 18.....	2645	25	225	223	31	.....	.....	8·1	15	2	.....	.....	614	.....	.....	.....	.....	91·0
12	Jan. 17/49.....	2741	24	1,040	787	.....	.....	.....	7·7	25	15	32	23	421	270	·368	758	44·0	62·2
13	Feb. 17.....	2798	17	4,130	1,700	29	.....	.....	7·9	40	15	42	30	233	152	·207	1,697	43·0	31·2
14	Mar. 22.....	3101	45	1,430	Ice	38	.....	.....	7·7	15	45	76	60	416	254	·346	982	89·6	61·9
15	Average (12 samples)..... (Apr./48 to Mar./49 incl.)		69	822	483	49	.....	.....	8·0	19	10	.....	.....	449	.....	·354	681	.....	61·7

* Drop in discharge after 4 days of quick rise to 1000 cfs—Records at Ealing, Oat.
† Doubtful sample owing to possible changes on storage.

STATION No. 82: THAMES RIVER (NORTH BRANCH)

16	Feb. 24/48.....	2346	224	Ice condition	894	35	.....	.....	8·3	8	Algae	Medium sediment		431	.....	.....	.....	.....	65·2
17	Mar. 18*.....	2489	244	7,660	4,100	40	.....	.....	9·0	9	Algae	Slight sediment		195	122	·166	2,520	24·6	28·8
18	April 20.....	2275	143	530	922	.....	.....	.....	8·2	10	5	7·8	3·4	409	246	·335	352	96·6	60·4
19	May 18.....	2406	157	2,100	937	64	.....	.....	8·4	15	Algae	Slight sediment		377	.....	.....	.....	.....	58·6
20	June 23.....	2393	115	118	99	70	.....	.....	8·4	6	7	.....	.....	397	.....	.....	.....	.....	50·0
21	July 19.....	2492	122	33	63	68	.....	.....	7·8	15	40	30	25	425	267	·363	24	30·4	55·8
22	Aug. 18.....	2292	33	51	45	.....	.....	.....	8·0	10	10	16	7·2	355	238	·324	33	42·5	46·0
23	Sept. 18.....	2452	48	15	16	61	.....	.....	7·8	4	0·3	.....	.....	450	.....	.....	.....	.....	52·0
24	Oct. 19.....	2530	36	74	41	43	.....	.....	8·2	3	2	.....	.....	541	345	·470	69	57·8	65·2
25	Nov. 23.....	2587	23	413	207	42	.....	.....	8·1	25	4	.....	.....	500	.....	.....	.....	.....	78·4

* Doubtful sample owing to possible changes on storage.

TABLE IV—Continued

Chemical Analyses of Raw Surface Waters in St. Lawrence River-Great Lakes Drainage Basin

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Iron (Fe): Total	Iron (Fe): Dissolved	Nitrite (NO_2)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Silica (SiO_2): Gravimetric	Silica (SiO_2): Colorimetric	Hardness as $CaCO_3$: Non-carbonate	Hardness as $CaCO_3$: Total	Sum of Constituents	Per cent sodium	Saturation index: +	Saturation index: −	Saturation index: −	No.
GREAT LAKES DRAINAGE BASIN—Continued																					
AT LONDON, ONT. Drainage area, 515 sq. miles.																					
13·1	5·3	4·6	.....	.....	.....	.....	6·2	.....	.....	124	0	.....	0	43·0	145	.....	.....	.....	.....	.....	1
3·7	4·8	3·3	.....	·03	.....	20·7	0·7	0	.....	2·4	26·4	17	21	12·1	58·1†	.....	.....	.....	.....	.....	2
18·4	5·8	2·3	.....	·05	.....	44·1	5·1	1·8	·20	177	0	1·6	0	57·9	203	.....	.....	.....	.....	.....	3
13·5	3·5	2·3	.....	.....	.....	.....	2·2	.....	.....	187	0	.....	0	28·2	182	.....	.....	.....	.....	.....	4
20·8	10·0	3·0	.....	.....	.....	.....	10·5	.....	.....	185	2·4	.....	1·6	70·9	227	.....	.....	.....	.....	.....	5
19·0	11·0	3·1	·30	·04	.....	50·5	9·2	3·1	·30	195	8·4	6·2	4·0	53·9	228	.....	.....	.....	.....	.....	6
19·8	11·3	2·7	.....	.....	.....	.....	12·0	.....	.....	224	0	.....	1·8	56·6	241	.....	.....	.....	.....	.....	7
22·5	14·8	3·5	.....	.....	.....	.....	13·8	.....	.....	212	0	.....	1·0	56·2	230	.....	.....	.....	.....	.....	8
22·7	13·3	2·9	.....	·01	.....	74·0	14·0	3·5	·27	243	4·3	4·0	5·2	67·0	273	.....	.....	.....	.....	.....	9
19·0	6·5	3·4	.....	.....	.....	79·8	8·7	.....	.....	256	0	.....	7·2	82·8	292	.....	.....	.....	.....	.....	10
21·3	11·0	2·6	.....	.....	.....	.....	11·8	.....	.....	285	0	.....	3·6	80·2	314	.....	.....	.....	.....	.....	11
14·6	3·8	2·6	1·0	·03	.....	47·9	4·4	11·5	.....	195	0	.....	5·0	55·3	215	.....	.....	.....	.....	.....	12
7·5	2·3	2·0	·30	·11	.....	24·8	1·2	10·6	·15	107	0	3·8	3·4	20·6	109	.....	.....	.....	.....	.....	13
13·5	3·2	1·6	2·5	·07	.....	39·7	2·9	6·2	·10	209	0	3·2	4·7	38·0	209	.....	.....	.....	.....	.....	14
17·7	8·0	2·7	.....	.....	.....	51·5	8·0	.....	.....	206	1·3	.....	3·1	55·6	227	254	7·0	0·6	.....	.....	15
AT LONDON, ONT.—Drainage area, 670 sq. miles																					
15·5	4·0	3·3	.....	.....	.....	.....	7·2	.....	.....	215	0	.....	0·9	50·6	227	.....	.....	.....	.....	.....	16
5·9	2·0	2·3	.....	·22	.....	13·3	0	4·9	·08	83·2	7·7	2·4	.....	14·9	95·9	.....	.....	.....	.....	.....	17
15·6	4·3	2·4	·23	·01	.....	32·2	3·7	2·7	·20	212	0	1·8	3·4	40·9	215	.....	.....	.....	.....	.....	18
13·8	3·3	2·4	.....	.....	.....	.....	2·3	.....	.....	178	19·2	.....	.....	25·1	203	.....	.....	.....	.....	.....	19
17·3	6·8	2·3	.....	.....	.....	.....	7·1	.....	.....	174	6·0	.....	1·4	43·3	196	.....	.....	.....	.....	.....	20
17·8	7·8	2·7	·68	·05	.....	45·1	8·7	1·8	·25	212	0	5·4	6·2	38·4	212	.....	.....	.....	.....	.....	21
17·0	7·5	3·5	·56	·06	.....	45·3	7·0	·8	·30	181	0	.....	6·6	36·8	185	.....	.....	.....	.....	.....	22
20·0	11·5	3·2	.....	.....	.....	.....	11·3	.....	.....	183	0	.....	3·0	62·3	212	.....	.....	.....	.....	.....	23
21·0	17·2	3·3	.....	·09	.....	81·5	21·3	1·8	·25	214	1·9	4·0	4·0	71·0	249	.....	.....	.....	.....	.....	24
15·8	5·0	3·2	.....	.....	.....	58·8	6·8	.....	.....	239	0	.....	6·7	64·6	261	.....	.....	.....	.....	.....	25

TABLE IV—Continued

Chemical Analyses of Raw Surface Waters in St. Lawrence River-Great Lakes Drainage Basin

(In parts per million)

No.	Date of collection	Sample No.	Storage period (Days)	Stream discharge (Second-feet): On sampling date	Stream discharge (Second-feet): Monthly mean	Water temperature (°F.)	Dissolved oxygen	Carbon dioxide	pH	Colour	Turbidity	Suspended matter: Dried at 105°C.	Suspended matter: Ignited at 550°C.	Specific conductance Micromhos (K x 10⁶) at 25°C.	Residue on Evaporation at 105°C. (Dissolved solids): P.P.M.	Residue on Evaporation at 105°C. (Dissolved solids): Tons per acre-foot	Residue on Evaporation at 105°C. (Dissolved solids): Thousand Tons per day	Loss on ignition at 550°C.	Calcium (Ca)
	UPPER ST. LAWRENCE RIVER-CENTRAL																		
	STATION No. 82—THAMES RIVER (NORTH																		
1	Dec. 20.....	2648	23	202	198	32	.....	.....	8·0	9	1	.....	.....	526	.....	.....	.....	.....	82·8
2	Jan. 17/49.....	2745	24	4,160†	1,380	.....	.....	.....	7·8	30	120	105	87	324	194	·264	2,180	33·8	48·0
3	Feb. 17.....	2797	13	3,710	2,290	32	.....	.....	7·7	30	30	153	126	271	173	·236	1,735	49·0	41·8
4	Mar. 22.....	3015	20	3,210	1,670	36	.....	.....	7·7	15	10	.....	.....	354	.....	.....	.....	.....	55·0
5	Average (12 samples)..... (April/48 to March/49 incl.)		63	1,218	656	50	.....	.....	8·0	14	21	.....	.....	411	244	·332	.....	51·7	57·8
	† Almost the monthly high—a flash rise.																		
	STATION No. 83: AVON RIVER																		
6	Mar. 30/50.....	4296	74	.....	.....	37	.....	.....	8·2	15	10	18	13	311	203	·276	.....	81·6	49·1
	STATION No. 84: SYDENHAM RIVER																		
7	April 1/49.....	3188	15	.....	.....	.....	.....	.....	8·5	.....	.....	.....	.....	336	.....	.....	.....	.....	46·7
	STATION No. 85: SYDENHAM RIVER																		
8	June 23/48.....	2777	244	.....	.....	73	(9·6)	(15)	8·4 (8·2)	0 (40)	25 (45)	15	11	446	274	·373	.....	29·6	67·8
	STATION No. 86: MAITLAND																		
9	Mar. 3/51.....	4999	30	.....	.....	36	.....	.....	8·3	25	5	.....	.....	390	.....	.....	.....	.....	58·7
	STATION No. 87: SAUGEEN RIVER NEAR																		
10	Mar. 20/48*....	2278*	174	24,300	8,410	.....	.....	.....	9·5	30	.....	.....	.....	123	97·4	·132	6,350	29·4	14·8
11	April 26.....	2306	154	2,820	3,590	.....	.....	.....	8·6	40	Algae	.....	.....	403	265	·361	2,020	57·4	56·2
12	May 24.....	2286	115	1,270	1,890	.....	.....	.....	8·5	40	4	.....	.....	443	.....	.....	.....	.....	61·5
13	June 27.....	2327	96	784	728	.....	.....	.....	7·9	25	1	.....	.....	483	.....	.....	.....	.....	65·5
14	July 27.....	2280	45	590	628	.....	.....	.....	8·0	25	4	9·8	5·4	513	340	·463	542	114	69·6
15	Aug. 30.....	2288	17	389	481	.....	.....	.....	7·9	25	3	.....	.....	569	.....	.....	.....	.....	77·5
16	Sept. 26.....	2374	17	322	332	.....	.....	.....	7·9	15	1	.....	.....	595	.....	.....	.....	.....	77·0
17	Oct. 25.....	2528	30	461	480	.....	.....	.....	8·3	9	0·9	.....	.....	579	393	·535	489	94·0	82·8

* Doubtful analysis owing to possible loss of $CaCO_3$ on storage.

TABLE IV—Continued

Chemical Analyses of Raw Surface Waters in St. Lawrence River-Great Lakes Drainage Basin

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Iron (Fe): Total	Iron (Fe): Dissolved	Nitrite (NO_2)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Silica (SiO_2): Gravimetric	Silica (SiO_2): Colorimetric	Hardness as $CaCO_3$: Non-carbonate	Hardness as $CaCO_3$: Total	Sum of Constituents	Per cent sodium	Saturation index: +	Saturation index:		Saturation index: −	No.
GREAT LAKES DRAINAGE BASIN—Continued																						
BRANCH) AT LONDON, ONT.—*Concluded*																						
17·3	5·5	2·6	.....	.....	.....	.....	7·0	.....	.....	271	0	.....	1·2	55·5	278	.....	.....	.....	.....		.....	1
10·4	2·1	2·4	3·1	·13	.....	27·7	2·2	12·4	.....	146	0	5·6	3·6	42·6	163	.....	.....	.....	.....		.....	2
8·1	2·8	2·3	·64	·06	.....	23·2	2·6	23·0	·11	129	0	3·4	3·6	31·7	138	.....	.....	.....	.....		.....	3
10·8	3·1	2·0	.....	.....	.....	31·2	3·5	.....	.....	181	0	.....	4·0	33·8	182	.....	.....	.....	.....		.....	4
15·4	6·4	2·7	.....	·07	.....	43·1	6·9	7·1	.....	193	2·3	.....	3·6	45·5	208	240	6·2	0·5	.....		.....	5
AT STRATFORD, ONT.																						
8·2	2·5	1·9	·26	·06	.....	26·7	0	8·0	·15	147	7·2	6·0	4·1	23·4	156	180	3·3	0·6	.....		.....	6
AT WALLACEBURG, ONT.																						
8·3	.....	.....	.....	.....	.....	41·4	11·0	.....	.....	114	9·6	.....	2·8	41·8	151	.....	.....	0·8	.....		.....	7
NEAR TUPPERVILLE, ONT.																						
15·1	7·0	2·1	·54	·05	.....	41·0	6·9	1·8	·02	222 (239)	9·8 (0)	3·8	4·4	32·9	231	266	6·1	1·1	.....		.....	8
RIVER NEAR WINGHAM, ONT.																						
15·0	2·3	0·9	.....	.....	.....	21·8	3·9	1·8	.....	234	1·2	.....	2·7	14·5	208	224	2·8	0·9	.....		.....	9
PORT ELGIN, ONT.—Drainage area, 1,565 sq. miles																						
3·2	5·0	2·3	.....	·01	.....	15·0	0	0	·40	29·3	12·0	18	23	6·1	50·1	.....	.....	.....	.....		.....	10
18·0	3·3	2·1	.....	·01	.....	42·0	2·5	3·5	.....	191	7·2	1·8	0·7	45·7	214	.....	.....	.....	.....		.....	11
22·7	3·7	2·1	.....	.....	.....	.....	2·0	.....	.....	196	6·0	.....	0·4	61·9	247	.....	.....	.....	.....		.....	12
23·8	3·2	1·8	.....	.....	.....	.....	2·3	.....	.....	217	0	.....	3·8	83·8	262	.....	.....	.....	.....		.....	13
25·0	4·3	1·7	·26	·04	.....	90·4	3·0	2·2	·20	210	0	5·2	7·4	105	277	.....	.....	.....	.....		.....	14
27·7	3·7	2·0	.....	.....	.....	.....	2·7	.....	.....	196	0	.....	7·8	146	307	.....	.....	.....	.....		.....	15
24·0	4·2	1·9	.....	.....	.....	.....	3·4	.....	.....	204	0	.....	4·8	124	291	.....	.....	.....	.....		.....	16
26·8	3·0	1·6	.....	·02	.....	115	3·3	2·2	·17	244	0	4·0	6·0	117	317	.....	.....	.....	.....		.....	17

TABLE IV—Continued

Chemical Analyses of Raw Surface Waters in St. Lawrence River-Great Lakes Drainage Basin

(In parts per million)

No.	Date of collection	Sample No.	Storage period (Days)	Stream discharge (Second-feet): On sampling date	Stream discharge (Second-feet): Monthly mean	Water temperature (°F.)	Dissolved oxygen	Carbon dioxide	pH	Colour	Turbidity	Suspended matter: Dried at 105°C.	Suspended matter: Ignited at 550°C.	Specific conductance Micromhos (K x 10⁶) at 25°C.	Residue on Evaporation at 105°C. (Dissolved solids): P.P.M.	Residue on Evaporation at 105°C. (Dissolved solids): Tons per acre-foot	Residue on Evaporation at 105°C. (Dissolved solids): Thousand Tons per day	Loss on ignition at 550°C.	Calcium (Ca)
	UPPER ST. LAWRENCE RIVER-CENTRAL																		
	STATION No. 87: SAUGEEN RIVER																		
1	Nov. 30.....	2584	16	1,030	936	.....	.....	.....	8·0	40	4	.....	.....	521	.....	.....	.....	.....	75·2
2	Dec. 27.....	2651	16	642	712	.....	.....	.....	8·2	20	3	.....	.....	630	.....	.....	.....	.....	93·5
3	Jan. 27/49.....	2747	14	2,000	3,000	.....	.....	.....	8·0	35	6	8·8	6·0	450	283	·385	1,527	47·0	61·4
4	Feb. 13.....	2785	10	1,070	2,300	.....	.....	.....	8·0	25	0·5	.....	.....	533	349	·475	1,008	81·2	75·6
5	Average (12 samples).....		59	2,974	1,957	.....	.....	.....	8·2	27	3·4	.....	.....	486	288	·392	1,989	70·5	67·5
	STATION No. 88: SAUGEEN																		
6	Mar. 12/51.....	4996	32	.....	.....	36	.....	.....	8·3	25	15	.....	.....	380	.....	.....	.....	.....	58·5
	STATION No. 89: SAUGEEN																		
7	Feb. 15/51.....	4897	8	.....	.....	.....	.....	.....	7·8	20	0·5	.....	.....	404	.....	.....	.....	.....	54·7
	STATION No. 90: SAUGEEN																		
8	Mar. 13/51.....	4997	31	.....	.....	35	.....	.....	8·0	35	1	.....	.....	326	.....	.....	.....	.....	44·8
	STATION No. 91: TEESWATER																		
9	Mar. 12/51.....	5046	54	.....	.....	32	.....	.....	7·9	35	9	17	11	356	222	·302	.....	89·6	50·8
	STATION No. 92: RUHL LAKE																		
10	Feb. 5/51.....	4883	7	.....	.....	.....	.....	.....	7·6	0	0·2	.....	.....	447	261	·335	.....	40·8	61·3
	STATION No. 93: SYDENHAM																		
11	Mar. 12/51.....	4995	32	.....	.....	33	.....	.....	7·8	25	4	.....	.....	391	.....	.....	.....	.....	56·3
	STATION No. 94: BEAVER RIVER AT																		
12	Mar. 10/51.....	4993	31	.....	.....	33	.....	.....	8·0	25	50	.....	.....	362	.....	.....	.....	.....	50·2

TABLE IV—Continued

Chemical Analyses of Raw Surface Waters in St. Lawrence River-Great Lakes Drainage Basin

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Iron (Fe): Total	Iron (Fe): Dissolved	Nitrite (NO_2)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Silica (SiO_2): Gravimetric	Silica (SiO_2): Colorimetric	Hardness as $CaCO_3$: Non-carbonate	Hardness as $CaCO_3$: Total	Sum of Constituents	Per cent sodium	Saturation index: +	Saturation index:		Saturation index: −	No.
GREAT LAKES DRAINAGE BASIN—Continued																						
NEAR PORT ELGIN, ONT.—*Concluded*																						
22·5	3·5	1·6	.....	.....	.....	88·1	4·5	.....	.....	236	0	.....	5·5	86·9	280	.....	.....	.....		.....	1
24·8	4·5	1·8	.....	.....	.....	.....	4·5	.....	.....	286	0	.....	3·0	102	336	.....	.....	.....		.....	2
20·5	2·3	1·4	·60	·03	.....	55·1	1·9	3·5	.....	212	0	5·8	4·6	63·6	238	.....	.....	.....		.....	3
24·6	3·0	1·1	.....	·03	.....	77·8	3·5	4·4	·25	254	0	6·0	5·2	81·8	290	.....	.....	.....		.....	4
21·9	3·6	1·7	.....	.....	.....	69·0	2·8	.....	.....	206	2·1	.....	6·5	85·3	259	300	1·8	0·8		.....	5
RIVER NEAR PAISLEY, ONT.																					
15·5	2·1	0·8	.....	.....	.....	32·9	3·5	0	.....	212	2·4	.....	5·2	31·9	210	225	2·1	0·9		.....	6
RIVER AT HANOVER, ONT.																					
21·5	1·6	1·2	.....	.....	.....	17·9	0	.....	.....	255	0	.....	6·4	15·7	225	229	1·5	0·4		.....	7
RIVER NEAR DURHAM, ONT.																					
14·0	2·0	0·7	.....	.....	.....	10·3	2·3	0	.....	205	0	.....	4·0	1·7	169	179	2·5	0·4		.....	8
RIVER AT PAISLEY, ONT.																					
15·0	4·1	0·9	·56	·04	.....	16·1	6·3	7·1	.....	201	0	.....	7·0	23·4	188	206	4·4	0·4		.....	9
NEAR HANOVER, ONT.																					
22·5	6·0	1·6	.....	·02	.....	17·3	1·5	1·4	0	288	0	.....	8·4	9·1	246	262	5·0	0·3		.....	10
RIVER ABOVE OWEN SOUND, ONT.																					
15·5	1·5	1·1	.....	.....	.....	10·3	2·8	2·7	.....	244	0	.....	3·2	4·2	204	214	1·5	0·4		.....	11
PLANT INTAKE, THORNBURY, ONT.																					
17·3	0·8	1·1	.....	.....	.....	12·6	2·5	4·4	.....	229	0	.....	4·2	8·8	196	206	0·9	0·5		.....	1

TABLE IV—Continued

Chemical Analyses of Raw Surface Waters in St. Lawrence River-Great Lakes Drainage Basin

(In parts per million)

No.	Date of collection	Sample No.	Storage period (Days)	Stream discharge (Second-feet)		Water temperature (°F.)	Dissolved oxygen	Carbon dioxide	pH	Colour	Turbidity	Suspended matter		Specific conductance Micromhos ($K \times 10^6$) at 25°C.	Residue on Evaporation at 105°C. (Dissolved solids)			Loss on ignition at 550°C.	Calcium (Ca)
				On sampling date	Monthly mean							Dried at 105°C.	Ignited at 550°C.		P.P.M.	Tons per acre-foot	Thousand Tons per day		
UPPER ST. LAWRENCE RIVER-CENTRAL																			
STATION No. 95: LAKE SIMCOE AT PLANT																			
1	Mar. 8/51.....	4990	33	.....	.....	36	.....	.....	7·8	15	4	.....	.....	298	.....	.....	.....	.....	48·6
STATION No. 96: LAKE																			
2	Sept. 24/47.....	2115	292	.....	.....	58	(9·8)	(2·0)	7·6 (8·4)	5 (20)	..... (<7)	.....	.....	267	160	·218	.....	26·6	35·6
3	April 20/52.....	5674	9	.....	.....	50	.....	.....	8·0	5	5	4·4	2·9	259	161	·219	.....	23·6	43·5
STATION No. 97: SEVERN RIVER AT No. 11 HIGHWAY																			
4	June 23/47.....	.....	.....	3,828	4,187	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
5	Sept. 23/47.....	2081	277	789	1,101	59	(9·7)	(2·0)	8·4 (8·3)	20 (20)	..... (<7)	.....	.....	238	151	·206	322	16·4	36·8
6	April 10/48.....	.....	.....	2,855	3,346	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
STATION No. 98: MUSKOKA																			
7	Sept. 22/47.....	2037	262	483*	498*	63	(9·4)	(2·0)	7·1 (6·6)	25 (35)	..... (<7)	.....	.....	38·9	34·2	·047	45	13·6	3·3
STATION No. 99: MUSKOKA RIVER (SOUTH BRANCH)																			
8	May 9/47.....	1455	5	3,570	3,140	.....	.....	.....	6·5	25	0·7	.....	.....	.....	39·0	·053	375	.....	3·2
9	June 10.....	1502	6	2,410	1,790	.....	.....	.....	6·4	30	1	.....	.....	.....	32·0	·044	210	.....	2·9
10	July 9.....	1570	6	605	635	.....	.....	.....	6·5	25	1	.....	.....	.....	30·4	·041	49	13·6	3·2
11	Aug. 9.....	1625	16	510	565	.....	.....	.....	6·3	25	0·8	.....	.....	.....	28·8	·039	39	12·8	3·0
12	Sept. 9.....	1660	27	530	498	.....	.....	.....	6·8	20	2	.....	.....	24·8	28·6	·039	41	9·2	3·8
13	Oct. 9.....	1695	26	405	448	.....	.....	.....	7·0	25	1	.....	.....	32·4	29·0	·040	37	12·0	3·2
14	Average (6 samples).....		14	1,348	1,179	.....	.....	.....	6·5	25	1·0	.....	.....	.....	31·3	·043	125	.....	3·2
STATION No. 100: LAKE																			
15	Sept. 18/47.....	2117*	298	.....	.....	69	(8·2)	(2·0)	7·6 (7·1)	30 (30)	..... (<7)	.....	.....	34·0	31·0	·042	.....	8·2	4·0

* Calculated as sodium.

* Discharge record at Mathiasville, Ont.
† Calculated as sodium.

† Calculated as sodium.

* Sample taken at 20 foot depth, ½ mile out in lake.
† Calculated as sodium.

TABLE IV—Continued

Chemical Analyses of Raw Surface Waters in St. Lawrence River-Great Lakes Drainage Basin

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Iron (Fe): Total	Iron (Fe): Dissolved	Nitrite (NO_2)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Silica (SiO_2): Gravimetric	Silica (SiO_2): Colorimetric	Hardness as $CaCO_3$: Non-carbonate	Hardness as $CaCO_3$: Total	Sum of Constituents	Per cent sodium	Saturation index: +	Saturation index: −	No.
GREAT LAKES DRAINAGE BASIN—Continued																				
INTAKE, BEAVERTON, ONT.—Area of Lake, 280 sq. miles																				
6·3	3·3	1·6	.....	.....	.....	23·1	4·5	1·3	.....	156	0	.....	2·9	19·1	147	169	4·6	0·2	.....	1
COUCHICHING AT ORILLIA, ONT.																				
6·0	13·3†		.....	·02	.....	19·8	3·8	2·6	.....	140 (132)	0 (0)	4·8	6·6	0	114 (118)	157	.....	0·2	.....	2
5·7	3·3	0·5	·17	·02	.....	21·1	5·1	Trace	·10	139	0	.....	3·3	18·0	132	151	5·1	0·2	.....	3
BRIDGE, NEAR ORILLIA, ONT.—Drainage area, 2,365 sq. miles																				
.....	.....		.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4
6·8	2·6†		.....	·01	.....	16·5	3·0	2·6	.....	116 (122)	4·3 (0)	.....	9·6	17·9	120	139	.....	0·6	.....	5
.....	.....		.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6
RIVER BELOW BRACEBRIDGE, ONT.																				
1·0	2·8†		.....	·10	.....	7·5	0 (0)	2·6	.....	10·5 (11·0)	0 (0)	.....	5·8	3·8	12·4	28·2	.....	.....	2·8	7
NEAR MATHIASVILLE, ONT.—Drainage area, 660 sq. miles																				
1·4	6·5†		·13	.....	0	13·2	0	2·7	.....	7·8	0	2·0	4·4	7·4	13·8	.....	.....	.....	.....	8
1·5	1·0†		.....	·02	0	7·2	0	2·7	.....	8·1	0	3·2	4·3	6·9	13·5	.....	.....	.....	.....	9
2·2	1·0†		·20	.....	0	7·2	0	2·2	.....	12·2	0	3·0	3·4	7·1	17·1	.....	.....	.....	.....	10
1·5	2·1†		.....	·04	.....	6·9	0	1·8	.....	7·3	0	2·4	2·4	7·7	13·7	.....	.....	.....	.....	11
1·4	2·7†		.....	·05	0	5·9	0	0·6	.....	12·2	0	1·8	3·6	5·2	15·2	.....	.....	.....	.....	12
1·1	3·6†		.....	·04	0	8·4	0	0·5	.....	8·8	0	3·0	3·4	5·3	12·5	.....	.....	.....	.....	13
1·5	2·8†		.....	.....	.....	8·1	0	1·7	.....	9·4	0	2·5	3·5	6·6	14·3	25·4	.....	.....	3·4	14
OF BAYS AT DWIGHT, ONT.																				
1·5	0·4†		.....	·03	.....	6·7	0 (0)	0·6	.....	11·7 (9·8)	0 (0)	3·4	5·0	6·6	16·2	23·9	.....	.....	2·6	15

TABLE IV—Continued

Chemical Analyses of Raw Surface Waters in St. Lawrence River-Great Lakes Drainage Basin

(In parts per million)

No.	Date of collection	Sample No.	Storage period (Days)	Stream discharge (Second-feet): On sampling date	Stream discharge (Second-feet): Monthly mean	Water temperature (°F.)	Dissolved oxygen	Carbon dioxide	pH	Colour	Turbidity	Suspended matter: Dried at 105°C.	Suspended matter: Ignited at 550°C.	Specific conductance Micromhos (K x 10⁶) at 25°C.	Residue on Evaporation at 105°C. (Dissolved solids): P.P.M.	Residue on Evaporation at 105°C. (Dissolved solids): Tons per acre-foot	Residue on Evaporation at 105°C. (Dissolved solids): Thousand Tons per day	Loss on ignition at 550°C.	Calcium (Ca)
	UPPER ST. LAWRENCE RIVER-CENTRAL																		
	STATION No. 101: MUSKOKA RIVER (NORTH BRANCH)																		
1	May 11/47	1464	9	3,630	2,990	.....	.....	.....	6·4	45	2	.....	.....	.....	44·0	·060	432	.....	4·3
2	June 10	1503	6	1,090	1,120	.....	.....	.....	6·3	40	1	.....	.....	.....	40·4	·055	118	.....	3·4
3	July 9	1569	6	475	655	.....	.....	.....	6·5	40	0·8	.....	.....	.....	39·6	·054	51	19·0	3·4
4	Aug. 9	1626	16	286	349	.....	.....	.....	6·3	45	0·7	.....	.....	.....	37·0	·050	28	19·2	3·3
5	Aug. 25*	1641	14	246	349	.....	.....	.....	6·7	40	0·6	.....	.....	.....	43·6	·059	29	21·0	4·6
6	Sept. 10	1661	26	197	221	.....	.....	.....	6·6	40	3	.....	.....	38·4	37·2	·051	20	13·6	4·2
7	Oct. 10	1696	25	242	225	.....	.....	.....	7·2	40	2	.....	.....	39·3	38·6	·053	25	17·2	3·8
8	Nov. 6	1733	20	200	353	.....	.....	.....	6·4	35	1	.....	.....	38·8	37·8	·051	20	12·8	3·8
9	Dec. 10	1782	43	461	461†	.....	.....	.....	6·6	45	2	.....	.....	38·0	41·2	·056	51	16·0	3·6
10	Jan. 10/48	1805	33	333	333†	.....	.....	.....	6·6	40	2	.....	.....	42·7	41·4	·056	37	18·6	3·8
11	Feb. 10	1827	13	286	286†	.....	.....	.....	6·6	30	4	.....	.....	45·3	43·2	·059	33	18·2	4·2
12	Mar. 11	1871	7	327	1,471	.....	.....	.....	6·6	50	2	.....	.....	50·1	49·2	·067	44	19·6	4·2
13	April 10	1940	17	3,960	3,070	.....	.....	.....	6·5	50	1	.....	.....	42·1	43·2	·059	463	26·0	2·7
14	Average (12 samples)		18	957	961	.....	.....	.....	6·5	41	2	.....	.....	42·9	41·1	·056	111	18·0	3·7

* Not included in average.
† Ice conditions Dec. 1/47 to March 13/48.

STATION No. 102: LAKE VERNON AT

15	Sept. 19/47	2133	299	.....	.....	66	.....	(2·5)	7·3 (6·7)	45 (60)	..... (<7)	.....	.....	39·9	38·4	·052	.....	9·6	4·8

STATION No. 103: MAGNETAWAN RIVER (NORTH BRANCH)

16	May 9/47	1453	5	710	695	.....	.....	.....	6·2	45	1	.....	.....	.....	45·0	·061	86	.....	3·6
17	June 11	1505	6	249	283	.....	.....	.....	6·5	80	1	.....	.....	.....	54·5	·074	37	31·0	3·7
18	July 11	1658	80	149	191	.....	.....	.....	7·1	50	3	.....	.....	40·8	42·8	·058	17	19·0	4·0
19	Aug. 10	1628	19	92	80	.....	.....	.....	6·3	60	2	.....	.....	.....	43·2	·059	11	20·9	3·9
20	Sept. 10	1654	19	36	95	.....	.....	.....	7·1	60	3	.....	.....	37·1	42·0	·057	4	20·6	4·0
21	Oct. 11	1700	24	96	89	.....	.....	.....	7·5	75	3	.....	.....	38·7	44·0	·060	11	21·8	3·6
22	Oct. 23*	1715	23	75	89	.....	.....	.....	6·6	70	3	.....	.....	41·4	46·2	·063	9	20·6	4·0

* Not included in average.

TABLE IV—Continued

Chemical Analyses of Raw Surface Waters in St. Lawrence River-Great Lakes Drainage Basin

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Iron (Fe): Total	Iron (Fe): Dissolved	Nitrite (NO_2)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Silica (SiO_2): Gravimetric	Silica (SiO_2): Colorimetric	Hardness as $CaCO_3$: Non-carbonate	Hardness as $CaCO_3$: Total	Sum of Constituents	Per cent sodium	Saturation index: +	Saturation index: −	No.
GREAT LAKES DRAINAGE BASIN—Continued																				
NEAR PORT SYDNEY, ONT.—Drainage area, 560 sq. miles.																				
1·9	2·6		.....	·03	0	8·4	6·4	2·2	.....	9·5	0	4·0	6·0	10·7	18·5	.....	.....	.....	.....	1
1·3	1·4		.....	·02	0	7·7	0	4·4	.....	10·5	0	4·0	4·4	5·2	13·8	.....	.....	.....	.....	2
1·5	2·6		.....	·15	0	6·9	0	2·7	.....	13·7	0	3·2	4·1	3·5	14·7	.....	.....	.....	.....	3
1·5	3·4		.....	·09	·01	7·7	0	2·2	.....	7·8	0	2·0	2·2	8·1	14·5	.....	.....	.....	.....	4
1·7	2·3		.....	·04	.....	7·9	0	1·3	.....	12·5	0	4·6	5·2	8·3	18·5	.....	.....	.....	.....	5
1·8	2·6		.....	·09	·03	8·2	0	1·3	.....	12·7	0	2·4	4·4	7·5	17·9	.....	.....	.....	.....	6
1·0	4·4		.....	·07	0	8·9	0	·7	.....	11·7	0	3·4	4·4	4·0	13·6	.....	.....	.....	.....	7
1·2	3·9		.....	·06	0	10·7	·8	·8	.....	12·2	0	3·0	5·2	4·4	14·4	.....	.....	.....	.....	8
1·7	2·5		.....	·09	0	10·2	·5	1·3	.....	14·6	0	8·0	5·0	4·0	16·0	.....	.....	.....	.....	9
1·3	4·8		.....	·08	0	11·5	1·4	1·8	.....	12·2	0	5·6	5·8	4·8	14·8	.....	.....	.....	.....	10
1·4	3·0	1·0	.....	·10	Trace	11·0	0	·1	.....	14·4	0	5·6	6·3	4·4	16·2	.....	.....	.....	.....	11
2·1	2·5	1·0	.....	·18	0	8·9	1·2	1·3	.....	15·4	0	6·2	3·0	6·5	19·1	.....	.....	.....	.....	12
0·9	1·0	1·5	.....	·07	0	9·2	0	·9	.....	11·0	0	2·2	7·8	1·5	10·5	.....	.....	.....	.....	13
1·5	3·1		.....	·07	0	9·0	·3	1·6	.....	12·1	0	4·1	4·9	5·6	15·3	43·9	.....	.....	3·3	14
PLANT INTAKE, HUNTSVILLE, ONT.																				
1·3	2·0	1·0	.....	·04	.....	6·9	4·7	·6	·40	12·2 (9·8)	0 (0)	5·2	4·6	7·3	17·3	32·3	18·9	.....	2·4	15
NEAR BURKS FALLS, ONT.—Drainage area,—135 square miles.																				
3·9	0·8		·07	.....	0	13·2	0	3·1	.....	7·3	0	2·5	5·6	19·1	25·1	.....	.....	.....	.....	16
1·2	4·3		·02	.....	0	7·2	0	3·5	.....	11·7	0	4·2	4·2	4·6	14·2	.....	.....	.....	.....	17
0·9	5·3		·17	.....	0	8·1	0	3·1	.....	9·8	0	3·0	5·4	5·7	13·7	.....	.....	.....	.....	18
1·9	2·6		·21	.....	.....	7·6	0	2·7	.....	11·0	0	4·4	3·8	8·3	17·3	.....	.....	.....	.....	19
1·1	4·0		·19	.....	·05	6·4	0	·4	.....	12·2	0	2·6	5·0	4·4	14·4	.....	.....	.....	.....	20
1·2	3·0		·16	.....	·04	6·6	0	·7	.....	13·4	0	2·8	4·8	2·9	13·9	.....	.....	.....	.....	21
2·7	2·6		·22	.....	·22	8·1	0	·6	.....	14·9	0	4·8	5·4	8·9	21·1	.....	.....	.....	.....	22

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TABLE IV—Continued

Chemical Analyses of Raw Surface Waters in St. Lawrence River-Great Lakes Drainage Basin

(In parts per million)

No.	Date of collection	Sample No.	Storage period (Days)	Stream discharge (Second-feet): On sampling date	Stream discharge (Second-feet): Monthly mean	Water temperature (°F.)	Dissolved oxygen	Carbon dioxide	pH	Colour	Turbidity	Suspended matter: Dried at 105°C.	Suspended matter: Ignited at 550°C.	Specific conductance Micromhos (K x 10^3) at 25°C.	Residue on Evaporation at 105°C. (Dissolved solids): P.P.M.	Residue on Evaporation at 105°C. (Dissolved solids): Tons per acre-foot	Residue on Evaporation at 105°C. (Dissolved solids): Thousand Tons per day	Loss on ignition at 550°C.	Calcium (Ca)
	UPPER ST. LAWRENCE RIVER-CENTRAL																		
	STATION No. 103: MAGNETAWAN RIVER																		
1	Nov. 10.....	1737	21	133	167	.....	.....		6·4	65	3	.....	.....	43·2	48·8	·066	17	21·6	4·2
2	Dec. 11.....	1783	42	129	137†	.....	.....		6·6	50	4	.....	.....	66·1	67·2	·091	23	21·2	5·5
3	Jan. 1/48.....	1806	31	82	82†	.....	.....		6·3	55	3	.....	.....	41·4	44·4	·060	10	21·2	3·9
4	Feb. 9.....	1828	14	55	55†	.....	.....		6·6	40	3	.....	.....	41·9	55·8	·076	8	28·4	4·1
5	Mar. 11.....	1872	7	56	304†	.....	.....		6·7	55	4	.....	.....	41·9	47·2	·064	7	18·0	4·0
6	April 11.....	1941	16	1,460	803	.....	.....		6·6	40	3	.....	.....	49·1	47·8	·065	188	23·2	3·3
7	May 2*.....	1963*	9	247	385	.....	.....		6·4	50	2	.....	.....	39·5	43·4	·059	28	21·8	3·5
8	Average (12 samples).....		24	287	249	.....	.....		6·7	56	3	.....	.....	44·5	48·6	·066	35	22·4	4·0

* Not included in average.
† Ice conditions Dec. 10/47 to Mar. 17/48.

STATION No. 104: MAGNETAWAN RIVER

9	Sept. 19/47.....	2038	265	245	254	63	(8·5)	(3·0)	7·2 (6·8)	40 (85)	..... (7)	.....	.....	43·0	42·8	·058	28	17·8	4·3

* Calculated as sodium.

STATION No. 105: SOUTH RIVER NEAR

10	May 15/47.....	1468	5	795	1,160	48	.....	.....	6·6	65	6	.....	.....	.....	46·4	·063	99	.....	4·6
11	June 16.....	1509	3	1,600	665	61	.....	.....	6·5	145	4	.....	.....	.....	73·0	·099	314	.....	4·1
12	July 15.....	1595	21	190	223	74	.....	.....	6·7	75	4	.....	.....	.....	52·2	·071	27	23·6	4·6
13	Aug. 15.....	1634	14	121	165	78	.....	.....	6·3	45	3	.....	.....	.....	56·0	·076	18	25·0	4·8
14	Sept. 15.....	1679	37	340	440	69	.....	.....	6·9	60	5	.....	.....	50·6	56·4	·077	52	23·4	5·4
15	Oct. 15.....	1702	26	144	221	56	.....	.....	6·5	130	5	.....	.....	49·2	65·4	·089	25	29·8	5·2
16	Average (6 samples).....		18	532	479	64	.....	.....	6·6	86	5	.....	.....	.....	59·0	·083	89	25·4	4·8

* Calculated as sodium.

STATION No. 106: SOUTH RIVER AT No. 11

17	Sept. 20/47.....	2112	296	.....	.....	59	(9·4)	(2·5)	7·5 (7·0)	40 (60)	..... (<7)	.....	.....	42·4	42·4	·058	.....	9·6	5·6

* Calculated as sodium.

STATION No. 107: LAKE NIPISSING,

18	Aug. 9/47.....	2099	301	642·25†	642·30†	71	(7·0)	(2·0)	9·3 (7·4)	30 (30)	..... (<7)	.....	.....	75·7	58·6	·080	.....	14·0	8·8

* Calculated as sodium.
† Water levels.

TABLE IV—Continued

Chemical Analyses of Raw Surface Waters in St. Lawrence River-Great Lakes Drainage Basin

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Iron (Fe): Total	Iron (Fe): Dissolved	Nitrite (NO_2)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Silica (SiO_2): Gravimetric	Silica (SiO_2): Colorimetric	Hardness as $CaCO_3$: Non-carbonate	Hardness as $CaCO_3$: Total	Sum of Constituents	Per cent sodium	Saturation index: +	Saturation index: −	No.
GREAT LAKES DRAINAGE BASIN—Continued																				
(NORTH BRANCH) NEAR BURKS FALLS, ONT.—*Concluded*																				
1·4	3·6		·20	.....	·21	8·2	0	1·3	.....	14·4	0	5·0	6·0	4·3	16·1	.....	.....	.....	.....	1
2·3	4·3		·29	.....	0	13·5	3·5	1·6	.....	18·5	0	9·0	11	8·0	23·2	.....	.....	.....	.....	2
1·7	4·7		·20	.....	0	12·4	0	2·2	.....	14·6	0	6·4	7·7	4·8	16·8	.....	.....	.....	.....	3
1·5	2·5	1·0	·18	.....	·03	8·4	0	·8	.....	14·6	0	7·8	7·0	4·5	16·5	.....	.....	.....	.....	4
1·5	2·0	0·5	·23	.....	0	8·9	0	·7	.....	16·8	0	6·2	4·0	2·4	16·2	.....	.....	.....	.....	5
1·2	2·0	4·0	·07	.....	0	9·2	0	·9	.....	6·1	0	2·4	8·2	8·2	13·2	.....	.....	.....	.....	6
1·3	2·0	1·5	·18	.....	·08	7·1	0	1·3	.....	8·1	0	3·8	4·8	7·5	14·1	.....	.....	.....	.....	7
1·7	3·5		·17	.....	·03	9·1	·3	1·8	.....	12·5	0	4·7	6·1	6·4	16·7	31·5	.....	.....	3·0	8
AT BURKS FALLS, ONT.																				
1·8	1·2*		·20	.....	.....	7·5	0	3·2	.....	12·7 (12·2)	0 (0)	.....	8·6	7·8	18·2	33·0	.....	.....	2·5	9
NIPISSING, ONT.—Drainage area, 304 sq. miles.																				
2·4	1·0		.....	·04	0	8·9	0	1·8	.....	8·3	0	5·6	5·6	14·6	21·4	.....	.....	.....	.....	10
1·1	3·1		.....	·05	0	8·4	0	2·7	.....	11·5	0	8·2	4·2	5·4	14·8	.....	.....	.....	.....	11
2·0	3·1		·35	.....	0	7·6	0	2·2	.....	15·4	0	7·4	3·0	7·1	19·7	.....	.....	.....	.....	12
1·8	2·7		·65	.....	0	6·4	0	3·5	.....	16·1	0	5·8	4·4	6·2	19·4	.....	.....	.....	.....	13
2·1	4·4		·78	.....	0	7·6	0	1·8	.....	17·8	0	11	6·4	7·5	22·1	.....	.....	.....	.....	14
3·2	2·2		·42	.....	0	10·2	0	1·8	.....	17·1	0	5·6	6·8	12·1	26·1	.....	.....	.....	.....	15
2·1	2·7*		·55	.....	0	8·2	0	2·3	.....	14·4	0	7·3	5·0	8·8	20·6	35·1	.....	.....	3·0	16
HIGHWAY BRIDGE NEAR SOUTH RIVER, ONT.																				
1·8	1·6*		·26	.....	.....	6·4	0 (0)	1·7	.....	20·3 (14·6)	0 (0)	4·2	7·6	4·8	21·4	34·9	.....	.....	1·9	17
NEAR NORTH BAY, ONT.—Area of lake, 330 sq. miles.																				
2·5	1·4*		.....	·05	.....	10·3	0 (0)	3·1	.....	3·4 (22·0)	11·5 (0)	.....	12·7	10·3	32·3	51·9	.....	0·2	..... (1·8)	18

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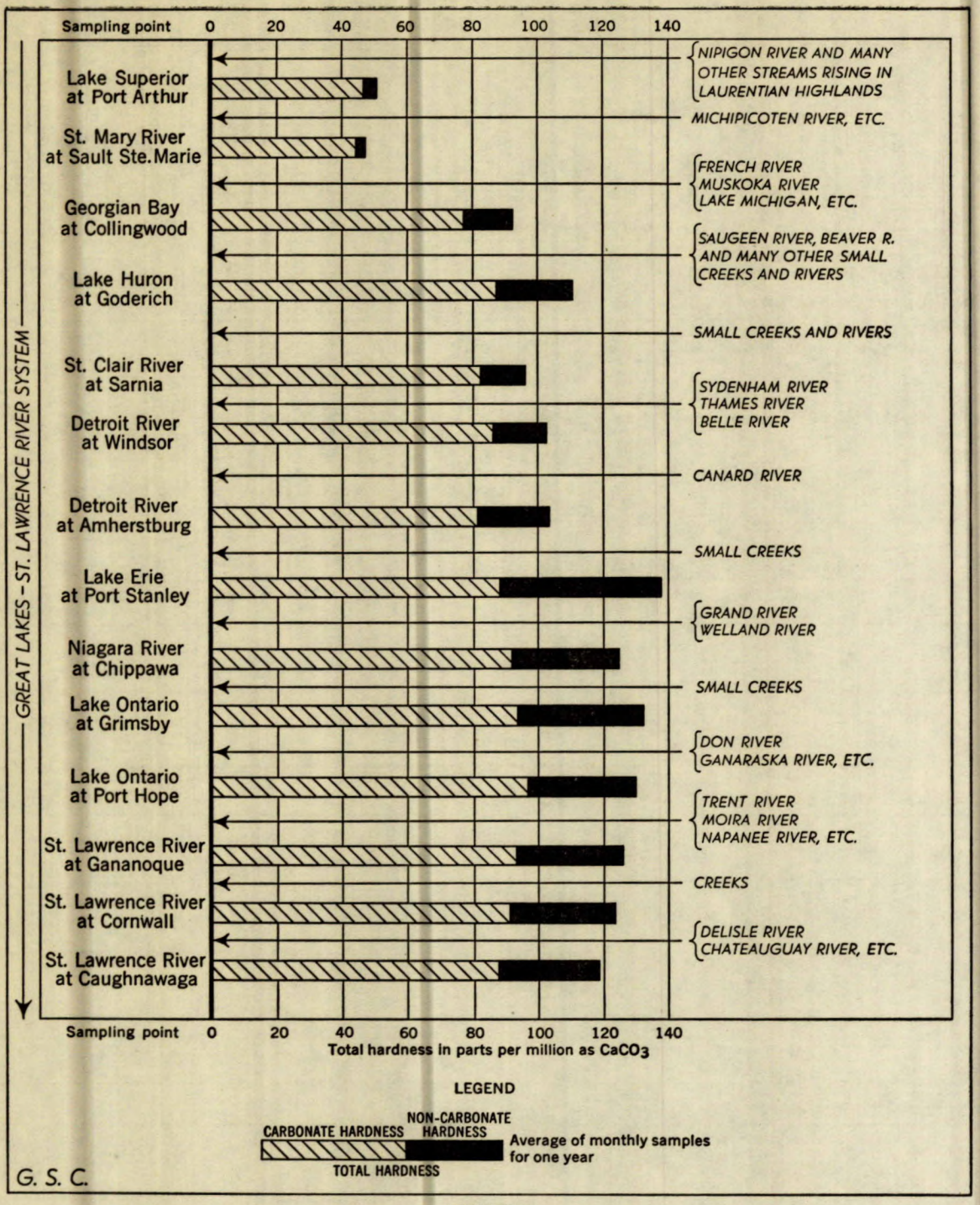

FIGURE 4.

VARIATION IN WATER HARDNESS ALONG
UPPER ST. LAWRENCE RIVER – GREAT LAKES SYSTEM IN CANADA

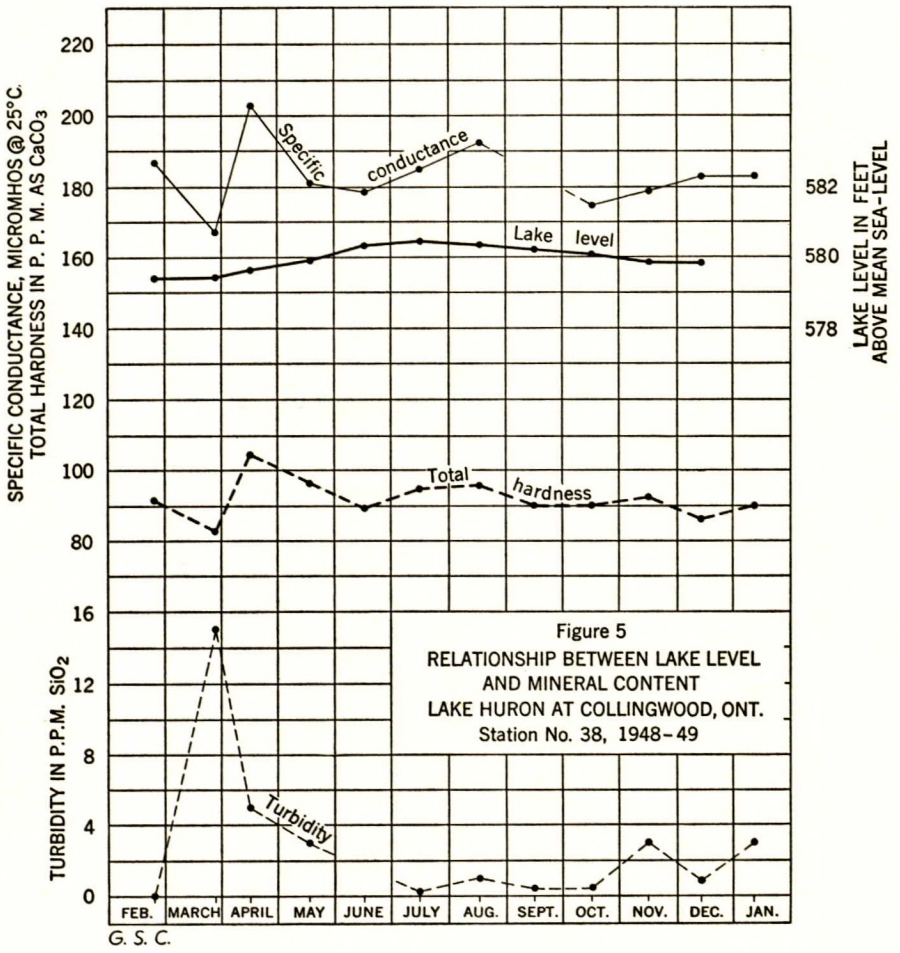

Figure 5
RELATIONSHIP BETWEEN LAKE LEVEL AND MINERAL CONTENT
LAKE HURON AT COLLINGWOOD, ONT.
Station No. 38, 1948–49

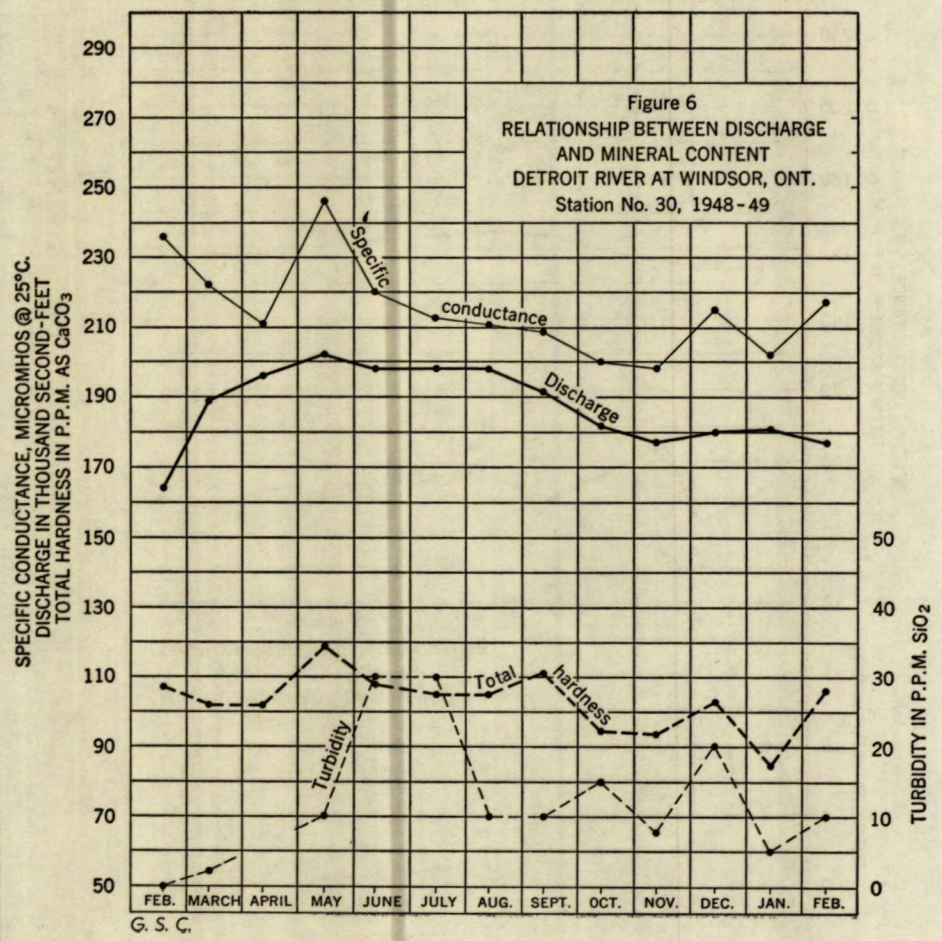
Figure 6
RELATIONSHIP BETWEEN DISCHARGE
AND MINERAL CONTENT
DETROIT RIVER AT WINDSOR, ONT.
Station No. 30, 1948-49
SPECIFIC CONDUCTANCE, MICROMHOS @ 25°C.
DISCHARGE IN THOUSAND SECOND-FEET
TOTAL HARDNESS IN P.P.M. AS $CaCO_3$
TURBIDITY IN P.P.M. SiO_2
290
270
250
230
210
190
170
150
130
110
90
70
50
50
40
30
20
10
0
Specific
conductance
Discharge
Total
hardness
Turbidity
FEB.
MARCH
APRIL
MAY
JUNE
JULY
AUG.
SEPT.
OCT.
NOV.
DEC.
JAN.
FEB.
G. S. C.

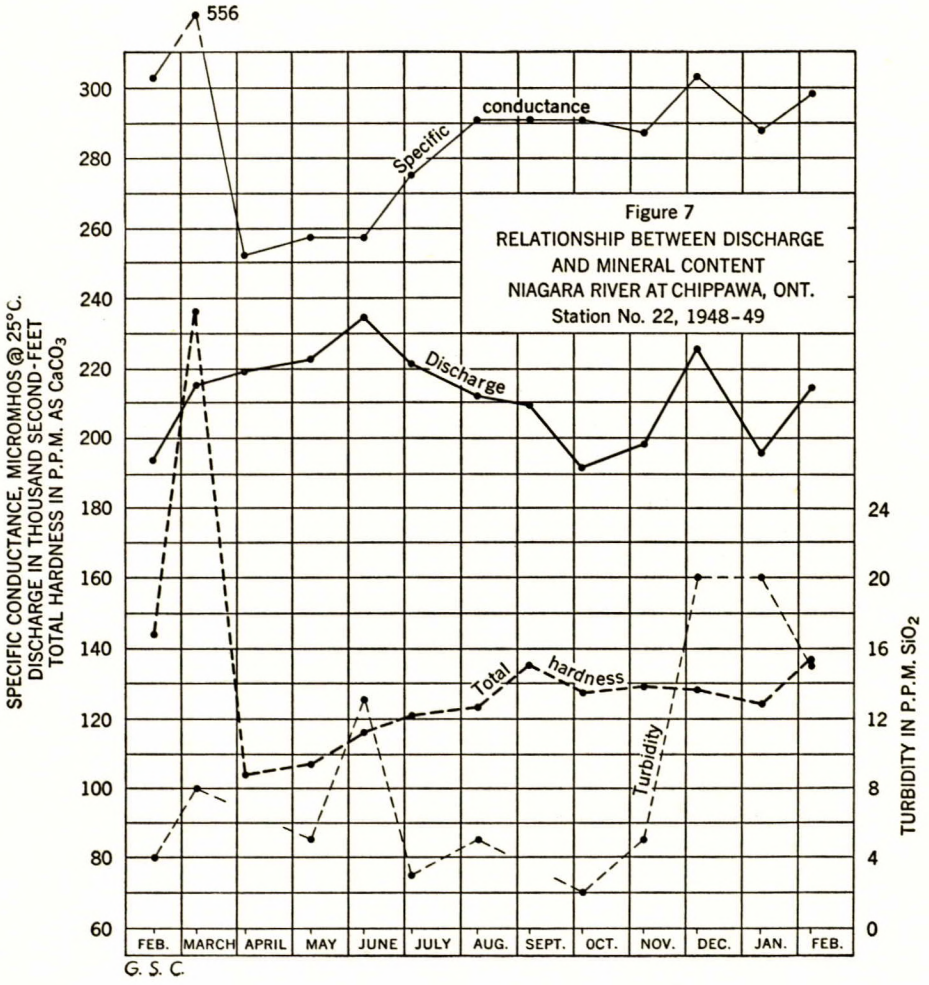

Figure 7
RELATIONSHIP BETWEEN DISCHARGE
AND MINERAL CONTENT
NIAGARA RIVER AT CHIPPAWA, ONT.
Station No. 22, 1948-49

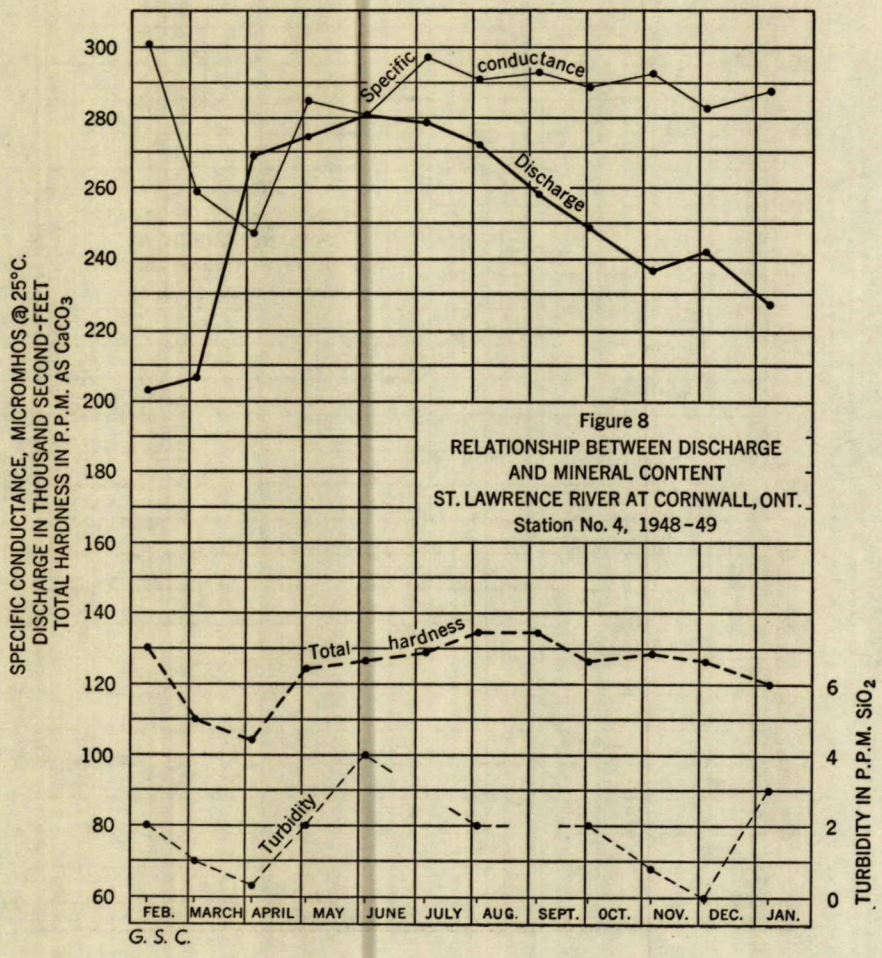

Figure 8
RELATIONSHIP BETWEEN DISCHARGE
AND MINERAL CONTENT
ST. LAWRENCE RIVER AT CORNWALL, ONT.
Station No. 4, 1948–49

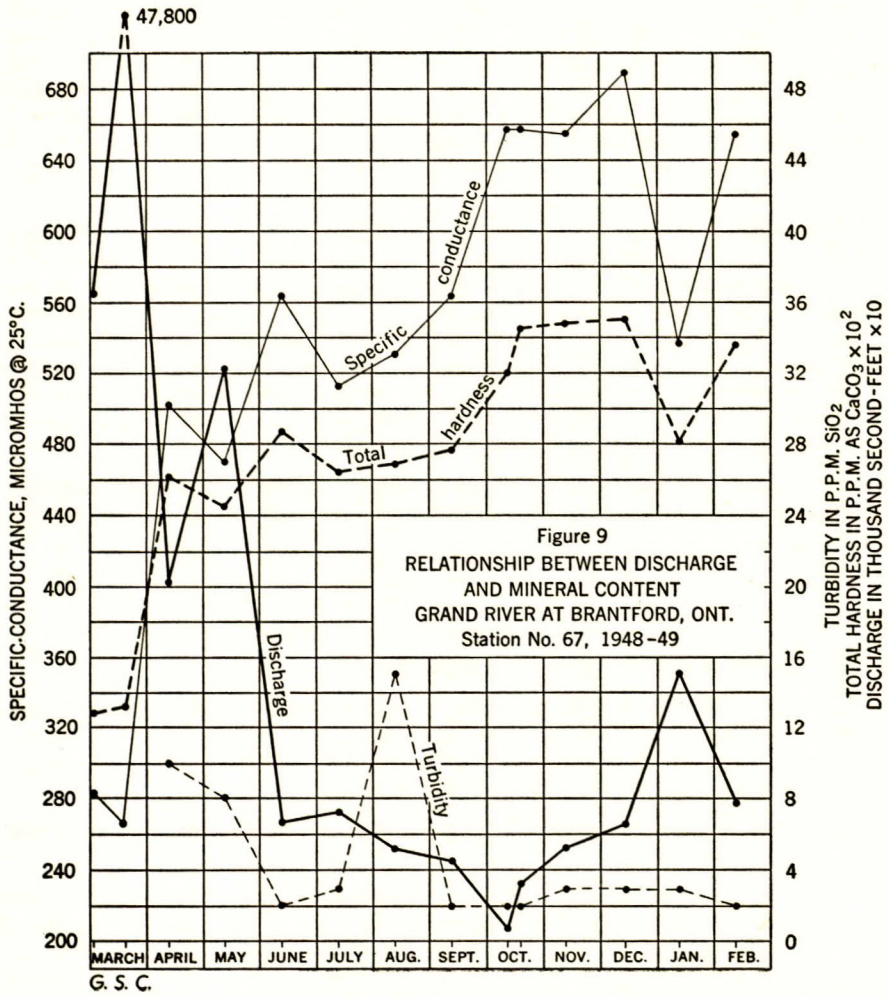

Figure 9
RELATIONSHIP BETWEEN DISCHARGE
AND MINERAL CONTENT
GRAND RIVER AT BRANTFORD, ONT.
Station No. 67, 1948-49

PART II

Municipal Water Supplies Within the Upper St. Lawrence River-Central Great Lakes Drainage Basin in Canada

During the period 1948 to 1951, the majority of the incorporated municipalities in this basin which have organized waterworks were visited. Information on the operation of the systems was obtained, and samples of the raw and finished (treated) water supplies were taken. A description of each municipal system is given below under the headings: population, ownership, source of supply, treatment, storage capacity, consumption of water, and industrial use. The information on the systems, in particular as regards treatment, has been condensed in this report since the area has so many systems with extensive treatment which in many cases are changing rapidly. It is hoped at some future date to discuss in some detail in a separate report the treatment of municipal supplies.

Table V tabulates the results of chemical analyses of these municipal waters. Those municipalities which use surface waters will, of course, be supplied with waters of varying quality, depending upon the seasonal variation in the surface water as shown in Table IV, Part I. While users of ground waters will generally have waters of more constant quality, a number of these, because a number of different well sources may be mixed in the systems in different proportions, also use waters varying in quality. Over-pumping may at times draw waters into the well from less suitable water tables. There is an indication from a comparison with more recent analyses that the quality of some of the civic well waters here reported has changed within the last two years, possibly because of over-pumping. The important effect of pumping has been noted in several wells by analyzing waters drawn from the water table at periodic intervals after pumping first began.

Figure 2 (in pocket) shows the location of those municipalities in this basin whose water supplies were studied, and also classifies the relative hardness of the waters on the basis of the following grouping:

Soft water	0 to 60 p.p.m. total hardness as $CaCO_3$
Medium hard water	61 to 120 p.p.m. total hardness as $CaCO_3$
Hard water	121 to 180 p.p.m. total hardness as $CaCO_3$
Very hard water	Greater than 180 p.p.m. total hardness as $CaCO_3$

These municipalities are listed alphabetically in Appendix B.

Table VI summarizes the information available regarding the area of this basin, the total population within the basin, and the population served with water by organized system; this latter changes in some areas quite rapidly. The data of Table VI were obtained from visits and correspondence with municipal officials, from the annual directory of "Municipal Utilities"[1] and from other sources.

Table VII summarizes the available information on the source, treatment, and hardness of these municipal water supplies.

Attention is drawn to the large number of municipal well waters which lost calcium carbonate while stored prior to analysis, with resultant changes in pH, conductivity, hardness, and total dissolved solids. The analyses obtained are given, but as field analysis results were often available, this loss of calcium as carbonate has been calculated and the corrected values are given in brackets. The majority of these waters were sampled again in 1952 and analyzed immediately, and it is interesting to note the general agreement with the earlier corrected analyses. As pointed out in Water Survey Report No. 1, it is most important that care be taken to prevent such precipitation or change, since the loss may be gradual, and the analyses at any one time may appear satisfactory from the standpoint of accuracy, yet the character of the water not be truly indicated. It is for this reason that, since June, 1950, a number of tests are carried out immediately upon receipt of the water in the laboratory.

[1] Municipal Utilities; The Monetary Time Printing Co. of Canada Ltd., 341 Church St., Toronto 2, Ont.

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

1954 Addendum*

Since preparation of this report, (1) the following municipal systems have been expanded or extended by new or additional rapid sand (mechanical) gravity filtration facilities. Capacity of the extension or addition is shown in brackets after the municipality:

Brantford (2·5 m.g.d.)
Burlington (2·0 m.g.d.)
New Toronto (15·0 m.g.d.)
Oshawa (5 m.g.d.)
Peterborough (2 m.g.d.)
Picton (1·0 m.g.d.)
Scarborough Twsp. (10·0 m.g.d.)
Wallaceburg (1·25 m.g.d.)
Windsor (21·0 m.g.d.)

(2) The following slow sand filtration systems have been replaced by rapid sand gravity systems: Port Credit (capacity, 1·4 m.g.d.), and Port Hope (capacity, 1·25 m.g.d.).

(3) The following municipalities have either replaced or installed new water systems:

(a) rapid sand filtration plants:
Alexandria (Garry River, capacity, 576,000 g.p.d.)
Beamsville (Lake Ontario, capacity, 400,000 g.p.d.)
Kingston (Lake Ontario, capacity, 10 m.g.d.)
Toronto Twsp. (Lake Ontario, capacity, 2·5 m.g.d.)
Trenton (Trent River, capacity, 1 m.g.d.)
Vineland (Lake Ontario, capacity, 400,000 g.p.d.)

(b) pressure filtration plants:
Beaverton (2 filters, capacity, 360,000 g.p.d.)
Bronte (2 filters, capacity, 144,000 g.p.d.)
Delhi (2 filters, capacity, 460,000 g.p.d.)
Port Rowan (capacity, 1·2 m.g.d.)

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* *Information compiled by Ontario Department of Health, Toronto.*

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

ONTARIO

Municipality	ACTON	AGINCOURT
Population served:	1948 / 1950 / 1951	1951
In municipality	2,248 / ..... / 2,872*	....
Outside municipality	72 / ..... / 168	....
Total	2,320 / 2,900 / 3,040	700
Date (s) of survey	Aug. 18, 1948; Feb. 1, 1950; April, 1951	March 19, 1951
Ownership	Municipally owned and operated	Municipally owned and operated
Source of supply	Six springs: one well to go into service in 1952	Treated Lake Ontario; purchased from Scarborough Township, Ont.
Treatment	Chlorination (sodium hypochlorite); pumped to system.	*See* Scarborough Township
Storage capacity (thousand gallons)	Reservoir at spring 50; Elevated tank 60; Fire reservoir 140	None; but elevated tank being built
Consumption (average in m.g.d.)	1947: 0·13; 1950: 0·10. In 1951, 50% of pumpage estimated used by industry.	No data; system was still under construction and only 20 services were connected at time of survey.
Industrial use	Ten major industries including tanning, wool combing, textiles (knitting), manufacture of intravenous solutions, tanks, presses, electric cooking apparatus, plastic utensils, extruded and moulded plastics and leather gloves.	Manufacture of paraffin waxes. This industry has own well supply but will probably use the civic water at a later date.
Remarks:	Two of the larger industries use Fairy Lake as source of process water.	.....

Municipality	AMHERSTBURG	ANCASTER TOWNSHIP
Population served:	1948 / 1951	1950 / 1951
In municipality	.... / 3,635*	605 / Total township.....7,594*
Outside municipality	.... /	1,195
Total	3,500 /	1,800
Date(s) of survey	Feb. 18, 1948; June 17, 1948	March 28, 1950
Ownership	Pumphouse and purification plant are owned and operated by Brunner, Mond Water & Gas Co. Ltd. Distribution system is owned and operated by a Public Utilities Commission.	Municipally owned and operated
Source of supply	Detroit River, just above Brunner, Mond plant, but below mouth of Canard River.	Two wells, about 68 feet deep; said to be on same water table.
Treatment	Mixing basins, settling basins, rapid sand filtration and pumped to system with chlorination. Alum, ammonium sulphate and, periodically, activated carbon added.	No treatment; pumped to system
Storage capacity (thousand gallons)	One reservoir	Standpipe—160
Consumption (average in m.g.d.)	1947–1948: Town .0·23 to 0·27; Distillery .0·07 to 0·23; Total .0·30 to 0·50. 100,000 gallons per year also supplied to summer cottages outside municipality.	1949: 0·045 (estimated)
Industrial use	A distillery, and Brunner, Mond Co. Ltd's chemical plant are the main users. The latter uses mostly raw water; on June 17th, 13 m.g.	No major industrial user.
Remarks	Turbidity of raw water varies widely up to 2000 p.p.m.; chemical addition and treatment varies correspondingly.	Only one well normally being pumped

* Population in Municipality according to preliminary data, Ninth Census of Canada, 1951.

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

ONTARIO

AJAX		ALEXANDRIA		ALLISTON	
1949	1951	1949	1951	1950	1951
.....	4,160*	.....	2,181*	2,019	1,968*
.....	.....	.....	.....	31	.....
3,500	.....	2,200	.....	2,050	.....
Feb. 25, 1949		June 9, 1949		Aug. 21, 1950.	
Central Mortgage and Housing Corporation, Ajax Development Project.		Municipally owned and operated by a Public Utilities Commission.		Municipally owned and operated by a Public Utilities Commission.	
Lake Ontario		Delisle River, above inflow from Loch Garry..		Deep wells.	
Pressure filtration (sand), chlorination to system		Chlorination; pumped to system		Chlorination; pumped to system.	
Elevated tank—100		Standpipe—96		Standpipe—170; Reservoir—90.	
1948		1948		1950	
0·55		0·25 (estimated)		0·126	
No major industrial use, the main user, in 1949, being the University of Toronto.		No major industrial use, the creamery having its own supply.		Secondary textiles (knitting), a foundry, wood working and a lumber company.	
First owned and operated by the Ajax Division, University of Toronto.		Consideration was being given at the time of survey to obtaining water from Loch Garry, analysis of which is given in Tables IV and V. Wells in vicinity are either sulphuretted or of insufficient volume. The Delisle River at this point has low flow in summer with, at times, considerable algal growth.			

ARTHUR		AURORA		AYLMER	
1951		1950	1951	1948	1951
....(1,078)*		....	3,326*	....	3,438*
....		....	....	....	....
1,200		3,675	....	3,000	....
March 16, 1951		March 22, 1950		Aug. 24, 1948.	
Municipally owned and operated by a Public Utilities Commission.		Municipally owned and operated		Municipally owned and operated by a Public Utilities Commission.	
Three wells, 220, 320 and 620 feet deep		Six wells, situated in three groups, in town		Three old wells, 165, 212, and 80 feet deep and one new well, 137 feet deep. Two wells are in town and two nearby in the township.	
No treatment; pumped to system		No treatment; pumped to system		No treatment; pumped to system.	
Standpipe—50		Ground reservoir—65; Standpipe—210		Elevated tank—50; Standpipe—150.	
No data, but estimated at 0·060 (1950)		1949	Industrial consumption is estimated at 86 to 90 per cent of total.	1947-48	
		0·57		0·28	Maximum (canning) 1·0 Minimum 0·1
Butter factory, dairy, two produce plants and two cold storage lockers.		Tanning, a metal finishing plant, C.N.R. and manufactures of electrical equipment, insulation, textiles, metal factory equipment, boots and shoes and soft drinks.		A large canning factory, a condensed milk plant and a tobacco factory; the latter uses civic water for 75 to 80 per cent of its needs.	
The 620 foot well is an emergency supply. The other two wells each supply about 50 per cent of water used.		.....		The three old wells have H_2S impurity, but new well has not. The airport has its own well	

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

ONTARIO

	BARRIE	BARTON TOWNSHIP
Municipality		
Population served:	1950 / 1951	1951
In municipality	.... / 12,434*	.... Total township..... 8,427*
Outside municipality	.... /	....
Total	13,300 /	2,800
Date(s) of survey	March 23, 1950	1951; data from annual directory of "Municipal Utilities".
Ownership	Municipally owned and operated by a Public Utilities Commission.	Municipally owned and operated. System is supervised by city engineer of Hamilton, Ont.
Source of supply	Two gravel wells (75 and 130 feet deep); three artesian wells. The gravel wells are considered to be on one water table while the three artesian wells are thought to be the same water.	Treated Lake Ontario; purchased from Hamilton, Ont.
Treatment	Aeration at three artesian wells; all wells pumped to system from reservoirs.	*See* Hamilton
Storage capacity (thousand gallons)	Ground reservoirs.....193 and 358 Standpipe.....153·4 Proposed new ground reservoir...500	None
Consumption (average in m.g.d.)	1948: 0·95 — 1949: 1·18 { Maximum.....1·778; Minimum.....0·7 }	0·050
Industrial use	Industrial consumption, approximately 31 per cent of total. Electrical equipment manufacture, (electroplating), dairies, soft drink manufacture, arena, two tanning companies and a meat packing firm. The tanning and packing companies have their own well supplies but do use some civic water.	No data
Remarks	Barrie includes the former municipality of Allandale, Ont.	

	BELLEVILLE	BERTIE TOWNSHIP
Municipality		
Population served:	1949 / 1950 / 1951	1951
In municipality	.... / .... / 19,394*	.... Total Township...5,521*
Outside municipality	.... / .... /	....
Total	20,000† / 25,000† /	3,750
Date(s) of survey	Feb. 22, 1947; March 21, 1950	1951; data from directory of "Municipal Utilities".
Ownership	Municipally owned and operated by a Public Utilities Commission.	Privately owned and operated by Prospect Point Waterworks Ltd., Ridgeway, Ont.
Source of supply	Bay of Quinte (Lake Ontario), but water may be affected by Trent River inflow.	Treated Lake Erie; purchased from Crystal Beach, Ont., and from Fort Erie, Ont.
Treatment	In 1950, prechlorination, mixing basin, underground sedimentation basin, rapid sand filtration (sand and anthrafilt), post-chlorination; pumped to system. Alum added at sump well prior to prechlorination.	*See* Crystal Beach and Fort Erie
Storage capacity (thousand gallons)	Standpipe..... 265 Clear well..... 1,250	None
Consumption (average in m.g.d.)	1946: 2·8 — 1949: 3·13	No data
Industrial use	Main users in 1950 are C. N. R., manufacture of telephone wire and cables, auto supplies, men's clothing, hardware and tools, industrial machinery, aircraft parts, optical materials, baby food and fruit and vegetable preparations. A plant producing synthetic resins, varnishes, glues and cements draws its water directly from Lake Ontario.	No data
Remarks	At times considerable algae in raw water	

* Population in Municipality according to preliminary data, Ninth Census of Canada, 1951.

† Includes Corbyville where there is a large distillery.

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

ONTARIO

BEAMSVILLE

1948	1951
....	1,703*
....	....
1,520	....

July 9, 1948

Municipally owned and operated

Five wells and springs; at time of survey only two wells (100 and 60 feet deep) being used.

Chlorination. Artesian wells and springs pumped into reservoirs when necessary. Water enters system from reservoirs by gravity.

Reservoirs—2,000 and 4,500

No record

Canning; a wood factory and several small industrial users such as dairies.

BEAVERTON

1951

....(1,045*)
....
1,000

March 8, 1951

Municipally owned and operated

Lake Simcoe

Pressure filtration (sand) and chlorination. Alum added at sump well prior to filtration.

Standpipe—100

1950

0·055 { Maximum..... 0·075 / Minimum..... 0·033

A plant manufacturing wire sweater forms (electroplating) is the main industrial user.

BELLE RIVER

1948		1951
	1,200	1,419*
Maidstone Township...	1,800	....
	3,000	....

Population may rise to 4,000 in summer.

June 18, 1948.

Municipally owned and operated.

Lake St. Clair.

Prechlorination, mixing basin, circular (Dorr type) settling tank, rapid sand filtration (anthrafilt), postchlorination; pumped to system. Alum or alum and lime added at mixing basin.

Standpipe—41·6.

1947–48

0·47 { Maximum..... 0·50 / Minimum..... 0·375

Canning and C. N. R.

Chlorine demand rises quickly if a wind change causes Thames River water to enter the plant; may at times be high turbidity and algae. Plant was built in 1947 and is fully automatic except for backwashing.

BLENHEIM

1948	1951
....	2,457*
....	....
2,200	....

June 16, 1948

Municipally owned and operated by a Public Utilities Commission.

Three deep wells

No treatment except aeration at pump to reservoir; pumped to system.

Elevated tank..... 50
Ground reservoir..... 80

1947–8

0·2 (estimated)

No major industrial user

BOBCAYGEON

1950	1951
....	1,166*
....	....
1,100	....

Sept. 14, 1950

Municipally owned and operated

Springs, about two miles distant

No treatment; water flows by gravity from springs to seven outlets at convenient locations on streets.

None

No record

No major industrial user; mainly a tourist centre; some boat-building.

BOWMANVILLE

1948	1950	1951
....	....	5,407*
....	....	....
3,750	4,600	....

March 2, 1948; March 21, 1950.

Municipally owned and operated by a Public Utilities Commission.

Nine springs, 9 miles distant, and two wells. The wells have seldom been used since 1949.

Chlorination; water flows to system by gravity from springs and spring reservoirs but water from wells is pumped directly into mains.

Four reservoirs—30, 100, 150, and 150.

Elevated tank (1950)—330.

1948	1950
0·45	0·73

Manufacture of rubber tires and tubes and of lubricating greases, a box factory, two nurseries and a foundry. The rubber company uses about 50% of total civic water.

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

ONTARIO

Municipality	BRACEBRIDGE		BRADFORD	
Population served:	1947	1951	1950	1951
In municipality	.....	2,636*	.....	1,447*
Outside municipality	.....	.....	.....	.....
Total	2,500	.....	1,500	.....
Date(s) of survey	Sept. 23, 1947		March 23, 1950	
Ownership	Municipally owned and operated by a Public Utilities Commission.		Municipally owned and operated by a Public Utilities Commission.	
Source of supply	Twenty-two springs or wells near the Muskoka River.		Two wells (No. 1, 86 feet deep and No. 2, 93 feet deep) about one-half mile apart, near village.	
Treatment	No treatment; one group of springs (16) enters system by gravity, the other group (6) is pumped to system.		No treatment; No. 2 well is generally used and is pumped directly to system.	
Storage capacity (thousand gallons)	Two reservoirs—159 and 159		Standpipe—160	
	1946-1947		1949	
Consumption (average in m.g.d.)	0·144		0·065 (Maximum 0·072; Minimum 0·060)	
Industrial use	Textile industries; however, one of the main industries, a woollen mill, uses the north branch of the Muskoka River for most process water.		Two vegetable packing plants, a cold storage plant, and the C.N.R.	
Remarks:	.....		.....	

*Population in Municipality according to preliminary data, Ninth Census of Canada, 1951.

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

ONTARIO

BRAMPTON		BRANTFORD			BRANTFORD TOWNSHIP
1948	1951	1948	1950	1951	1951
.....	..... (8,337)*	35,000	37,113	36,555*	..... (17,489*) Total Twp.
.....	.....	..... Brantford Twp.....	5,000	.....	....
6,300	8,800	.....	42,113	.....	8,050† .....
Aug. 25, 1948; Dec. 1951.....		March 1, 1948; Jan. 24, 1950.....			1951
Municipally owned and operated by a Public Utilities Commission.		Municipally owned and operated by a Public Utilities Commission.			Municipally owned and operated.
Two wells, 110 and 97 feet deep; most of supply is from the deeper well. A new well was drilled late in 1949.		Grand River—a mixture of direct river water and river water from infiltration galleries.			Treated Grand River; supplied by Brantford Public Utilities Commission.
No treatment; pumped to system from reservoir.		In 1950 prechlorination, settling basins, rapid sand filtration, dechlorination with sulphur dioxide, then post-chlorination with added ammonia; water pumped to system. Alum added at sump well.			*See* Brantford, Ont.
Ground reservoir..... 1,250 Elevated tank..... 250		Clear water reservoirs..... 1,000 Proposed elevated tank..... 500			None.
1947	1950	1947	1949		1950
0·75 (estimated)	0·55	3·7	Domestic use.....0·97 Industrial.....1·86 Total.....2·83		0·090 (approximate)
Nine greenhouses; a tannery; a soap factory; a provincial reformatory; manufacturer of gummed paper, paper cups, stationery, boots and shoes, pharmaceuticals, heating and cooking apparatus, and metal hose; five dairies.		Manufacture of industrial machinery including farm equipment, carpets, abrasives, cordage, primary and secondary textiles, hardware, tools, auto and aircraft parts, wood and paper products, paints, silverware, polishes, musical instruments, confectionery, etc.; a heavily industrialized city.			No data.
Greenhouses used in 1947 about 0·66 m.g.d.....		This plant uses a raw water often heavily contaminated with industrial and domestic wastes and having at times a high algal content which gives rise to taste and odour problems. Chemical laboratory control is carried out on all phases of treatment. The flow sheet has been under constant change since the first survey in 1948 and it is expected that this flow sheet will be further modified by new extensions and possibly the use of activated carbon.			†Possibly not all served with water. *See* Brantford, Ont.

71579—6

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

ONTARIO

Municipality	BRIGHTON		BROCKVILLE	
	1948	1951	1948	1951
Population served:				
In municipality	.....	1,918*	.....	12,211*
Outside municipality	.....	.....	.....	.....
Total	1,000†	.....	11,100	.....
Date(s) of survey	Aug. 12, 1948		June 10, 1948	
Ownership	Municipally owned and operated by a Public Utilities Commission.		Municipally owned and operated by a Public Utilities Commission.	
Source of supply	Springs, two miles distant		St. Lawrence River	
Treatment	Chlorination; water flows from open collecting reservoir by gravity to system.		Chlorination; pumped to system	
Storage capacity (thousand gallons)	Two reservoirs, one being the collecting reservoir		None	
Consumption (average in m.g.d.)	No record		1947-8 About 3·5	
Industrial use	Canning, dehydrated vegetable processing, misc. metal products (electroplating), carbonated beverages and the C. N. R. The beverage plant filters its water supply.		The C. N. R., the Ontario Mental Hospital, two condensed and powdered milk plants, a foundry, a hat manufacturing plant and manufacture of hardware, and abrasives.	
Remarks:	†Total population—1,800		An electric wire and cable plant, outside the municipality, has its own water supply, but also uses the civic supply. A new plant to produce nylon hosiery is expected to use about 2 m.g.d. in 1950.	

*Population in Municipality according to preliminary data, Ninth Census of Canada, 1951.

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

ONTARIO

BRUSSELS		BURKS FALLS		BURLINGTON		
1951		1947	1951	1948	1949	1951
....	(809)*	....	885*	5,000	5,200	5,975*
....	....	....	....	2,800†(est.)	4,100††	4,210††
900	....	790	....	7,800	9,300	10,185
March 14, 1951		Sept. 20, 1947		Aug. 25, 1948; March 27, 1950.		
Municipally owned and operated		Municipally owned and operated		Municipally owned and operated by a Public Utilities Commission.		
One well, 200 feet deep		One deep well alongside the Magnetawan River. Lake Rezin, which is available for fire protection, enters the system by gravity.		Lake Ontario.		
No treatment; pumped to reservoir and then to system.		No treatment; well water pumped to system. Lake water may also be used if supply is insufficient, but it is coloured and warm and gives rise to algal troubles in summer.		Mixing and settling basins, rapid sand filtration (sand and anthrafilt) and chlorination. Alum, and, at times, activated carbon, added at sump well; water pumped to system.		
Reservoir—100		One reservoir		One clear well ..... 92 One reservoir ..... 1,000 One standpipe 150		
1950		No record		1947	1950	
0·010				0·8	2·0	
Main user is a creamery. A packing company (poultry) has its own well.		Main industries are sawmills which use the Magnetewan River; they also produce hardwood flooring.		Canneries, manufacture of insecticides, basket factory, C.N.R., dairies and manufacture of resins and wax size. A chemical plant in Nelson Township also uses this water and a considerable amount is used for irrigation by market gardeners in Nelson Township.		
.....		.....		Carbon added usually in the spring when turbidity is high and when algal growth is heavy. Plant at time of survey was running at near capacity with a correspondingly shorter retention time. †Part of Nelson Township. ††Part of Nelson Township and Burlington Beach, Ont.		

71579—6½

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

ONTARIO

Municipality	**BURLINGTON BEACH**	**CALEDONIA**
Population served:	1949 / 1951	1950 / 1951
In municipality	.... / 2,812*	.... / 1,677*
Outside municipality	.... /	.... / ....
Total	1,900 /	1,400 (estimated) / ....
Date(s) of survey	1949; data taken from "Water and Sewage" directory.	March 31, 1950
Ownership	Municipally owned and operated	Municipally owned and operated.
Source of supply	Treated Lake Ontario; purchased from Burlington, Ont.,† and Hamilton, Ont.	Three wells, (18 feet deep), close together
Treatment	*See* Burlington and Hamilton	Sodium zeolite softening; all water is not always softened; pumped to system.
Storage capacity (thousand gallons)	None	Standpipe—50
Consumption (average in m.g.d.)	1949: 0·142	1949: 0·050
Industrial use	A summer resort	Main activity in area is farming, gypsum mining and production of lime. The creamery and lime-gypsum plant have their own wells. The C.N.R. uses Grand River water.
Remarks	†Burlington supplies 68 services in winter and 86 in summer in the area east of the harbour bridge. Hamilton supplies the area west of the bridge.	....

Municipality	**CAYUGA**	**CHATHAM**
Population served:	1950	1948 / 1949 / 1951
In municipality	....	.... / 20,263 / 21,153*
Outside municipality	....	.... / 3,237†† / 6,600††
Total	350†	22,000 / 23,500 / 27,753
Date(s) of survey	April 24, 1950	Feb. 19, 1948; June 22, 1948; Apr. 12, 1949.
Ownership	Municipally owned and operated. (System was put into operation late in 1948.)	Municipally owned and operated by a Public Utilities Commission.
Source of supply	Deep rock well, near village	Thames River
Treatment	Addition of calgon; pumped to system	Prechlorination, sedimentation basin, pressure filtration (sand) and post-chlorination. Alum added at sump well and midway through sedimentation basin. In summer ammonium sulphate added at time of prechlorination and post-chlorination.
Storage capacity (thousand gallons)	One tank—200	Open sedimentation basin.....9,000 Two clear wells..... 500 each
Consumption (average in m.g.d.)	1949: Approximately 0·038 (estimated from pump)	1947: 2·7; 1948: 3·27 (Maximum.....5·23, Minimum.....1·67)
Industrial use	Main activity of area is farming and main users are two creameries.	C.N.R., C.P.R., a tobacco company, a sugar refining company, canning, and manufacture of farm equipment, auto supplies, men's clothing, pails, sheet metal products, metal stampings, and other diversified products. It is estimated that 30 of the larger industries used in 1947 about 32 per cent of the total. The tobacco company zeolite-softens the water before use.
Remarks	†Total population—750. In 1954 new wells and revision of system in operation.	A rapid sand filtration plant being planned. Turbidity varies widely; algae severe at times. Present system has about 50 hrs. retention in sedimentation basin. †† Chatham Township.

* Population in Municipality according to preliminary data, Ninth Census of Canada, 1951.

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

ONTARIO

CAMPBELLFORD		CANNINGTON		CARDINAL	
1948	1951	1951	1951	1948	1951
....	3,203*	....	881*	....	1,780*
....	....	....	....	1,750	....
3,100	....	800	....	1,750	....
Aug. 12, 1948		March 7, 1951		Aug. 10, 1948.	
Municipally owned and operated by a Public Utilities Commission.		Municipally owned and operated		Plant owned and operated by The Canada Starch Co. Ltd. Distribution system owned by municipality.	
Trent River		One gravel well		St. Lawrence River, near The Canada Starch Co's. plant.	
Chlorination; pumped to system		No treatment; pumped to system		Chlorination and pressure filtration (sand). Process water for a portion of The Canada Starch Co's. plant is pumped directly with only chlorination.	
50		None No data		Elevated tank—88.	
1947–48				1947–48	
0·864 { Maximum 1·5 Minimum 0·325				0·15 { Maximum 0·27 Minimum 0·10	
Textile manufacture, a creamery, a cheese and butter plant, a shoe factory, and a dried hay plant. The textile plant has its own water supply, using the Trent River. There is also also a plant producing groundwood pulp.		Manufacture of cereals and grain products		Main industrial user is The Canada Starch Co. Ltd. producing glucose, syrup and starch and consuming about 0·6 m.g.d., of which about 0·4 m.g.d. are treated by filtering, softening, etc. for boiler use. About 0·20 m.g. chlorinated raw water are used daily for washing and condensing in this plant.	
At times a high chlorine demand due to algae in water.		This system had only been in operation a short time when visited.			

CHATHAM TOWNSHIP	CHESLEY	CHIPPAWA	
1951	1951	1948	1951
.... Total township 8,272*	1,671*	....	1,751*
....	....	....	....
6,600	1,707	1,425	....
Jan. 1, 1950. (Data supplied by Chatham Public Utilities Commission.)	March 13, 1951	July 14, 1948.	
Municipally owned and operated	Municipally owned and operated by a Public Utilities Commission.	Municipally owned and operated.	
Treated Thames River; purchased from Chatham, Ont.	Three wells, 590, 129, and 65 feet deep; the latter is the main source.	Treated Niagara River; purchased from Niagara Falls, Ont. since June 1948.	
See Chatham	No treatment; water pumped to system	Chlorination and pumped to system. Purchased prior to chlorination; *see* Niagara Falls for initial treatment of water.	
None	Standpipe 60 Ground reservoir (at 590 ft. well) 180	Elevated tank—67·5.	
1949	1950	1947	
0·032	0·18	0·2 (Maximum—0·4)	
None	A knitting plant (secondary textiles), three furniture manufacturing plants and a creamery.	No major users; a plant manufacturing abrasives uses river water directly for most industrial processing.	
		Previous to June, 1948, Niagara River water pumped directly to system with chlorination.	

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

ONTARIO

Municipality	CLARKSON	CLIFFORD
Population served:		1951
In municipality	Included in Port Credit, Ont.	504*
Outside municipality		....
Total		465
Date(s) of survey	1951	March 16, 1951
Ownership	Municipally owned and operated	Municipally owned and operated
Source of supply	Treated Lake Ontario; supplied by Port Credit, Ont.	Two wells, one being owned by the creamery
Treatment	*See* Port Credit	No treatment; pumped to system
Storage capacity (thousand gallons)	None	Ground reservoir 200 Standpipe 187
Consumption (average in m.g.d.)	Included in Port Credit consumption	No data
Industrial use	An oil refinery is the major industry. No data on use of civic water by this refinery.	A creamery
Remarks:		

Municipality	COLLINGWOOD	COOKSVILLE
Population served:	1951	Included in Port Credit, Ont.
In municipality	7,403*	
Outside municipality	.....	
Total	8,000	
Date(s) of survey	March 9, 1951	1950
Ownership	Municipally owned and operated by a Public Utilities Commission.	No information
Source of supply	Georgian Bay (Lake Huron)	Treated Lake Ontario; supplied by Port Credit, Ont.
Treatment	Chlorination; pumped to system	*See* Port Credit
Storage capacity (thousand gallons)	None	None
Consumption (average in m.g.d.)	1950 1·5	Included in Port Credit's consumption
Industrial use	A shipbuilding firm, a furniture factory, a cannery and a creamery. A textile plant is expected in the near future.	Manufacture of brick, tile, fire clay products, fireworks.
Remarks:		

*Population in Municipality according to preliminary data, Ninth Census of Canada, 1951.

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

ONTARIO

CLINTON

1951
2,543*
.....
2,400

March 14, 1951.....
Municipally owned and operated by a Public Utilities Commission.
Two wells.....

No treatment; pumped to system.....

Ground reservoir..... 80
Standpipe..... 100

1950
0·275 (Maximum 0·35 / Minimum 0·20)

An R.C.A.F. radio school, two hosiery manufacturers, a packing firm and a cold storage locker.

60% of pumpage used by industry, the R.C.A.F. school and station alone using 50 per cent.

COBOURG

1947	1950	1951	1952
.....	.....	7,439*	.....
.....	.....	.....	.....
6,350	7,500	.....	7,893

Feb. 23, 1947; March 21, 1950; May 29, 1952.....
Municipally owned and operated by a Public Utilities Commission.
Lake Ontario.....

Prechlorination and pressure filtration (sand) direct to system. Alum added with chlorine at sump well. In 1950 sand in filters replaced with anthrafilt.

Elevated tank..... 300
Open reservoir..... 200†

1946	1949	1951
0·7 (Maximum 1·0)	0·8 Maximum 1·5)	0·7

Dyeing plant, machine shops, foundry, manufacture of aircraft and automotive parts, plastics, carpets, pharmaceuticals, sheepskin leather, misc. steel products, fruit flavours, etc., food processing, canning, a chemical laboratory, and a packing plant.

†This reservoir kept filled to carry over plant in case of blockage by frazil ice and when turbidity is excessive.

COLBORNE

1950	1951
.....	1,107*
.....	.....
1,100	.....

March 21, 1950.
Municipally owned and operated by a Public Utilities Commission.
Four springs.

No treatment; normally flows to system but, occasionally, pumping is necessary.

Standpipe..... 300

1949
0·068 (estimated)

Four canning factories and a cold storage plant.

CORNWALL

1947	1949	1951
15,000	16,800	16,800*
12,600†	13,000†	14,500†
27,600	29,800	31,300

Feb. 9, 1948.....

Municipally owned and operated.....

St. Lawrence River.....

Chlorination; pumped to system by water power.
None.....

1947
4·75

The main industries, a synthetic textile plant and a pulp and paper plant pump river water for process use but civic water is used for drinking in plants. Industrial users include plants manufacturing furniture, tar paper, men's clothing, chemicals, mattresses, etc. Industrial use by various industries about 1 m.g.d.

†Cornwall Township.....

CORNWALL TOWNSHIP

1948	1951	Total township, —21,394*
.....	.....	
.....	.....	
12,600	14,500	

1951 (data from "Municipal Utilities" directory)

Municipally owned and operated (operated by city of Cornwall).
St. Lawrence River; supplied by Cornwall, Ont..

See Cornwall.....
None.....

Included in Cornwall's consumption.....

No data.....

.....

COURTRIGHT

1948	1951
....	530*
....	....
450	....

June 23, 1948.

Municipally owned and operated.

Two wells, some distance from municipality.

No treatment; pumped to system.
None; but construction of a standpipe being considered.
No record.

No major user.

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

ONTARIO

Municipality	CROWLAND TOWNSHIP	CRYSTAL BEACH†
Population served:	1948 — 1951 — Total Township population, 22,047*	1948 — 1951
In municipality	..... —	..... — 1,203*
Outside municipality	..... —	..... — .....
Total	6,700 — 10,950	1,000 — .....
Date(s) of survey	1948, 1949 data from "Water & Sewage" directory and questionnaire.	July 15, 1948.
Ownership	Municipally owned and operated (operated by Welland Board of Water Commissioners).	Municipally owned and operated.
Source of supply	Treated Welland Canal water; purchased from Welland, Ont.	Lake Erie, above Crystal Beach.
Treatment	*See* Welland.	A relatively new plant. Pressure filtration (anthrafilt); chlorination. Alum added intermittently prior to filtration at which time one filter used as a settling basin.
Storage capacity (thousand gallons)	None.	Elevated tank 100
Consumption (average in m.g.d.)	1948 — 1949: Included in Welland. — 0·847	1947-48: Summer ..... 1·2; Winter ..... 0·3
Industrial use	A steel pipe manufacturing plant and several other major industries are located in the Township near the city of Welland: *see* Welland, Ont.	None; a summer resort. Population served in summer may rise to 15,000 or 20,000.
Remarks:	.....	Turbidity never high due to sandy beach.

† Includes Bay Beach.

Municipality	DUNDAS	DUNNVILLE
Population served:	1950 — 1951	1948 — 1951
In municipality	..... — 6,780*	..... — 4,440*
Outside municipality	..... —	..... — .....
Total	6,700 —	4,500 — .....
Date(s) of survey	March 28, 1950; June, 1952.	Feb. 16, 1948; July 16, 1948.
Ownership	Municipally owned and operated by a Public Utilities Commission.	Municipally owned and operated by a Public Utilities Commission.
Source of supply	Spencer Creek, entering plant by gravity.	Grand River (near mouth).
Treatment	In 1950, prechlorination, rapid sand filtration (anthrafilt), aeration at open reservoir, then by gravity to system. In 1952, chlorine dioxide used. Alum added continually.	In July, mixing basin, rapid sand filtration, chlorine and chlorine dioxide treatment and pumped to system. Alum added continually. At one time activated carbon and chlorine used instead of chlorine dioxide.
Storage capacity (thousand gallons)	Reservoir at dam ..... 1,800; Open reservoir near plant 1,000	Two clear wells ..... 100 each; Elevated tank 100
Consumption (average in m.g.d.)	1949: 0·425 — 1951: 0·5 (Maximum 0·7)	1947: 0·69 — 1948: Feb. 0·79, July 1·0
Industrial use	A woodworking plant manufacturing store equipment, a plant producing metal working machines, such as lathes and presses, another producing hardware and small tools, manufacture of church and school furniture, hosiery, and underwear, a cotton mill and a feed mill. The plant producing lathes and presses is one of the larger consumers and uses 0·1 to 0·125 m.g.d.	Primary and secondary textiles, two canning factories, a wire works, C.P.R. and manufacture of fish nets. Civic water softened by many industries. One large textile plant producing towelling uses civic water only for fire protection.
Remarks:	.....	Raw water has a high chlorine demand.

*Population in Municipality according to preliminary data, Ninth Census of Canada, 1951.

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

ONTARIO

DELHI

1950	1951
.....	2,448*
.....	.....
1,500††	.....

March 31, 1950

Municipally owned and operated by a Public Utilities Commission.

Springs, in nearby hills

Springs flow into open reservoirs, then chlorinated and pumped to system; capacity of springs, 1·175 m.g.d.

Open reservoirs.....250 and 160
Standpipe..... 105

1949
0·08

A foundry producing television masts, etc.; manufacture of air conditioning equipment, and two dairies. A tobacco plant has its own well, using 9,000 to 20,000 g.p.d.

†† Total population, 2,500

DESERONTO

1948	1950	1951	1952
.....	.....	1,447*	.....
.....	.....	.....	.....
1,200	1,700	.....	1,800

July 7, 1948; Jan. 1950; June 14, 1952

Municipally owned and operated by a Public Utilities Commission.

Bay of Quinte (Lake Ontario)

Plant installed in 1898. Chlorination; pumped to system. Private wells still used by many residents.

Elevated tank.....75

1947	1949	1951
0·25	0·24	0·26

In 1949, industry used 19,000 g.p.d. Two canning plants, manufacture of wood boxes, optical equipment, radios, electronic supplies and electrical equipment, such as heaters, irons, etc.

Seasonal algal conditions cause high chlorine demand. When canning factories operating additional usage of 60,000-70,000 g.p.d. These factories filter water through sand and activated carbon filters.

DRESDEN

1948	1951
.....	2,053*
.....	.....
2,050	.....

June 23, 1948.

Municipally owned and operated.

Two deep wells, only one normally being used.

No treatment; pumped to system. Due to some H_2S in water there is a gas release at the pumps. Plant built in 1942-1943.

Elevated tank.....58·3

1947-48
0·085

When canneries operating up to 0·143.
Industry uses about 0·07 m.g.d.

Two canning factories, a woodworking plant producing wheels and other bent goods, a creamery and a plant producing dehydrated grasses and alfalfa meal.

.....

DURHAM

1951
1,823*
.....
2,000

March 13, 1951

Municipally owned and operated by a Public Utilities Commission.

One artesian well, ¼ mile distant

No treatment; pumped to system from ground reservoir.

Ground reservoir..... 100
Elevated tank..... 200

1950
0·25

Manufacture of furniture and hosiery; a crushed stone company, and a producer of buttermilk.

.....

DUTTON

1948	1951
.....	794*
.....	.....
800	.....

June 15, 1945

Municipally owned and operated.

Treated Lake Erie; purchased from West Lorne, Ont.

See West Lorne

Elevated tank..... 180

1947-48
0·030

No major user

.....

EAST YORK TOWNSHIP

1949	1951	
.....	.....	Total township population— 64,207*
.....	.....	
55,800	62,000	

1949 data from "Water & Sewage" directory; 1951 data from "Municipal Utilities" directory.

Municipally owned and operated.

Treated Lake Ontario; purchased from Scarborough Township, Ont.

See Scarborough Township.

Elevated tank..... 200

1949	1951
2·1	2·21

A considerable number of varied industries. Industrial use therefore quite high.

.....

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

ONTARIO

Municipality	ELMIRA	ELMVALE
Population served:	1948 / 1949 / 1951	1951
In municipality	.... / .... / 2,585*	....789*
Outside municipality	.... / .... /	....
Total	2,500 / 2,700 / 2,625	800
Date(s) of survey	Aug. 20, 1948; Dec. 15, 1949; March 21, 1952	March 9, 1951
Ownership	Municipally owned and operated by a Public Utilities Commission.	Municipally owned and operated
Source of supply	In 1948 four wells and a spring; in 1952, five wells and a spring. No. 5 well and spring are outside municipality. No. 3 well supplies 75% of water. Well capacity 2·8 m.g.d. (1948).	Artesian wells
Treatment	No treatment; pumped to system directly or from reservoirs.	No treatment; pumped to system
Storage capacity (thousand gallons)	Spring creek storage 1,250; Standpipe 40; Ground reservoirs 60 and 70	Elevated tank—60
Consumption (average in m.g.d.)	1948: 1·0 (72% industrial use); 1949: 1·1; 1951: 1·13 (50·9% industrial use)	1950: 0·031
Industrial use	A textile plant, a furniture factory, creamery, manufacture of felt and felt boots, agricultural and industrial chemicals, chains and malleable iron. The felt plant uses spring water for washing and boiler use and the chemical plant softens the well water for certain uses.	None; farming is the main activity in area
Remarks	Spring water feeding Lorches Creek is used only in emergency since it is said to be high in iron: when used it is chlorinated after entering reservoirs.	....

Municipality	EXETER	FENELON FALLS
Population served:	1950 / 1951	1948 / 1951
In municipality	2,500 / 2,532*	.... / 1,298*
Outside municipality	25 /	.... / ....
Total	2,525 /	1,200† / ....
Date(s) of survey	Feb. 13, 1950	Aug. 13, 1948
Ownership	Municipally owned and operated by a Public Utilities Commission.	Privately owned and operated
Source of supply	Three wells† and springs. In 1949 spring water supplied 85·7%. Total capacity 0·39 m.g.d.	Springs, in nearby hills
Treatment	No treatment; pumped to system	No treatment; flows from collecting ground by gravity to system.
Storage capacity (thousand gallons)	Elevated tank 35; Underground reservoir 300	None
Consumption (average in m.g.d.)	1949: 0·207 (Maximum 0·32; Minimum 0·16)	No record
Industrial use	A canning firm, a packing house, a lumber company, a cold storage plant, etc.	Manufacture of textiles and wood turning (toys, handles).
Remarks	Moodie and Abbott wells mostly used with springs. At time of survey no wells being pumped, spring water being supplied † Kestle, Moodie & Abbott wells.	† Only a portion served, the remainder using public taps or private wells.

*Population in Municipality according to preliminary data, Ninth Census of Canada, 1951.

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

ONTARIO

ELORA

1951
....1,347*
....
1,320

Feb. 14, 1951.....
Municipally owned and operated.....
One well.....

No treatment; pumped to system. Plant capacity—0·144 m.g.d.

Elevated tank—124.....

1950
0·031

Manufacture of furniture (2 firms) and a knitting firm; industrial use only about 1,000 g.p.d.

.....

ESSEX

1948	1951	1952
....	2,734*	....
....	....	....
2,000	....	2,766

June 18, 1948; April 5, 1952.....
Municipally owned and operated by a Public Utilities Commission.
Four deep wells, all considered different in quality. Only three wells† normally used.

Aeration with compressed air at reservoirs, chlorination, pumped to system.

Four ground reservoirs..	2,400	In
Standpipe.....	15	1952

1947–1948	1951
0·22	0·175

A cannery, New York Central Railway, a bakery and a dairy.

Industry in 1948 used normally 0·17 to 0·20 m.g.d. but cannery alone may use at times 0·35 m.g.d. Aeration at reservoirs carried out to remove H_2S.

†Garrow well, Broome well (206 feet deep) and Howe well (196 feet deep).

ETOBICOKE TOWNSHIP

1947	1948	1951
....	....	Population in total township 53,459*
....	....	
20,800	31,476	

March 5, 1947.
Municipally owned and operated.

Four deep wells alongside Mimico Creek. Three wells (85′ deep), normally used. Some water purchased from Weston, Ont.

Sodium zeolite softening, addition of calgon, and pumped to system. Only a portion softened to maintain mixture of softened and raw water at hardness of 80 p.p.m. as $CaCO_3$.

Clear well.....	550
Standpipe.....	450

1946
1·5 (Maximum—3·0) (2 wells operating)

A considerable number of varied industries including misc. iron and steel products.

Water is actually partly creek water which has percolated through 100 feet of gravel to shale bed in depression formed by the river. Treatment necessary to decrease initial hardness of 400 p.p.m. $CaCO_3$ and iron content of 2 p.p.m. to 80 p.p.m. $CaCO_3$ and 0·2 p.p.m. Fe.

FERGUS

1948	1951	1952
....	3,377*	....
....	....	....
3,100	....	3,411

Feb. 25, 1948; Aug. 20, 1948; April 3, 1952.....
Municipally owned and operated by a Public Utilities Commission.
Two wells, 250 to 260 feet deep; only one well being used at time of survey in 1948.
Chlorination since 1948; pumped to system.....

Reservoirs—175 and 225.....

1947–1948	1951
0·25	0·28

No major industrial user of civic water. A large manufacturer of washing machines, pumps, etc., has own wells and a supplier of steel chairs stools, uses civic water only for domestic purposes.

.....

FONTHILL

1948	1951
....	1,411*
....	....
1,200	....

July 15, 1948.....
Municipally owned and operated.....
Springs or a spring-fed creek.....
No treatment,† pumped to system.....

Elevated tank—160.....

No record.....

Main industries are a canning factory and a cold storage plant; the canning plant has its own spring water supply.

.....

†Chlorination said to have been started later.

FOREST

1950	1951
1,700	1,782*
16	....
1,716	....

Feb. 9, 1950.
Municipally owned and operated by a Public Utilities Commission.
Fourteen deep wells, all said to be drawing from the same water table.
No treatment; pumped by air pumps to system.

One reservoir.....	225	
Standpipe.....	75	
Public.....0·10		
Industrial.... 0·075		
Total..... 0·175	Maximum .0·275	
	Minimum .0·085	

A cannery, a basket and crate manufacturer, a vinegar plant, two creameries and a large cold storage plant.

.....

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

ONTARIO

Municipality	FOREST HILL		FORT ERIE	
Population served:	1950	1951	1948	1951
In municipality	.....	15,135*	7,300	7,555*
Outside municipality	.....	.....	2,700†	.....
Total	15,978	.....	10,000	.....
Date(s) of survey	July 20, 1950		July 13, 1948	
Ownership	Municipally owned and operated		Municipally owned and operated	
Source of supply	Treated Lake Ontario; purchased from Toronto, Ont.		Niagara River at source and Lake Erie; since 1950 most of supply from Lake Erie.	
Treatment	*See* Toronto		Two plants. At each chlorination, and pumping to system. Fluoridation reported begun in 1952.	
Storage capacity (thousand gallons)	None		Elevated tanks—250 and 333	
Consumption (average in m.g.d.)	1949		1947	
	0·93 (Maximum 1·07, Minimum 0·7)		0·99 (Maximum 1·66)	
Industrial use	Mostly a residential district; a concrete mixing plant.		A steel works (tanks, ore bins), manufacture of bronze windows and New York Central Ry. The C.N.R. pump industrial water directly from river (3 m.g.d.).	
Remarks:	.....		In 1948 a new plant with filtration was being planned. † Waverly, Erie, Crescent Park and part of Bertie Township.	

Municipality	GLENCOE		GODERICH	
Population served:	1948	1951	1948	1951
In municipality	....	978*	.....	4,887*
Outside municipality	....	....	.....	.....
Total	800	....	4,927	.....
Date(s) of survey	July 17, 1948		Feb. 23, 1948	
Ownership	Municipally owned and operated by a Public Utilities Commission.		Municipally owned and operated by a Public Utilities Commission.	
Source of supply	Four deep wells and one test well		Lake Huron, near harbour	
Treatment	No treatment; pumped to system		Two settling basins; chlorination; pumped to system.	
Storage capacity (thousand gallons)	Elevated tank 104		Standpipe 125	
Consumption (average in m.g.d.)	1947		1947	1948
	0·028		0·563 (Maximum 0·95, Minimum 0·33)	0·593 (Maximum 1·082, Minimum 0·34)
Industrial use	Main activity is farming. A creamery has its own well. The C.N.R. previously used the civic water.		Manufacture of stools, seats, road machinery, flour mills, salt manufacture, grain elevators, C.N.R. and C.P.R. Industrial use in 1948 by seven largest industries, 0·10 m.g.d. that is, about 17%.	
Remarks:	.....		.....	

*Population in Municipality according to preliminary data, Ninth Census of Canada, 1951.

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

ONTARIO

GALT

1948	1951
.....	19,142*
.....	.....
15,000	.....

Feb. 27, 1948.....
Municipally owned and operated by a Public Utilities Commission.
Two wells, 194 and 164 feet deep; both said to be on the same water table.
No treatment; pumped to system.....

Reservoir..... 180
Standpipe..... 220

1947
2·2

A heavily industrialized area. Manufacture of iron castings, hardware, wire goods, heating and cooking apparatus, heavy industrial machinery, steamplant equipment, brass and copper goods, boots and shoes, textiles, boilers and woodworking. The several textile plants usually treat civic water and in some plants Grand River water used for certain processing.
There are about 900 domestic softeners in use in the city.

GANANOQUE

1948	1951
.....	4,525*
.....	.....
4,000	.....

Feb. 10, 1948.....
Municipally owned and operated by a Public Utilities Commission.
St. Lawrence River.....
Chlorination; pumped to system.....

Standpipe..... 157

1947
0·45

Industrial use averages 0·126
Manufacture of milk products, furniture and steel products (5 firms) including shovels, auto parts, hardware, and wire. Most industries use civic supply for sanitation and drinking only, remainder of water being pumped directly from St. Lawrence and Gananoque Rivers.

.....

GEORGETOWN

1948	1951	1952
.....	3,441*	.....
.....	.....	.....
3,150	.....	3,523

Aug. 18, 1948; April 2, 1952.
Municipally owned and operated.
In 1948, two spring sources. In 1952, only a deep well being used.
No treatment. In 1948, water from reservoirs by gravity to system; pumped to reservoirs. In 1952 no treatment; pumped to system.
In 1952, reservoirs—375 and 200.

1947	1951
0·6 (estimated)	0·5

Pulp and paper manufacture (2 plants), manufacture of ceramic products and electrical supplies such as insulators and C.N.R. One of the paper companies also uses Credit River for process water. Industrial use in 1948—0·12 m.g.d.

.....

GRANTHAM TOWNSHIP

1951	
.....	Total township—15,390*
.....	
8,100	

1951; data from "Municipal Utilities" directory..
Municipally owned and operated.....
Treated Welland canal; purchased partly from St. Catharines, Ont., and partly from Merritton, Ont. (about 150 homes).
See St. Catharines and Merritton.....

None.....

1951
0·3

No data.....

.....

GRAVENHURST

1947	1948	1951
.....	.....	2,982*
.....	.....	.....
2,500	2,700	.....

Sept. 24, 1947.....
Municipally owned and operated by a Public Utilities Commission.
Two wells, 72 feet deep.....
Addition of calgon (2 p.p.m.); pumped to system.

Standpipe..... 100

1946-47
0·4 (Maximum 0·5, Minimum 0·28)

Manufacture of brushes and soft drinks; C.N.R.; two dairies; a boat building plant. Industrial use about 0·2 m.g.d. or 50% of total.[1]

Calgon added first in 1946 at rate of 5 p.p.m. This municipality previously used Gull Lake as source but algae conditions were at times serious.

GRIMSBY

1948	1951
2,300	2,739*
Grimsby Beach 300	.....
2,600	.....

Feb. 14, 1948; July 9, 1948.
Municipally owned and operated by a Public Utilities Commission.
Lake Ontario.

Pressure filtration (sand), chlorination; pumped to system. Lump alum added at sump well prior to filtration.
Clear well..... 100
Elevated tank..... 90

1947	1948
0·462†	0·616, (Maximum, 0·920)

Manufacture of iron and steel products (hospital and kitchen equipment); two canning factories, two basket factories, a distillery, an ice plant and C.N.R. The latter softens the water prior to use in boilers.
Under certain wind conditions red clay along the shore causes high turbidities; algae conditions may be troublesome in summer.
† Outside municipality—40,000 to 50,000 g.p.d.

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

ONTARIO

Municipality	GUELPH	GUELPH TOWNSHIP
Population served:	1948 / 1951	1951
In municipality	25,077 / 27,246*(27,215)	.... Total township..... 4,741*
Outside municipality	2,000† / 2,000†	....
Total	27,077 / 29,246	2,000
Date(s) of survey	Feb. 27, 1948; Aug. 16, 1948; April 3, 1952.....	1951; data from annual directory of "Municipal Utilities".
Ownership	Municipally owned and operated.....	Municipally owned and operated.....
Source of supply	Springs, 4½ miles distant and three deep wells (140' deep). Only two wells, the Park St. and Metcalfe St. wells, are normally used.	Wells and springs; purchased from Guelph, Ont.
Treatment	Chlorination of spring water; piped to reservoirs and pumped to system. Wells pumped to system. In 1948 wells supplied 50% of water, most from the Park St. well.	*See* Guelph.....
Storage capacity (thousand gallons)	Two covered reservoirs (spring water) 1,000 Elevated tank..... 500	None.....
Consumption (average in m.g.d.)	1947–1948 / 1951 5·25 / 4·47 34% used by industry.	1951 0·4 (estimated)
Industrial use	Manufacture of textiles (carpets, worsted yarns, men's and women's clothing, laces, awnings, cottons), hats, agricultural implements, engines, boilers, tanks, pipe fittings, brass castings, various sheet metal products, automobile supplies, stoves, surgical appliances, wood specialties, vinegar and pickles, etc.; a hospital; a provincial reformatory.	No data.....
Remarks	The Emma St. well is a harder water and seldom used. Three other wells are available but low in capacity and not used. In 1952 Metcalfe St. well seldom used. † Guelph Township.	.....

Municipality	HARRISTON	HESPELER
Population served:	1951	1948 / 1951
In municipality	....(1,487)*	.... / 3,843*
Outside municipality	....	.... / ....
Total	1,536	3,400 / ....
Date(s) of survey	March 16, 1951.....	March 1, 1948.....
Ownership	Municipally owned and operated.....	Municipally owned and operated.....
Source of supply	One deep well.....	Two wells, 100 feet deep; a third well is being considered.
Treatment	No treatment; pumped to system.....	Pumped with aeration to reservoir, then pumped with chlorination to system.
Storage capacity (thousand gallons)	Standpipe—60.....	Reservoir..... 210 Elevated tank..... 100
Consumption (average in m.g.d.)	1950 0·2	1947 / 1949 0·25 (est.) / 0·36
Industrial use	A stove foundry, a packing firm (butter, cheese), a casket factory, a knitting and spinning mill (sweaters, hosiery), and a beverage firm; the latter treats the water by filtration through quartz.	A textile manufacturing centre (woollens and worsted goods), manufacture of hockey sticks, etc., and of enamelled ware. Some industries soften the civic water, others use the Speed River treated or raw for processing.
Remarks	.....	Iron and H_2S removed by aeration (compressed air) at reservoir.

* Population in Municipality according to preliminary data, Ninth Census of Canada, 1951.

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

ONTARIO

HAGERSVILLE

1950	1951	1952
....	1,742*	....
....	....	....
1,613 (est.)	....	1,600

March 31, 1950; June 19, 1952

Municipally owned and operated

In 1950, one rock well (Park well); in 1952, two wells.

Intermittent chlorination; pumped to reservoir and to system.

Ground reservoir—65

1949	1951
0·023	0·05

Manufacture of gloves, a seed plant and a gypsum-lime plant. At time of survey none of these using civic water.

System put into operation, Sept. 1949

HAMILTON

1947	1949	1951
179,758	190,000	207,544*
....	....	51,028†
....	....	258,572*

March 3, 1947

Municipally owned and operated

Lake Ontario

Prechlorination and ammonium sulphate addition, mixing basins, settling basins, rapid sand filtration, post-chlorination and pumped to system. Alum added at mixing basins intermittently.

Reservoirs.....11,000, 14,000 and 450
Elevated tank..... 750

1946	1949
27·2	30·25

A heavily industrialized area including primary steel and iron production, various heavy industrial machinery, sheet metal products, castings, structural steel, etc. Manufacture of electrical supplies, food stuffs, glass products, wood and paper products, tobacco products, rubber goods, canning, basic chemicals, soaps, textiles, fertilizer, etc.

Turbidity varies from about zero to 400 p.p.m. and alum addition varies with turbidity.

† Parts of Barton Twp. and Nelson Twp.

HANOVER

1951
....(3,511)*
....
3,400

July 15, 1950; Feb. 5, 1951.

Municipally owned and operated by a Public Utilities Commission.

Ruhl Lake, about 2½ miles distant.

Chlorine and chlorine dioxide treatment; pumped to system. Chlorine dioxide added only in summer to control taste due to algae.

Closed reservoir—400.

1950
0·4

Seven furniture manufacturers, three manufacturers of hosiery (dyeing and bleaching), two dairies, a flour mill, and a lumber mill. Main industries use about 30% of pumpage.

HUMBERSTONE

1948	1951
....	3,886*
....	....
3,300	....

1948

Municipally owned and operated

Treated Lake Erie; purchased from Port Colborne, Ont.

See Port Colborne

None

1948
0·41

Manufacture of boots and shoes, a flour and feed mill. *See* also Port Colborne, Ont.

HUNTSVILLE

1947	1951
....	3,244*
....	....
3,125	....

Sept. 18, 1947

Municipally owned and operated by a Public Utilities Commission.

Lake Vernon

Two mixing basins, two settling basins, rapid sand filtration, chlorination and pumped to system. Alum and soda ash added at mixing basins. Soda ash added finally to clear well to raise pH.

Open reservoir, on nearby hill—750

1946–47	
0·56	Maximum..... 0·647
	Minimum..... 0·40

C.N.R., manufacture of wood flooring and of sole leather (tanning); the leather firm pumps lake water direct for most process use.

INGERSOLL

1948	1951
....	6,504*
....	....
6,000	....

Aug. 23, 1948.

Municipally owned and operated by a Public Utilities Commission.

Two wells† (380 feet deep) and springs; the latter supply about 50% of water.

Wells—aeration at elevated tank; pumped to system. At springs, collected by gravity, chlorination and pumped to system.

Reservoir at springs..... 750
Elevated tank (wells)..... 138·2

1947–48
0·7

Industrial use about 28% of total.

Manufacture of machine tools, screws, dies, furnaces, furniture, ambulances, paper boxes and a supplier of hides and fertilizer. A plant manufacturing cream cheese has its own well supply. The plant manufacturing screws and nuts uses about 13% of total.

†Wells on same water table so only one used at a time. Aeration carried out to remove H_2S.

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

ONTARIO

Municipality	IROQUOIS	KINCARDINE
Population served:	1950 / 1951	1951
In municipality	..... / 1,081*	..... (2,652*)
Outside municipality	..... /	.....
Total	1,034 /	3,000
Date(s) of survey	Mar. 20, 1950	March 13, 1951
Ownership	Municipally owned and operated	Municipally owned and operated by a Public Utilities Commission.
Source of supply	St. Lawrence River	Lake Huron
Treatment	Chlorination; pumped by water power to system.	Pressure filtration (sand), chlorination at clear well; repumped to system. Alum added at sump well. During winter, 3 hrs. retention prior to filtration.
Storage capacity (thousand gallons)	None	Clear well ..... 456 Elevated tank 75
Consumption (average in m.g.d.)	1949 0·079 (estimated)	1950 In winter, 0·21. In summer, 0·60.†
Industrial use	A linen mill (towels), a cheese plant and a cold storage plant. The linen mill uses 75% of pumpage.	Manufacture of hosiery (dyeing) and of salt; two furniture factories; a dairy and a creamery.
Remarks:	.....	† A heavy tourist trade accounts for increased summer use.

Municipality	LAKEVIEW†	LA SALLE
Population served:		1949 / 1951
In municipality	.....	..... / 1,848*
Outside municipality	.....	..... / .....
Total	.....	1,500 / .....
Date(s) of survey	.....	1949
Ownership	.....	Municipally owned and operated by a Public Utilities Commission.
Source of supply	*See* Port Credit, Ont.	Treated Detroit River; purchased from Windsor, Ont.
Treatment	*See* Port Credit	*See* Windsor
Storage capacity (thousand gallons)	.....	None
Consumption (average in m.g.d.)	.....	1949 0·089
Industrial use	.....	No data
Remarks:	† Lakeview area is supplied by Port Credit Waterworks system and is included in data for Port Credit.	.....

* Population in Municipality according to preliminary data, Ninth Census of Canada, 1951.

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

ONTARIO

KINGSTON

1948		1951
.....		36,510
.....	Portsmouth†	3,393
37,000		39,903*

1948

Municipally owned and operated by a Public Utilities Commission.

Lake Ontario

Chlorination; pumped to system

Reservoir 628

1948	1949
6·7	6·995

A tannery, shipbuilding and repairs, manufacture of woollens, plastic goods, nylon, confectionery, storage batteries, tile, locomotives and aluminum metal products; Queen's University; army installations, several hospitals and a Federal Penitentiary.

Some of the larger industrial users draw their water directly from lake.

† In late 1951, Portsmouth village and nearby township areas were annexed to the city.

KINGSVILLE

1948	1951
.....	2,627*
.....	.....
2,600	.....

June 17, 1948

Municipally owned and operated by a Public Utilities Commission.

Lake Erie

Mixing basin, settling basin, pressure filtration (sand), chlorination, to system. Alum and at times ammonium sulphate added at mixing basin.

Standpipe 28

1947-48

In winter, −0·28;
In summer, when canning is in process, −0·5

Three tobacco factories, a cannery and a sawmill

.....

KITCHENER

1948	1951	1952
.....	44,797*	.....
.....	.....	.....
40,000	.....	45,810

Aug. 19, 1948; April 2, 1952.

Municipally owned and operated by a Public Utilities Commission.

Ten wells in two groups, in city; one well, on Lancaster St., in suburb of Bridgeport.

No treatment; 5 wells (120 to 160 feet deep) enter reservoir on Shoemaker St. and 5 enter reservoir on Strange St.; pumped to system. Lancaster St. well pumped to reservoir and system.

Shoemaker St. Reservoir 3,000
Strange St. Reservoir 1,000
Lancaster St. Reservoir 2,500
Two elevated tanks ..... 500 and 830

1948
5·0

In August, 1948, 6·3 m.g.d., 75% from Shoemaker St. wells.

Industrial use 60 to 70% of total. Tanning, meat packing, textiles (shirts, etc.), C. N. R.; manufacture of rubber goods (tires, rubber machinery, boots and shoes), leather products, cordage, industrial machinery, iron castings and hardware, gloves, plastic goods, electrical supplies, furniture, confectionery, auto supplies, etc.

Larger industries are meat packing, manufactures of rubber goods, leather, furniture and textiles.

LEAMINGTON

1948	1951	1952
.....	6,909*	.....
.....	.....	.....
6,500	.....	6,585

June 16, 1948; April 7, 1952

Municipally owned and operated (1948)

Municipally owned and operated by a Public Utilities Commission (1952).

Two wells

Aeration at reservoirs; pumped to reservoirs and then repumped to system.

Four ground reservoirs—1,250 total

1947	1951
1·0	1·0

Two tobacco factories; canning and pickling; a lumber mill. The large canning and pickling plant has its own supply—Lake Erie and wells.

.....

LEASIDE

1948	1951
.....	16,092*
.....	.....
13,568	.....

1948

Municipally owned and operated

Treated Lake Ontario; supplied by Toronto, Ont.

See Toronto

None

1948

1·8 (approximately)

A highly industrialized area with many diversified industries including manufacture of railway cars, auto and aircraft supplies, paints, electrical equipment, supplies; sporting goods, hardware, scientific equipment, etc.

.....

LINDSAY

1948	1951
.....	9,587*
.....	.....
8,750	.....

July 21, 1948; Aug. 14, 1948.

Municipally owned and operated by a Public Utilities Commission.

Scugog River, above town; one auxiliary well, 60 feet deep which is seldom used, being a very hard water.

In 1948, prechlorination, chlorine dioxide treatment, settling basins, rechlorination, pressure filtration to system. Alum added at sump well.†

Standpipe 290

1947-48

0·87

Canadian Arsenals Ltd., C.N.R.; C.P.R.; manufacture of medicines and pharmaceuticals, woollen yarn, carpets, phenolic moulding, brake and clutch linings, wooden dowels, etc. The largest use is the manufacture of pharmaceuticals. Several firms pump directly from the river.

† Various treatment methods and points of addition of chemicals have been tried on this water to remove serious odours and tastes due to seasonal algae conditions. Late in 1950, activated silica was being added with alum to improve coagulation, etc.

71579—7

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

ONTARIO

Municipality	LISTOWEL	LONDON
Population served:	1951	1948 / 1951
In municipality	....(3,449*)	89,550 / 102,784* Total metropolitan area, 120,991*
Outside municipality	....	7,200† / 7,800†
Total	3,500	96,750 / 110,584
Date(s) of survey	March 15, 1951	July 19, 1948; Dec. 31, 1951
Ownership	Municiplaly owned and operated by a Public Utilities Commission.	Municipally owned and operated by a Public Utilities Commission.
Source of supply	Three artesian wells, 345 feet deep, all on the same water table.	In 1951, deep wells, springs, and Thames River, 9 groups of wells situated in and around the city. Springs collected near Thames River.
Treatment	No treatment; pumped to system	Springs collected and pumped to reservoir; several groups of wells also pumped to this reservoir with chloramine treatment then to system by gravity. Two groups of wells are aerated, pressure filtered, and pumped to system with chloramine treatment.
Storage capacity (thousand gallons)	Ground reservoir..... 165 Two elevated tanks.....150 and 65	Open reservoirs at springs, 6,000 and 10,000. Two reservoirs, 1,000 and 5,000.
Consumption (average in m.g.d.)	1950 0·4	1947 / 1951 8·67 Wells..... 60% / 9·7; max. 12·7 Springs..... 30% River..... 10%
Industrial use	Textiles (dyeing), a furniture factory and production of condensed milk.The textile plant further treats the water for many process uses. Industrial use is 35% of total.	Industrial use in 1947 by 36 largest industries 28% of total. Wide diversity of industrial use including brewing, production of iron and steel products such as industrial machinery, castings, boilers, engines, agricultural implements, hardware, structural steel, etc., tanning, textile manufacture, manufacture of foodstuffs, glass, leather goods, tobacco products, paints, etc. The University of Western Ontario is also a large user. The C.P.R. and C.N.R. use river water for railway engine boilers.
Remarks	....	All other wells are pumped either to reservoirs and then to system or directly to system with chloramine treatment. River water used only for fire protection, heating systems and railway engines is not treated. † Westminster Township, etc.

* Population in Municipality according to preliminary data, Ninth Census of Canada, 1951.

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

ONTARIO

LONG BRANCH			LUCKNOW	MARKDALE
1949	1950	1951	1951	1951
....	....	8,711*	....(891*)	....(1,001*)
....	....	....	....	....
5,450	7,661	....	980	965
1949; data from "Water & Sewage" directory....			March 14, 1951.....	March 9, 1951
Municipally owned and operated.....			Municipally owned and operated.....	Municipally owned and operated.
Treated Lake Ontario; purchased from New Toronto, Ont.			Two wells, 127 feet and 40 feet deep; supply is usually a mixture.	Small creek, nearby.
See New Toronto.....			No treatment; pumped to system.....	Natural filtration, chlorination; pumped to system.
None.....			Elevated tank—160.....	Elevated tank—62.
1949	1950		1950	1950
0·457	0·75 incl. water supplied to Toronto Township.		0·13	0·185 (estimated).
Manufacture of aluminium castings, water meters, paints, car bodies and iron and steel products (Canadian Arsenals Ltd.)			A dairy and a flour mill.....	A creamery and a tannery (leather and felt slippers) primarily a farming community.
.....			New wells have been test drilled and a small spring-fed lake two miles distant could be brought into the system.	

71579—7½

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

ONTARIO

Municipality	MARKHAM	MEAFORD
Population served:	1950 / 1951	1951
In municipality	.... / 1,593*	....(3,159*)
Outside municipality	.... /	....
Total	1,500 /	3,200
Date(s) of survey	March 22, 1950	March 10, 1951
Ownership	Municipally owned and operated by a Public Utilities Commission.	Municipally owned and operated by a Public Utilities Commission.
Source of supply	Artesian well (spring)	Georgian Bay (Lake Huron)
Treatment	Gravity flow to ground reservoirs, chlorination (sodium hypochlorite), pumped to system.	Natural filtration, chlorination, pumped to system.
Storage capacity (thousand gallons)	Two reservoirs....40 and 95 Elevated tank.... 60	Elevated tank—125
Consumption (average in m.g.d.)	1949 0·090 { Maximum.... 0·175 Minimum.... 0·050	1950 0·285
Industrial use	Very little industrial use; a dairy	Five woodworking plants supplying flooring, radio cabinets, kitchen cabinets, etc. Manufacture of cabinet hardware (electroplating), woollens and two creameries.
Remarks	....	....

Municipality	MILTON	MILVERTON
Population served:	1948 / 1951 / 1952	1951
In municipality	..... / 2,450* /	..... (1,053*)
Outside municipality	..... / ..... /	.....
Total	2,350 / ..... / 2,600	1,040
Date(s) of survey	Aug. 18, 1948; April, 1952	March 15, 1951
Ownership	Municipally owned and operated	Municipally owned and operated
Source of supply	Springs; in 1952 springs and a well	Two deep wells, normally only one (175 feet deep) being used.
Treatment	In 1952, no treatment; pumped to system from reservoirs. At times springs are also pumped.	No treatment; pumped to system
Storage capacity (thousand gallons)	Two reservoirs (one for fire)—500 total	Reservoir....75 Standpipe....50
Consumption (average in m.g.d.)	No record	1950 0·065
Industrial use	Manufacture of wire and wire goods, textiles (sweaters, hosiery), and a feed mill. Two pressed-brick factories have their own well water supplies.	A furniture company, a creamery, an ice arena and manufacture of felt shoes, textiles and farm machinery.
Remarks:	....	....

* Population in Municipality according to preliminary data, Ninth Census of Canada, 1951.

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

ONTARIO

MERRITTON

1948	1950	1951
3,740	4,100	4,708*
Grantham Twp. 400	600	....
4,140	4,700	....

July 12, 1948; Feb. 1, 1950.....
Municipally owned and operated.....

Lake Erie water from Welland Canal above Thorold and near Thorold Waterworks plant.
Choramine treatment, pressure filtration (sand), open settling basin, then gravity to system. Alum added at sump well along with chlorine and ammonium sulphate (chloramine).
Open reservoir (settling basin)—5,000.....

1947	1949
1·65	1·41

In 1948, mills in town used about 1·3 m.g.d. Four pulp and paper mills, manufacture of auto supplies, of heavy mining and industrial machinery, of compressed gas, storage batteries and welding equipment. One paper mill also pumped about 1·5 m.g.d. of water direct from canal.

.....

MIDLAND

1951
....(6,949*)
....
7,260

March 8, 1951.....
Municipally owned and operated by a Public Utilities Commission.
Creeks and springs near town.....

Springs enter creek, whose waters are naturally filtered, chlorinated and pumped to system.

Reservoir, 157 and elevated tank, 207.

1950		
0·72	Maximum	1·22
	Minimum	0·43

Industrial use about 30% of total. Manufacture of silk goods, dresses, footwear, iron castings, furs, precision instruments; a machine shop and foundry; shipbuilding.

.....

MILDMAY

1951
....(846*)
....
750

March 16, 1951.
Municipally owned and operated.
Two artesian wells, only one being used.

No treatment; pumped to system from an open reservoir.

Open reservoir—24.

No data.

A threshing machine foundry, a sawmill and a creamery; the latter two having their own well supplies.

.....

MIMICO

1948	1949	1951
.....	.....	11,289*
.....	.....	.....
9,650	10,261	.....

1949; data from "Water & Sewage" directory....
Municipally owned and operated by a Public Utilities Commission.
Treated Lake Ontario; purchased from New Toronto, Ont.
See New Toronto. Water is booster-pumped to some extent.
Tank..... 250

1948	1949
0·244	0·518 8·7% of New Toronto pumpage.

A distillery, a Provincial mental hospital and various industries, such as manufacture of wooden boxes and electrical apparatus (*see* also New Toronto).

.....

MITCHELL

1950	1951
1,700	1,987*
368†	.....
2,068	.....

Feb. 9, 1950.....
Municipally owned and operated by a Public Utilities Commission.
One deep well in use; another drilled in 1949 to go into service late in 1950.
No treatment; pumped to system.....

Reservoir..... 10

1949
0·3 (estimated)

A dairy, a packing firm, a produce firm and manufacture of hosiery.

† Includes part of Logan Township and part of Fullarton Township.

MORRISBURG

1947	1951
.....	1,826*
.....	.....
1,400	.....

Feb. 21, 1947.
Municipally owned and operated.
St. Lawrence River.

Chlorination; pumped to system.

Reservoir..... 80

No data.

Manufacture of paper bags, etc.; manufacture of tooth-brushes, a knitting mill, and C.N.R.

.....

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

ONTARIO

Municipality	MOUNT FOREST	NAPANEE
	1951	1947 / 1951
Population served:		
In municipality	..... (1,951*)	..... / 3,863*
Outside municipality	.....	..... / .....
Total	2,100	3,300 / .....
Date(s) of survey	March 16, 1951	March 6, 1947
Ownership	Municipally owned and operated by a Public Utilities Commission.	Municipally owned and operated by a Public Utilities Commission.
Source of supply	Three wells, one 550 feet deep	Napanee River, flowing through canal in town...
Treatment	No treatment; pumped to system	From canal to settling basin (baffled) pressure filtration (anthrafilt) to system with chlorination. Alum and at times activated carbon added to basin. Portion of water used to operate pumps.
Storage capacity (thousand gallons)	Ground reservoir....60 Standpipe....50	Standpipe.... 133
Consumption (average in m.g.d.)	1950 0·16	1946 0·8
Industrial use	A basket factory, a casket factory, a creamery and dairy, a foundry, and a knitting mill.	Manufacture of furniture
Remarks:	.....	.....

Municipality	NEW TORONTO			NIAGARA (Niagara-on-the-Lake)		
	1947	1950	1951	1948	1951	1952
Population served:						
In municipality	10,500	10,677	11,126*	.....	2,098*	.....
Outside municipality	.....	17,922 (est.)**	26,500**	.....	.....	.....
Total	.....	28,599	37,626	1,800**	.....	2,200†
Date(s) of survey	March 1, 1947; July 19, 1950			July 12, 1948; May 10, 1952		
Ownership	Municipally owned and operated by a Public Utilities Commission.			Municipally owned and operated		
Source of supply	Lake Ontario			Niagara River, near mouth		
Treatment	In 1947, two baffled mixing basins, two settling basins (one circular), and pressure filtration (anthrafilt), to system. Alum added at sump well and chlorine and chlorine dioxide at second settling basin.†			Pressure filtration to system; alum, activated carbon and chlorine added prior to filters. Extra pumps to supply military camp when needed.		
Storage capacity (thousand gallons)	Elevated tanks—250 and 75			Standpipe.... 66		
Consumption (average in m.g.d.)	1946		1949	1947		1951
	Treated.... 5·6		5·9 75% used by New	0·20		0·21
	Raw..... 1·2		2·35 Toronto	(Minimum—0·13)		
	Total..... 6·8		8·25			
Industrial use	Industrial use about 67% of total. Main user is plant producing rubber products which uses considerable raw water. Other users include a distillery, a tannery, and manufacturers of canned foods, sheet metal products (cans), paper bags, wallpaper, paints, colours, metal appliances, miscellaneous textiles, engines and machinery, brass goods, etc.			Canning, a boat works, a winery, occasionally a military camp, and a manufacturer of marmalade; a heavy tourist trade in summer.		
Remarks:	**Mimico, Long Branch and part of Toronto Township. † A quantity of raw water is pumped directly to the rubber plant. Considerable turbidity and algae in water in spring and fall. A new plant is under construction.			**Population may rise to 3,000 or 3,500 owing to tourists in summer. † This plant also supplies a summer colony (500) in Niagara Township, known as Mississauga area, which used 3·73 m.g. during the season (1951). May be a high chlorine demand in the summer.		

* Population in Municipality according to preliminary data, Ninth Census of Canada, 1951.

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

ONTARIO

NELSON TOWNSHIP

1949		1951
.....	.....	Total township,
.....	.....	8,136*
4,100	4,200	

1949
Municipally owned and operated by a Public Utilities Commission (Inter-Urban Area Board of Burlington-Nelson).
Treated Lake Ontario; from Burlington Waterworks plant.
See Burlington
None
Included in consumption of Burlington
See Burlington
.....

NEW HAMBURG

1950	1951
.....	1,733*
.....	.....
1,500	.....

March 3, 1950; Feb. 6, 1951
Municipally owned and operated
Springs
No treatment intended. System not expected in full operation until early summer, 1951.
No data
No data
Expected users are a brass foundry, and manufacturers of silk goods, furniture and felt boots; the latter now uses Nith River for process water.
.....

NEWMARKET

1950	1951
.....	5,323*
.....	.....
4,800	.....

March 23, 1950.
Municipally owned and operated.
Cotter St. well..... 200 feet deep
Sirgley artesian well..... 200 feet deep
Water St. well—a new artesian well.
Cotter St. well—chlorination (hypochlorite); by gravity or pumped to system and reservoir. Sirgley well—aeration (iron removal) and pressure filtration (sand). Water St. well—no treatment; pumped to system from reservoirs.
Reservoirs.....190 and 120
Standpipe..... 253

1949	On March 23/50
——	Cotter St. well.....0·30
0·43	Sirgley well.....0·09
	Water St. well.....0·05
	Total.....0·44

Estimated industrial use—22% of total. Manufacture of pencils, presses, washers, office furniture, plastic records, electronic supplies and caskets; a tannery and a county hospital.
The tannery uses civic water for refrigeration only as it has its own spring water supply.

NIAGARA FALLS

1948	1951
20,000**	22,735*
.....	.....
.....	.....

Feb. 16, 1948
Municipally owned and operated
Niagara River from power plant canal above falls at Chippawa.
Mixing basins, prechlorination, settling basins, rapid sand filtration, pumped to system; alum added at mixing basins.
No data

1947

4·0† (Maximum—7·5)

Considerable industrial use including plants manufacturing breakfast foods, leather goods, auto supplies, miscellaneous iron and steel products, industrial machinery, brass goods, silverware and jewellery, storage batteries, wines, etc.

A large plant producing abrasives and chemicals draws its cooling water directly from the canal.
**Supplies also Chippawa, Queenston, a portion of Niagara Township and about one-half of Stamford Township.
†Includes other areas served.

NIAGARA TOWNSHIP

1951	
.....	Total township—
.....	5,085*
2,900	

1951; data from "Municipal Utilities" directory..
Municipally owned and operated
Treated Niagara River; from plants at Niagara, Ont., and Niagara Falls, Ont.
See Niagara and Niagara Falls, Ont.
None

1951

Winter	0·017
Summer	0·050

No data
.....

NORTH GRIMSBY TOWNSHIP

1951	
.....	Total township—
.....	2,960*
1,800	

1951; data from "Municipal Utilities" directory.
Municipally owned and operated.
Treated Lake Ontario; supplied by Grimsby, Ont.
See Grimsby.
None.

1951

0·070

No data, but area activity is mainly fruit farming.
.....

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

ONTARIO

Municipality	NORTH YORK TOWNSHIP				NORWICH		
Population served:	1949	1950	1951		1948	1950	1951
In municipality	.....	.....	.....	Total township—	1,300	1,366	1,433*
Outside municipality	.....	.....	.....	84,363*	100	100	.....
Total	37,932	47,500	80,200†		1,400	1,466	.....
Date(s) of survey	March 27, 1950				July 17, 1948; Jan. 25, 1950		
Ownership	Municipally owned and operated				Municipally owned and operated by a Public Utilities Commission.		
Source of supply	Three wells, 140, 160 and 150 feet deep, Don River and purchased from York Township. Part of Township supplied by Toronto and part by Weston, Ont.				Two deep wells in town. An auxiliary supply from well at creamery.		
Treatment	Plant 1—Two wells, aerated, settled in baffled basins, filtered (anthrafilt) for iron removal, and a portion (½ to ⅓) zeolite-softened, chlorinated, pumped to system. River water if used, chlorinated, pumped to system. Plant 2—Gravel well (150 feet deep) aerated, filtered, a portion (¼ to ¾) zeolite-softened, pumped to system.				Chlorination (sodium hypochlorite) when drawn from ground reservoirs, otherwise no treatment and pumped to system.		
Storage capacity (thousand gallons)	Two ground reservoirs..... 2,000 Two pumphouse reservoirs.....90 and 75 Two standpipes.....500 and 150				Two ground reservoirs..... 100 total Standpipe.....30·2		
Consumption (average in m.g.d.)	1949	1950	1951		1947	1949	
	2·5 (0·66 purchased)	2·52	3·5**		0·082	0·15	
Industrial use	Some of the main users are manufacturers of golf clubs and balls, woollens, business machines, pharmaceuticals, plywood glues and chemicals, concrete blocks, and a printing and publishing firm.				In 1949 industrial use 0·035 m.g.d. (23%). Manufacture of vinegar, brooms, a fruit-packing plant, and C.N.R. A creamery has its own well supply.		
Remarks:	** Includes 150 services in Markham Township. † Data from "Municipal Utilities" directory, Dec. 1951, and represents total population served with water. Various portions of Township have different waters owing to (1) percentage mixture, (2) percentage softened, (3) source.				Reservoirs normally used for fire protection only.		

* Population in Municipality according to preliminary data, Ninth Census of Canada, 1951.

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

ONTARIO

NORWOOD	OAKVILLE			OJIBWAY	
1951	1948	1951	1952	1947	1951
.... (920*)	.....	6,878*	8,000	....	19*
....	.....	.....	2,200†	....	....
900	5,000	.....	10,200	165	....
March 7, 1951	June 12, 1948; April 19, 1952			July, 1950; data supplied by Windsor Public Utilities Commission.	
Municipally owned and operated	Municipally owned and operated by a Public Utilities Commission.			.....	
One well, 75 feet deep	Lake Ontario			Treated Detroit River; supplied by Windsor, Ont.	
No treatment; pumped to system	Large sedimentation basin (3·5 m.g.), chlorination; pumped to system.			*See* Windsor.	
Standpipe 125	Elevated tank 550			None.	
1950	1947	1951		1947	1949
0·023	0·85	6·55 (Maximum—20·0)		0·021	0·016
No major industrial user	Manufacture of rubber and plastic goods, paints, baskets and veneers, electrical appliances, fasteners, stampings, aircraft parts and preserved foods; a tannery and ferro enamelling.			Most of pumpage is industrially used; *see* Windsor, Ont.	
System installed in 1948	† Trafalgar Township. New industries planning in 1952 to establish in and around Oakville will no doubt increase total and industrial consumption very greatly in the future.				

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

ONTARIO

Municipality	ORANGEVILLE	ORILLIA
Population served	1950 / 1951	1947 / 1951 / 1952
In municipality	.... / 3,229*	.... / 12,013* / ....
Outside municipality	.... /	.... / .... / ....
Total	3,350 /	10,900 / .... / 12,000
Date(s) of survey	March 24, 1950	Sept. 24, 1947; April 29, 1952
Ownership	Municipally owned and operated	Municipally owned and operated by a Public Utilities Commission.
Source of supply	Springs, two miles from town	Lake Couchiching and two deep wells. Supply may be either or a mixture. Wells said to be on same table.
Treatment	Chlorination when necessary; gravity to reservoirs and system but occasionally pumped.	Lake water—Chlorination, pressure filtration (sand), pumped to system. Alum added with chlorine at sump well. Sometimes chlorine dioxide or activated carbon also added. Well water—Pumped to reservoirs, then pumped with chlorination through pressure filters to system. Often mixed in sump well with lake water.
Storage capacity (thousand gallons)	Three reservoirs—125 total	Two ground reservoirs (wells)...513 total Standpipe.....25·3
Consumption (average in m.g.d.)	No record	1946: 1·28 (Maximum 2·23); 1951: 1·98
Industrial use	A knitting mill (hosiery), a bottling plant, a sawmill and two creameries; manufacture of pharmaceuticals.	About 7 foundries and machine shops producing agricultural implements, hardware, tools industrial machinery, miscellaneous sheet metal products including enamelled ware, primary iron and steel, and electrical equipment. Manufacture of woollen yarns, hardwood flooring and sawmilling. The industries use about 50% of total pumpage.
Remarks	....	In 1946: Well No. 1..... 29·9 m.g. Well No. 2..... 29·3 m.g. Lake water.....4,611·6 m.g. Total.....4,670·8 m.g.

Municipality	PALMERSTON	PARIS
Population served:	1951	1950 / 1951 / 1952
In municipality	....(1,572*)	.... / 5,239* / ....
Outside municipality	....	.... / .... / ....
Total	1,440	5,060 / .... / 5,574
Date(s) of survey	March 15, 1951	March 31, 1950; April 20, 1952
Ownership	Municipally owned and operated by a Public Utilities Commission.	Municiaplly owned and operated by a Public Utilities Commission.
Source of supply	Two gravel wells, 82 feet deep	Two flowing springs and one deep, gravel well.
Treatment	No treatment; pumped to system	No treatment: one spring flows to reservoir and is pumped to system; the other spring and well are pumped to system.
Storage capacity (thousand gallons)	Ground reservoir..... 100 Standpipe..... 200	Open reservoir—1,000
Consumption (average in m.g.d.)	1950: 0·25	1949: 0·43 (Maximum—0·60); 1951: 0·5
Industrial use	A creamery, a clay-products company, a dairy and the C.N.R.; the latter uses 75% of total, Palmerston being a divisional point.	In 1949, industrial use 50% of total. Four textile plants (hosiery, woollens) some of which draw water at times directly from Grand River; manufacture of road machinery, water paints, gypsum and alabastine products, furniture, refrigerators, window screens, etc.
Remarks	....	....

* Population in Municipality according to preliminary data, Ninth Census of Canada, 1951.

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

ONTARIO

OSHAWA

1947	1951
17,924	41,359*
6,000 (est.)	....
33,924	....

Feb. 24, 1947.....
Municipally owned and operated by a Public Utilities Commission.
Lake Ontario, 3 miles from city.....

Prechlorination, mixing and settling basins, rapid-sand filtration, post-chlorination, pumped to system; alum, chlorine and, at times, activated carbon added at sump well.

Clear well..... 500
Elevated tank..... 500

1946	
3·07	(Maximum..... 4·08)

Manufacture of automobiles, auto supplies, iron castings, glass products, sheet metal products, aluminium awnings, wooden boxes, hardware, tools, etc.; a tannery.

Consideration being given at time of survey to increasing retention time to overcome seasonal problem of clay and algae in water. Clear well capacity also to be doubled.

OWEN SOUND

1948	1951
....	16,204*
....	....
15,000 (est.)	17,000

Feb. 24, 1948; Mar. 12, 1951.....
Municipally owned and operated by a Public Utilities Commission.
Springs and Sydenham River: the latter supplies the higher area of the town including most of the industries.
Spring water—chlorinated at reservoirs; by gravity to system.
River water—slow sand filtered and chlorinated; by gravity to system.

Two open reservoirs—5,000 total.

1947	1950
Springs..... 1·5	....
River..... 1·3	....
Total..... 2·8	2·25

A tannery, a boat works, a knitting mill, a furniture factory (toys), a cheese factory and railways; manufacture of hardware, tools, propellers, stoves, flooring.

.....

PAISLEY

1951
....(719*)
....
730

Mar. 12, 1951.
Municipally owned and operated.
One deep well.

No treatment; pumped to system.

Standpipe—120.

1950
0·070

A creamery, a basket factory and manufacture of office supplies.

Owing to hardness of well water, consideration was being given to changing source, perhaps to Teeswater River.

PARKHILL

1950	1951
1,000	985*
20	....
1,020	....

Feb. 1950.....
Municipally owned and operated by a Public Utilities Commission.
One deep well.....
No treatment; pumped to system.....

Elevated tank..... 100
Reservoir..... 12

1949
0·066

A creamery, a cold storage plant and two dairies.

Aeration is being considered to remove H_2S from well water.

PARRY SOUND

1951
....(5,065*)
....
4,600

Feb. 26, 1951.....
Municipally owned and operated by a Public Utilities Commission.
Georgian Bay (Lake Huron).....
Chlorination; pumped to system.....

Elevated tank—150.....

1950	
0·5	Maximum..... 0·7
	Minimum..... 0·4

No major industrial user.....

PENETANGUISHENE

1951
....(4,914*)
....
5,000

March 8, 1951.
Municipally owned and operated by a Public Utilities Commission.
One well, 190 feet deep.
No treatment; pumped to system.

Two ground reservoirs—250 each.

1950
0·59

A provincial mental hospital, a shoe factory a stove foundry, a wooden box factory and a beverage plant: shipbuilding and ship repairs.

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

ONTARIO

Municipality	PETERBOROUGH	PETROLIA
Population served:	1948 / 1951	1948 / 1950 / 1951
In municipality	..... / 38,166*	..... / 3,200 / 3,104*
Outside municipality	..... /	..... / 50 / .....
Total	33,000 /	2,700† / 3,250† / .....
Date(s) of survey	Aug. 26, 1948	June 24, 1948
Ownership	Municipally owned and operated by a Public Utilities Commission.	Municipally owned and operated by a Public Utilities Commission.
Source of supply	Otonabee River, 2½ miles above town	Lake Huron, 13 miles distant
Treatment	Mixing and settling basins, rapid sand filtration, chlorination, pumped to system. Alum added at mixing basin.	Mixing basin, settling basins, chlorination, pumped to system. No filtration. Alum added, when necessary, at mixing basin.
Storage capacity (thousand gallons)	Ground reservoir 2,000	Settling basin at plant ..... 1,000 Two standpipes ..... 1,000 total
Consumption (average in m.g.d.)	1947: 3·8 / 1948: 4·5	1947–8: 1·0 / 1950: Public ..... 0·5, Industrial .. 0·4, Total ..... 0·9
Industrial use	Considerable industrial use including manufacture of electrical apparatus and supplies, textiles, jewellery and silverware, leather goods, hardware, tools, agricultural implements, machinery, carpets, miscellaneous paper products, etc. The producer of electrical apparatus is the largest user (1 m. cu. ft. per month). Several of the other large firms (meat packing, stock and poultry feeds) draw water directly from the river for process use.	Oil refining, a creamery, an oil well supply company, a canning factory and manufacture of gaskets. The oil refinery uses 50% of total; the cannery has its own well supply.
Remarks:	.....	† Also supplies Brights Grove (a beach resort) one mile each side of plant.

Municipality	PORT CREDIT	PORT DALHOUSIE
Population served:	1950 / 1951	1948 / 1951
In municipality	2,400† / 3,605*	..... / 2,608*
Outside municipality	..... /	..... / .....
Total	..... /	1,750 / .....
Date(s) of survey	July 7, 1948; March, 1950	1948; data from "Water and Sewage" directory
Ownership	Municipally owned and operated	Municipally owned and operated by a Public Utilities Commission.
Source of supply	Lake Ontario	Treated Welland Canal; purchased from St. Catharines, Ont.
Treatment	In 1948, mixing and settling basins, slow sand filtration, chlorination, pumped to system. In 1950, construction underway of plant to use a vertical flow, clarifier, rapid sand filtration, chlorination and pumping to system.	*See* St. Catharines. Water flows by gravity from St. Catharines to Port Dalhousie.
Storage capacity (thousand gallons)	Underground reservoir ..... 40 Elevated tank 50	None
Consumption (average in m.g.d.)	1947: 0·28 / 1949: 0·30 Total pumpage—0·35	1948: 0·22 (approx.)
Industrial use	The main industries in the area, a plant producing corn starch, glucose, and an oil refinery pump their own process water.	No information on industrial usage; there is a shipbuilding and ship repair industry at Port Dalhousie.
Remarks:	† This system also supplies Lakeview, Cooksville, Clarkson, Stavebank, and a portion of Toronto Township. Main problem in treatment is a red clay turbidity.	.....

* Population in Municipality according to preliminary data, Ninth Census of Canada, 1951.

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

ONTARIO

PICTON

1948	1951
3,600	4,236*
700	.....
4,300	.....

Aug. 11, 1948.....
Municipally owned and operated by a Public Utilities Commission.
Lake Ontario.....
Settling basins, chlorination, pressure filtration (anthrafilt) to system. Alum and in the spring activated carbon added at sump well with aeration to aid mixing.
Open reservoir..... 750

1947
0·65 {Maximum—0·72 Minimum—0·47

Five canneries and C.N.R.; a military camp draws its own water directly from the open reservoir. The C.N.R. use civic water in engine boilers.

.....

POINT EDWARD

1950	1951
.....	1,837*
.....	.....
1,700	.....

July, 1950.....
Municipally owned and operated.....
St. Clair River; purchased from Sarnia, Ont.....
See Sarnia.....
None.....

1949
0·1

Industrial use about 17% of total.
C.N.R., Canada Steamship Lines Ltd. and several small industries.
See also Sarnia.

.....

PORT COLBORNE

1948	1951
7,307	8,182*
3,900†	.....
11,207	.....

July 15, 1948.
Municipally owned and operated.
Welland Canal, at entrance at Lake Erie.
Chlorination, pressure filtration (sand) to system. Alum and chlorine dioxide added at pumps.
None.

1947	1948
1·24	1·5 (Maximum—2·14)

Manufacture of pig iron, cement, flour, boilers, engines, a marine repair plant, C.N.R. and a nickel refinery. The flour mills and refinery pump their own process water.

† In township..... 600
Humberstone..... 3,300
3,900
Consideration being given to construction of a new plant with clarifier and rapid sand filtration.

PORT DOVER

1948	1950	1951	1952
.....	2,250	2,436*	.....
.....	20	.....	.....
2,150†	2,270†	.....	2,589†

July 16, 1948; Jan. 23, 1950; April 22, 1952.....
Municipally owned and operated by a Public Utilities Commission.
Springs, 3 miles away.....
Pumped to collecting well; chlorination; pumped to system.

Reservoir..... 300
Standpipe..... 200
In 1952, capacity increased to total of 1 m.g.

1947	1949
0·35 (est.)	0·33 Max. 1·5 when canning

Canning, two fish processing plants, two knitting mills, a co-operative packing plant, dairies and several smaller industries.
†In summer, tourists increase population to about 5,500.
At time of survey visit (1948) the cannery was drilling for its own well supply.

PORT ELGIN

1951
..... (1,551*)
.....
1,540

Mar. 12, 1951.....
Municipally owned and operated.....
Springs and wells.....
Chlorination of mixed sources in sump well; pumped to system.

Standpipe..... 100

1950
0·247

Main users are C.N.R. and a plant manufacturing brooms, brushes, etc. The latter has its own 50,000 gal. elevated storage tank.
Tourist influx in summer brings consumption up to more than double the winter figure.

PORT HOPE

1948	1951
.....	6,542*
.....	.....
5,100	.....

Feb. 11, 1948.
Municipally owned and operated by a Public Utilities Commission.
Lake Ontario, west of mouth of Ganaraska River. Two wells are also available.
Slow sand filtration, chlorination, pumped to system.

Three clear wells; an elevated tank—285.

1947
0·85 (Maximum 1·0)

A radium refinery; production of iron castings, hardware, tools and cutlery.
Consideration being given in 1948 to replacing slow sand filters with rapid sand filters.

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

ONTARIO

Municipality	PORT McNICOLL	PORT PERRY
Population served:	1951	1950 / 1951 / 1952
In municipality	....(878)*	.... / 1,666* / ....
Outside municipality	....	.... / .... / ....
Total	1,000	1,200 (est.) / .... / 1,750
Date(s) of survey	March 8, 1951	April 5, 1950; April 24, 1952
Ownership	Municipally owned and operated	Municipally owned and operated
Source of supply	Georgian Bay (Lake Huron)	One well, 170 feet deep. Until July, 1949; source was Lake Scugog.
Treatment	Chlorination; pumped to system	No treatment until 1952, then chlorination periodically carried out to disinfect mains; pumped to system.
Storage capacity (thousand gallons)	Standpipe—300	Elevated tank—65
Consumption (average in m.g.d.)	1950: 0·090	1949: 0·060 (maximum 0·144)
Industrial use	No major industrial user. C.P.R., docks, and laundry use lake water through their own systems.	Main users are a knitting mill, a creamery, a poultry farm, a bottling works and a secondary textile plant.
Remarks		The area is a summer resort.

Municipality	PRESCOTT	PRESTON
Population served:	1948 / 1951	1948 / 1951 / 1952
In municipality	.... / 3,476*	.... / 7,608* / ....
Outside municipality	.... /	.... / .... / ....
Total	3,500 /	7,500 / .... / 7,919
Date(s) of survey	Aug. 10, 1948	Aug. 18, 1948; April 22, 1952
Ownership	Municipally owned and operated by a Public Utilities Commission.	Municipally owned and operated by a Public Utilities Commission.
Source of supply	St. Lawrence River, ½ mile upstream from centre of town.	In 1948, two springs and three wells, two of which are said to be same water. The springs supply most of water. In 1952, four additional wells, 3 in service.
Treatment	Chlorination; pumped to system	Springs collected in pipe by gravity, wells pumped to same pipe. Chlorination at reservoirs, pumped to system.
Storage capacity (thousand gallons)	Standpipe—100	Two ground reservoirs.....100 and 200 Standpipe..... 125
Consumption (average in m.g.d.)	1947–1948: 0·5 (100% metered)	1947: 0·575 / 1951: 0·65
Industrial use	Main users are C.P.R., a creamery, the Department of Transport, a manufacturer of sheet metal products (electro-plating), a hosiery manufacturer, and manufacturers of miscellaneous paper products, leather goods and soft drinks. These industries may use from 25,000 to 50,000 g.p.d.	Heavy industrial use by firms manufacturing heating and cooking apparatus, automobile supplies, sheet metal products, machinery, hardware, electrical apparatus, woollen cloth, miscellaneous wood products, boots and shoes, etc.
Remarks		In 1948 only two wells normally used; Bush well (No. 1) being very hard and seldom used.

*Population in Municipality according to preliminary data, Ninth Census of Canada, 1951.

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

ONTARIO

PORT ROWAN	PORTSMOUTH	PORT STANLEY
1951	1951	1948 / 1951
....(793*)	3,393*	.... / 1,482*
....	....	.... / ....
800	....	1,000† / ....
Feb. 1951	1951	Feb. 17, 1948
Municipally owned and operated	Formerly supplied with water by Kingston Waterworks. In late 1951 the municipality was annexed by Kingston, Ont.	Municipally owned and operated.
Lake Erie (Long Point Bay)	Treated Lake Ontario; Kingston, Ont.	Lake Erie.
Mixing and settling basins, sand filtration, chlorination; pumped to system. Alum added at mixing basin.	*See* Kingston	Mixing basin, settling basin, pressure filtration, chlorination; pumped to system. Alum added and, when algae conditions severe, ammonium sulphate at sump well.
Elevated tank—187		Two elevated tanks—66 each
1950		1947
0·02 (approx.)		0·125 (Maximum 0·30)
No major industrial user	*See* Kingston	At time of survey a gas company was constructing a plant which will use 0·2 m.g.d. of civic water.
		Considerable red clay turbidity in water at times.
		† Population increases to 4,000 in summer.

QUEENSTON	RICHMOND HILL		RIDGETOWN	
See Niagara Falls, Ont.	1950	1951	1948	1951
	....	2,137*	....	2,361*
	....	....	....	....
	1,960	....	2,000	....
	March 22, 1950		June 15, 1948.	
	Municipally owned and operated		Municipally owned and operated by a Public Utility Commission.	
Queenston is supplied by Niagara Falls, Ont., and is included in data given on this system.	Two deep wells said to be on same water table. Previously a creek water was used after treatment.		Eight wells, 6 or 7 normally being used.	
	No treatment of well waters; pumped to system.		Aeration at compressed air-lift pumps, aeration at reservoir, chlorination, pumped to system.	
	Clear well..... 40 Old sand filters.... 18 } Equipment of old plant Elevated tank..... 60		Two ground reservoirs..... 50 each; Elevated tank..... 50.	
	1949		1947	
	0·1 { Maximum..... 0·15 Minimum..... 0·060		0·125	
	Three greenhouses and one cannery. Greenhouses used 45% of total in 1948.		A broom and brush manufacturer, a stamping and die-making plant, a canning factory (0·25 m.g.d.). The Pere Marquette Railway has its own well supply.	

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

ONTARIO

Municipality	RIDGEWAY	RIVERSIDE
Population served:	1951	1947 / 1948 / 1951
In municipality	.....	..... / ..... / 9,114*
Outside municipality	.....	..... / ..... / .....
Total	1,200	5,904 / 6,400 / .....
Date(s) of survey	April 23, 1951	1947; 1948; data taken from "Water & Sewage" directory and also supplied by Windsor Public Utilities Commission.
Ownership	Municipally owned and operated	Owned and partly operated by municipality; partly operated by Windsor Public Utilities Commission.
Source of supply	Lake Erie	Treated Detroit River; section west of Little River supplied by Windsor and section east of Little River by Tecumseh, Ont.
Treatment	Proposed chlorination and pumping to system	*See* Windsor, Ont., and Tecumseh, Ont.
Storage capacity (thousand gallons)	Standpipe 200; Elevated tank 250	None
Consumption (average in m.g.d.)	At time of survey—0·060	1947: From Windsor—0·268; 1949: 0·351
Industrial use	No data	No data
Remarks:	Plant still under construction and will not be in full operation till June, 1951.	.....

Municipality	SANDWICH WEST TOWNSHIP	SARNIA
Population served:	1947 / 1951 / Total township, 10,293*	1948 / 1949 / 1951
In municipality	..... /	22,300 / 21,842 / 34,420*
Outside municipality	..... /	6,000† / 6,537† / .....
Total	4,870 / 5,300	28,300 / 28,379 / .....
Date(s) of survey	1947; data from Windsor Public Utilities Commission. 1949; data from "Water & Sewage" directory.	Feb. 20, 1948; 1949
Ownership	Municipally owned and operated	Municipally owned and operated
Source of supply	Treated Detroit River; from Windsor, Ont.	St. Clair River, two miles north of Sarnia
Treatment	*See* Windsor	Long settling basin, chlorination; pumped to system.
Storage capacity (thousand gallons)	None	1948—None; 1949—Elevated tank—500
Consumption (average in m.g.d.)	1947: 0·322; 1949: 0·349	1947: 5·75 (approx.); 1949: 4·91 (Max.—7·3, Min.—3·7)
Industrial use	*See* Windsor	Industrial use about 35% of total. A large synthetic rubber plant, an oil refinery and C.N.R. Use civic water for drinking only. Industries using civic water include manufacturers of auto-supplies, structural steel castings, brass and copper products; shipbuilding and repairs.
Remarks:	.....	† Sarnia Township 1948: 4,500, 1949: 5,000; Point Edward 1948: 1,500, 1949: 1,537; Total 1948: 6,000, 1949: 6,537. A new intake and installation of rapid sand filters under consideration.

* Population in Municipality according to preliminary data, Ninth Census of Canada, 1951.

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

ONTARIO

RODNEY		SANDWICH EAST TOWNSHIP			SANDWICH SOUTH TOWNSHIP		
1948	1951	1947	1951	Total township, 14,886*	1948	1951	Total township, 3,070*
....	881*	.....	.....		.....	.....	
....	....	.....	.....		.....	.....	
750	....	9,950	9,800		2,300	2,300	
June 15, 1948.....		1947 data supplied by Windsor Public Utilities Commission; 1951 data from "Municipal Utilities" directory.			1948; 1951; data from "Water & Sewage" directory.		
Municipally owned and operated by a Public Utilities Commission.		Municipally owned and operated by a Public Utilities Commission.			Municipally owned and operated by a Public Utilities Commission.		
Treated Lake Erie; supplied by West Lorne, Ont.		Treated Detroit River; supplied by Windsor, Tecumseh, and Sandwich West Township.			Treated Detroit River; supplied by Windsor Public Utilities Commission through Sandwich West Township..		
See West Lorne.....		*See* Windsor and Tecumseh, Ont.....			*See* Windsor, Ont.		
Elevated tank..... 180		None.....			None.		
1947		1947	1949		No data; included in Sandwich West.		
0·0225; (Maximum, under contract with West Lorne—0·030)		0·378	0·474				
A factory manufacturing baskets, crates, etc.....		Area is highly industrialized. *See* Tecumseh and Windsor, Ont.			*See* Windsor, Ont.		
.....		.....			.....		

SARNIA TOWNSHIP			SCARBOROUGH TOWNSHIP		SEAFORTH
1948	1949	1951	1949	1951	1951
.....	.....	4,366*	23,642	Total township—	..... (2,061*)
.....	.....	.....	53,765†	55,836*	.....
4,500	5,900	.....	77,407		2,100
.....			Feb. 23, 1949; Mar. 22, 1950.....		Mar. 14, 1951.
.....			Municipally owned and operated by a Public Utilities Commission.		Municipally owned and operated by a Public Utilities Commission.
St. Clair River; supplied by Sarnia, Ont.....			Lake Ontario.....		Four wells, 240, 175, 120 and 210 feet deep. The first three wells are said to be on the same water table and first two supply most of water.
See Sarnia.....			In 1950, mixing and settling basin (Dorr-type), with mechanical flocculation, sedimentation basins, rapid sand filtration, chlorination, pumped to system. Alum and chlorine dioxide added during treatment.		No treatment; pumped to system.
.....			Clear wells, 3,000; 3 elevated tanks 500, 250 and 90.		Ground reservoir..... 140 Standpipe..... 60
See Sarnia.....			1948 1949 Township..... 0·84 0·484 East York..... 1·8 0·707 Total..... 2·64 1·191		1950 0·15
See Sarnia.....			Thirty-one major industries, including manufacture of brick, pressure vessels, electrical fittings, sporting goods, pharmaceuticals, cement products, optical lenses, printing, jewellery, paper containers, chrome furniture, refrigerator fixtures, etc.		Main users are a plant producing boilers, machinery, etc., a shoe factory, production of flax fibre, a creamery, a dairy, a flour mill and an arena.
.....			† East York Township.....		
			A new and larger plant constructed in 1953.		

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

ONTARIO

Municipality	SHELBURNE	SIMCOE	
	1951	1948	1951
Population served:			
In municipality	....(1,182*)	6,700	7,197*
Outside municipality	....	300	....
Total	1,200	7,000	....
Date(s) of survey	Mar. 9, 1951	July 16, 1948	
Ownership	Municipally owned and operated	Municipally owned and operated by a Public Utilities Commission.	
Source of supply	Two wells; it is planned to replace these with one new well.	Two wells, 60 feet deep, and springs. Total capacity, 3·06 m.g.d.	
Treatment	No treatment; pumped to system	Springs naturally filtered to ground reservoir; pumped to system. One well pumped to system: other is treated to remove iron and softened but this water seldom used.	
Storage capacity (thousand gallons)	Elevated tank—198	Elevated tank—130	
Consumption (average in m.g.d.)	1950	1947–1948	
	0·14 (est.)	0·65	Max. when canning—1·059
			Well and springs each supply about 50% of water.
Industrial use	No major industrial user; largest users are a creamery and a dairy.	Canning, manufacture of pickles, of jams, etc., of woollen cloth, hosiery, and knitted goods, of leather gloves and of sheet metal products. No railways use civic water and the woollen mills soften the water for certain uses.	
Remarks	....	....	

Municipality	STAVEBANK	STAYNER
		1951
Population served:		
In municipality	*See* Port Credit, Ont.	....(1,259*)
Outside municipality		....
Total		1,210
Date(s) of survey	1948	Mar. 9, 1951
Ownership	....	Municipally owned and operated
Source of supply	Supplied by Port Credit, Ont.—treated Lake Ontario.	Spring fed creek and one well (180 feet deep); the latter is an auxiliary supply.
Treatment	*See* Port Credit	Creek water, chlorinated and gravity to system. Well water, when used, pumped without treatment to system.
Storage capacity (thousand gallons)	....	Covered reservoir—500
Consumption (average in m.g.d.)	*See* Port Credit	No data; estimated at 0·75 (1950)
Industrial use	*See* Port Credit	A vinegar factory and a creamery
Remarks	....	....

*Population in Municipality according to preliminary data, Ninth Census of Canada, 1951.

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

ONTARIO

SOUTHAMPTON

1951
.... 1,689*
....
1,732†

Mar. 12, 1951.....
Municipally owned and operated by a Public Utilities Commission.
Lake Huron.....

Naturally filtered, chlorinated and pumped to system.

Standpipe 220.....

1950
0·30

Production of veneers and plywood; furniture factories; considerable tourist trade.

† Rises to 3,000 in summer.

SOUTH RIVER

1951
....(913*)
....
1,000

Feb., 1951.....
Municipally owned and operated.....
Springs.....

Chlorination (sodium hypochlorite); pumped to system. At time of survey, system not yet completed.

Standpipe—100.....
0·005, but at time of survey still only a few consumers.

None at time of survey.....

STAMFORD TOWNSHIP

1950	1951
....	.... Total township—17,671*
....	....
12,800 (est.)	13,500

June 2, 1950.
Municipally owned and operated by a Public Utilities Commission.
Partly purchased from Niagara Falls, Ont.—treated Niagara River; partly supplied by two wells (springs).
Well water chlorinated and pumped to system.
See Niagara Falls for treatment of river water.

Standpipe—200.

1949	
River.....	0·984
Wells.....	0·329
	1·223

Considerable industrial use. Twelve major industries use about 35% of total.

ST. CATHARINES

1948	1951
....	37,833*
....	....
34,600	....

July 12, 1948.....
Municipally owned and operated by a Public Utilities Commission.
Lake Erie via Welland Canal. Water taken from canal at Allenburg, flows through Twelve Mile Creek to two large basins or lakes to plant at Decew Falls.
Mixing and settling basins, rapid sand filtration, chlorination, by gravity to system. Alum added at mixing basin.
Clear water reservoir—5,000. Two artificial lakes.

1947
5·5 (Maximum 10·0)

A heavy industrial use of water including manufacture of automobile parts, locks, electrical appliances, hardware, tools, white metal alloys, machinery, castings, textiles (laces, rugs, woollens, artificial silk, hosiery, etc.), soil pipe and fittings, chains, wire screens, wines, farm implements, etc., canning.

.....

ST. CLAIR BEACH

1951
473*
....
....

.....
.....
Treated Detroit River—supplied by Tecumseh, Ont.

See Tecumseh.....

.....

Included in Tecumseh, Ont.....

See Tecumseh.....

.....

STIRLING

1950	1951
....	1,101*
....	....
1,150	....

March 21, 1950.
Municipally owned and operated.

Two wells, one rock, 60 feet deep and one sand point, 18 feet deep.

No treatment; pumped to system.

Standpipe—200.

1950
0·035 to 0·1 (estimated).

A farming centre; a creamery, a cheese factory and a cold storage plant.

.....

71579—8½

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

ONTARIO

Municipality	ST. MARYS	STONEY CREEK
Population served:	1948 / 1951	1950 / 1951
In municipality	..... / 3,988*	1,600 / 1,901*
Outside municipality	..... /	450 / .....
Total	3,820 /	2,050 / .....
Date(s) of survey	July 21, 1948	March 23, 1950
Ownership	Municipally owned and operated by a Public Utilities Commission.	Municipally owned and operated
Source of supply	Five wells, 150 to 160 feet deep. Four wells on same water table are normally used.	Lake Ontario, 1½ miles distant
Treatment	Air-lift pumped to system with chlorination (sodium hypochlorite); at times a portion pumped to secondary storage for fire protection.	Natural filtration, pumped to system
Storage capacity (thousand gallons)	Ground reservoir ..... 130 Elevated tank 85	Tank 250
Consumption (average in m.g.d.)	1947 0·3	1949 0·25 {Maximum—0·6 Minimum—0·175
Industrial use	Manufacturers of washing machines, lawn mowers, fasteners, shirts, dairy products, C.N.R. and a cold storage plant. A cement plant has its own water supply.	A food factory, a winery, a basket factory, a producer of frozen and canned fruits and a dairy.
Remarks:	.....	.....

Municipality	ST. THOMAS	SWANSEA
Population served:	1948 / 1951 / 1952	1949 / 1951
In municipality	19,000 / 17,942* /	..... / 8,020*
Outside municipality	4,000† / ..... /	..... / .....
Total	23,000 / ..... / 23,000†	7,100 / .....
Date(s) of survey	June 15, 1948; May 8, 1952	1949; data from "Water & Sewage" directory
Ownership	Municipally owned and operated by a Public Utilities Commission.	Municipally owned and operated
Source of supply	Kettle Creek. Dammed creek is fed by several springs and pumped wells. Well water pumped —2·3 m.g. in 1948.	Treated Lake Ontario; purchased from Toronto, Ont.
Treatment	Prechlorination, aeration, mixing and settling basins, rapid sand filtration, post-chlorination; pumped to system. Alum and, at times, ammonium sulphate and activated carbon added at mixing basin.	*See* Toronto, Ont.
Storage capacity (thousand gallons)	Clear well ..... 1,000 Dammed creek ..... 300,000 Open reservoir ..... 25,000 Standpipe 500	None
Consumption (average in m.g.d.)	1947 / 1951 1·8 {Maximum—2·5 Minimum—1·4 / 2·56	1949 / 1951 0·399 / 0·4
Industrial use	Chesapeake and Ohio Rialway, C. N. R., a provincial hospital, Wabash Railway. New York Central Railway uses Pinafore Lake as a source of water. Manufacture of boots and shoes, railway rolling stock, sheet metal products, roller bearings, iron and brass goods, auto accessories, vitrified tile, etc.	Several major industries including production of iron and steel products, pottery, tile, stoveware, fire brick and other clay products.
Remarks:	†Includes city suburbs of Lindehurst and Yarmouth Heights and outlying districts. Water is aerated to remove iron; at times high turbidity and algae conditions; $CuSO_4$ added to reservoir to control latter.	

*Population in Municipality according to preliminary data, Ninth Census of Canada, 1951.

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

ONTARIO

STOUFFVILLE

1949	1951	1952
.....	1,685*	.....
.....	.....	.....
1,450	.....	1,858

1949; data from "Water & Sewage" directory. 1952—Questionnaire.

Municipally owned and operated.....

Artesian springs, three miles distant.....

By gravity through filter bed to reservoir, pumped to system. Chlorination begun after 1949.

Two reservoirs—250 and 300.....

1951
No record. Industries used 2·55 a year.....

A machine and tool factory (rubber moulds), a firm supplying goldfish feed and accessories and a manufacturer of ladies' apparel.

.....

STRATFORD

1950	1951
.....	18,741*
.....	.....
18,823	.....

March 30, 1950; March 15, 1951.....

Municipally owned and operated by a Public Utilities Commission.

Six rock wells (350 to 400 feet deep) and the Avon River.

No treatment: pumped to system. Chlorination if necessary. River water is used for certain industrial uses and as an emergency supply.

Reservoir..... 2,000
Standpipe..... 500

1949	1950	
2·25 from wells	River water.....	0·416
	Wells.....	2·348
	Total.....	2·764

In 1950, industrial consumption about 40% of total. Main users are furniture factories, a shoe factory, meat packing, and manufacture of mirrors, soft drinks, harness, rubber products, textiles and knitted goods, brass products, bearings, etc. The C.N.R. and a gas works use river water.

.....

STRATHROY

1948	1951	1952
.....	3,679*	.....
.....	.....	.....
3,229	.....	4,000

July 19, 1948; May 8, 1952.....

Municipally owned and operated by a Public Utilities Commission.

Five deep wells, ½ mile distant.....

No treatment: water from three wells mixed, chlorinated, if necessary, pumped to system.

Well reservoir..... 130
Standpipe..... 160

1947	1951
0·20	0·447

Canning, flour milling, textiles, knitting, seed cleaning, furniture factory, a plant nursery, a creamery and manufacture of woodenware (axe handles, etc.). C.N.R. used 0·082 m.g.d. in 1951; a large textile industry.

.....

TARA

1951
....(480*)
....
450

Mar. 12, 1951.....

Municipally owned and operated.....

One rock well, 350 feet deep.....

No treatment; pumped to system.....

Standpipe..... 117

1950
0·007

No major industrial user.....

.....

TAVISTOCK

1950	1951	1952
.....	1,087*	.....
.....	.....	.....
1,150	.....	1,100

Mar. 30, 1950; June 26, 1952.....

Municipally owned and operated by a Public Utilities Commission.

Two artesian wells or springs, ½ mile distant.....

No treatment; pumped to system from reservoirs.

Open ground reservoirs..... 150 and 75
Standpipe..... 40

1950-51
0·03 to 0·04

Flour mills, hosiery mill, and a wooden box factory. The knitting mill has its own well supply.

.....

TECUMSEH

1948	1951	1952
.....	3,519*	.....
.....	.....	.....
3,050†	.....	4,988†

June 19, 1948; May 8, 1952.

Municipally owned and operated by a Public Utilities Commission.

Detroit River, near source.

Pressure filtration, chlorination, to system. Alum and ammonium sulphate and, at times, activated carbon added to sump well. In 1951, activated silica added with alum with good results when the turbidity is severe in spring.

None.

1947	1951
0·72 (Max.—1·325)	0·64 (Max.—1·6)

Main users are manufacturers of plastic curtains, etc., foodstuffs; canning factories, a seed cleaning plant and other smaller industries. A brewery uses Windsor civic water.

.....

† Included are part of East Sandwich Township, part of Riverside, and St. Clair Beach, which are supplied by Tecumseh Public Utilities Commission.

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

ONTARIO

Municipality	TEESWATER	THORNBURY
	1951	1951
Population served:		
In municipality	....(766*)	....(971*)
Outside municipality	....	....
Total	870	1,000
Date(s) of survey	March 16, 1951	March 10, 1951
Ownership	Municipally owned and operated	Municipally owned and operated
Source of supply	One artesian well	Beaver River
Treatment	No treatment; pumped to system	Pumped, partly by water driven pumps through pressure filters (sand) to system with chlorination (hypochlorite solution). Alum added with chlorine prior to filtration.
Storage capacity (thousand gallons)	None	Elevated tank—55
Consumption (average in m.g.d.)	No record; (capacity is 1·296)	1950 0·11
Industrial use	Main area activity is farming, a creamery and a sawmill.	A vinegar plant, a cold storage plant and canneries.
Remarks	....	....

Municipality	TILLSONBURG		TORONTO†		
	1948	1951	1947	1949	1951
Population served:					
In municipality	....	5,322*	674,300	673,104	670,945*
Outside municipality	....	....	....	161,896	....
Total	5,000	....	....	835,000	....
Date(s) of survey	Aug. 24, 1948		Feb. 27, 1947; June 7, 1950		
Ownership	Municipally owned and operated by a Public Utilities Commission. Fire system operated by municipality.		Municipally owned and operated		
Source of supply	Two gravel wells, 70 feet deep, said to be same water. Fire system uses Lake Erie water.		Lake Ontario off Toronto Island and Victoria Park.		
Treatment	Wells, no treatment; pumped to system. Fire system uses raw Lake Erie water.		Victoria Park plant—mixing and settling basins, rapid sand filtration, chlorination, pumped to system. Alum added at mixing basin when required. At times super chlorination used for taste control with dechlorination with sulphur dioxide. Capacity, 300 m.g.d. Toronto Island plant—similar treatment.		
Storage capacity (thousand gallons)	Elevated tank—288		Two closed reservoirs. 33,000 and 50,000 Elevated tank.... 546		
Consumption (average in m.g.d.)	1947 0·43 (Maximum—0·696)		1949 City only.... 93·33 Total max... 147·36 Total..... 103·8 Total min.... 65·93		
Industrial use	C.P.R. (boilers) tobacco processing, sheet metal products, wooden boxes, hardware, tools, cutlery, heating and cooking apparatus, boots and shoes, milk powder, etc.		A highly industrialized area with diversified industries of all types including paper, packing, soaps, rubber products, heavy machinery, textiles, iron and steel products, etc. Industrial use therefore is very high.		
Remarks	There is some difficulty in obtaining well waters free from H_2S. Many households have their own wells.		....		

† Total metropolitan area of Toronto population—1,108,532 (1951*).

* Population in Municipality according to preliminary data, Ninth Census of Canada, 1951.

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

ONTARIO

THOROLD		THOROLD TOWNSHIP		TILBURY	
1948	1951	1948	1951	1948	1951
....	6,390*	....	....	....	2,682*
....	....	....	.... Total township 6,499*	....	....
6,000	....	1,500	2,000	2,500	....
July 10, 1948		July 14, 1948		June 21, 1948.	
Municipally owned and operated by a Public Utilities Commission.		Municipally owned and operated		Municipally owned and operated by a Public Utilities Commission.	
Welland Canal, one mile distant		Welland Canal		Lake St. Clair, 5 miles distant, near mouth of Thames River.	
Open reservoir and settling basin, then by gravity through pressure filters with chlorination to system. Alum and activated carbon added at open reservoir.		Chlorination, pressure filtration to system. Alum added intermittently.		Prechlorination, mixing and settling in Dorr clarifier, pressure filtration to system. Alum added at clarifier.	
Open reservoir 5,000 Standpipe 100		Well reservoir 40 Elevated tank 50		Elevated tank—250.	
1947		1947		1947	
Domestic 1·75 (1·5 – 2·0) Industrial 7·0 (6·0 – 8·0)		0·18 { Maximum 0·215 Minimum 0·15		0·75	
Total 8·75 (7 – 10)					
Main users are a pulp and paper company, and manufacturers of felt and paper products, abrasives, artificial ice, pulp products and radio supplies. Three large pulp and paper firms and a forging plant draw large amounts of raw water from the canal directly.		Two large paper and fibreboard producers use civic water for drinking purposes only. They draw process water directly from canal. A firm supplying machines, mining equipment etc., draw all water direct from canal.		Two canning factories, grain elevators, New York Central Railway, C.P.R. and a producer of auto bodies and supplies.	
.....		.....		Plant rebuilt in 1948: Capacity about 3 m.g.d.	

TORONTO TOWNSHIP		TRAFALGAR TOWNSHIP		TRENTON	
1951		1951		1948	1951
....		....		10,000	10,048*
....	Total township—28,334*	....	Total township—8,058*	3,000 to 4,000†	....
6,500		2,200		13,000 to 14,000	....
1951		April, 1950		Aug. 11, 1948.	
Municipally owned and operated		Municipally owned and operated		Municipally owned and operated by a Public Utilities Commission.	
Lake Ontario; from Port Credit and New Toronto Ont.		Treated Lake Ontario from Oakville Waterworks plant.		Springs in nearby hills, spring-fed creek and well.	
See Port Credit and New Toronto		*See* Oakville, Ont.		Chlorination, well water pumped to system. Well is continually replenished by pumping spring-fed creek water into gravel pit which naturally filters water into well.	
Proposed elevated tank—100		None		Closed reservoir—650.	
Included in consumption of the supplying municipalities; estimated at about 0·5 in 1950.		Included in data for Oakville		1947 1·6 (2·0 when canning factories operating).	
No data but considerable industrial use		No data. Industrial use growing rapidly		Canning, preserving (jams), textiles (cottons, men's clothing), foodstuffs (doughnuts), electroplating, dyeing, a cold storage plant and airport. One textile mill and a pulp and paper plant pump own process water from Trent River.	
.....		.....		.....	
				†R.C.A.F. airport and station (0·5 m.g.d.).	

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

ONTARIO

Municipality	TWEED		UXBRIDGE	
	1950	1951	1950	1951
In municipality served:				
In municipality	....	1,552*	....	1,775*
Outside municipality	....	....	....	....
Total	1,600	....	1,700	....
Date(s) of survey	April 6, 1950		April 5, 1950	
Ownership	Municipally owned and operated by a Public Utilities Commission.		Municipally owned and operated	
Source of supply	Three rock wells		Three artesian wells near town. Two, 60 feet deep, are normally used.	
Treatment	No treatment; pumped to system		Intermittent chlorination, pumped to system from ground reservoir.	
Storage capacity (thousand gallons)	Elevated tank—160		One ground reservoir	
Consumption (average in m.g.d.)	No data		No record; only two meters which show use of a total of 25,000 to 30,000 g.p.d.	
Industrial use	Plants manufacturing confectionery, veneers, and steel vats and tanks.		A tannery, a producer of special metal trays and a bottling plant.	
Remarks				

Municipality	WATERDOWN		WATERFORD		
	1950	1951	1948	1951	1952
Population served					
In municipality	....	1,344*	....	1,742*	....
Outside municipality	....	....	....	....	....
Total	1,100	....	1,415	....	1,690
Date(s) of survey	March 29, 1950		July 17, 1948; May, 1952		
Ownership	Municipally owned and operated by a Public Utilities Commission.		Municipally owned and operated by a Public Utilities Commission.		
Source of supply	Four wells in and near town. Water supply may be a varying mixture of wells.		Two wells or springs about 15 feet deep, ½ mile distant.		
Treatment	No treatment; pumped to system		Chlorination (sodium hypochlorite); pumped to system from collecting reservoir.		
Storage capacity (thousand gallons)	Ground reservoirs 125 Standpipe 75		Collecting reservoir 165 Elevated tank 75		
Consumption (average in m.g.d.)	1949 0·05 (rising in summer to 0·08 or 0·09)		1947-8 No record; 0·36 (est.)	1951 0·66	
Industrial use	A manufacturer of jams; dairies, and a convent.		A canning and pickling firm (6 m.g./yr.), a manufacturer of textiles (1·3 m.g./yr.), and a firm manufacturing artificial flowers.		
Remarks					

* Population in Municipality according to preliminary data, Ninth Census of Canada, 1951.

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

ONTARIO

VICTORIA HARBOUR	WALKERTON	WALLACEBURG
1951	1951	1948 / 1951
....(933*)	....(3,239*)	.... / 7,674*
....	....	.... / ....
950	3,250	6,000 / ....
Mar. 8, 1951	Mar. 13, 1951	June 22, 1948.
Municipally owned and operated	Municipally owned and operated	Municipally owned and operated by a Public Utilities Commission.
Georgian Bay (Lake Huron)	Wells and springs, 1½ miles distant	St. Clair (Chenal Ecarte) River, just above mouth of Sydenham River.
Chlorination (sodium hypochlorite); pumped to system.	Wells—No treatment; pumped to system. Springs—Emergency supply in a ground reservoir, chlorinated, pumped to system.	A portion chlorinated and pumped direct to one large cannery. Remainder prechlorinated, mixed and settled in basin, rapid sand filtered, post-chlorinated, pumped to system. Alum and chlorine dioxide added.
No information	Ground reservoir..... 200 Elevated tank..... 200	Clear well..... 270 Elevated tank..... 196
No record	1950 0·2	1947 3·8† chlorinated / Industrial use as high as 2·2 m.g.d.
Grain elevators, a dairy, and a canning factory.	Wood products (spools, etc.), a packing plant, a metal stamping and die works, manufacture of furniture, furniture hardware, etc.	Heavy industrial use by plants manufacturing cattle food, glass products, brass and copper products, electroplated products, white metal alloys, and aluminum products; dairies, sugar refinery, etc. The large cannery uses large amounts of only chlorinated water.
.....	.....	High turbidity (3,000 p.p.m.) at times due to Sydenham River in flood entering intakes.
		† Includes water chlorinated only and pumped to cannery.

WATERLOO			WATFORD			WELLAND	
1948	1950	1951	1948	1951	1952	1948	1951
....	....	11,979*	....	1,200*	....	16,000	15,341*
....	....	....	....	....	....	7,600†	10,950†
10,500†	11,300†	....	1,000	....	927	23,600	26,291
Aug. 21, 1948; March 30, 1950			June, 1948; May 8, 1952			July 14, 1948.	
Municipally owned and operated by a Public Utilities Commission.			Municipally owned and operated by a Public Utilities Commission.			Municipally owned and operated by a Public Utilities Commission.	
In 1948, two rock wells, 350 feet deep, and two gravel wells, 40 and 108 feet deep. In 1950 an additional gravel well and one sand point. A 111 foot well at distillery is an emergency supply (5 m.g./mth).			Four deep wells, three in town; normally only two used.			Welland Canal (Lake Erie).	
In 1950, all wells, except sand point and emergency well pumped to ground reservoirs with some aeration and then to system. The sand point and the emergency well are pumped direct to system. Three ground reservoirs..... 250 each Elevated tank..... 250			In 1948, aeration by falling over coke trays, compressed air aeration at reservoir, pumped to system. In September, 1951, a degasifier and chlorination applied to remove residual H_2S. Well reservoir..... 62·5 Elevated tank..... 16			Mixing and settling basins, prechlorination, rapid sand filtration, dechlorination with sulphur dioxide, pumped to system. Alum and lime and in spring, when algae present, ammonia and, at times, activated carbon added. Two elevated tanks.....60 and 90 Clear well..... 1,500	
1947	1949		1947	1951		1947	
1·46	1·157		0·050	0·073		4·6	
Twenty-eight major industrial users including a distillery, a brewery, a furniture factory, and plants manufacturing barrels, kegs, sheet metal products, carriages, machinery and men and women's clothing.			Industrial use in 1947 about 75% of total, in 1951 about 51% of total. A plant producing wire and wire goods and a poultry packing plant.			Main users are a rubber plant, a number of machine shops and plants producing iron and steel products, motors, castings, farm machinery, etc.; manufacture of cotton cloth, cordage, rope, men's clothing, compressed gas and welding equipment; six railways, a steel pipe plant and two producers of ferro-alloys and iron and steel use canal water direct. Some of these plants are in the nearby townships.	
The rock wells supplying a very hard water are only used when necessary. †Also serves hospital in Kitchener.			Aeration to remove H_2S and iron			†Crowland Township, Dane City (Humberstone Township), and part of Thorold Township.	

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

ONTARIO

Municipality	WEST LORNE		WESTMINSTER TOWNSHIP		
	1948	1951	1948	1951	
Population served:					
In Municipality	850	1,031*	1,000	1,240	Total township— 15,076*
Outside municipality	500†	....	....	....	
Total	1,350	....	....	....	
Date(s) of survey	June 15, 1948		1948; 1951; data from "Water & Sewage" and "Municipal Utilities" directories.		
Ownership	Municipally owned and operated		Municipally owned and operated		
Source of supply	Lake Erie		Wells; supplied by Public Utilities Commission, London, Ont.		
Treatment	Mixing and settling basins, rapid sand filtration, chlorination, pumped to system. Alum added at mixing basin.		*See* London, Ont.		
Storage capacity (thousand gallons)	Two elevated tanks..... 65 and 90 In Dutton, standpipe..... 180 In Rodney, standpipe..... 180		None		
Consumption (average in m.g.d.)	1947		1951		
	0·30	When canneries operating up to 0·535, i.e. industrial use about 65 to 70% of total.	0·0265		
Industrial use	Cannery, Michigan Central Railway, two producers of hardwood flooring and a creamery.		No data		
Remarks	† Plant also supplies Rodney, Dutton and Eagle.				

*Population in Municipality according to preliminary data, Ninth Census of Canada, 1951.

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

ONTARIO

WESTON		WHEATLEY		WHITBY		
1950	1951	1948	1951	1948	1950	1951
7,330	8,646*	....	1,017*	....	....	7,230*
5,000††	....	....	....	....	....	....
12,330	....	900†	....	6,530	6,705	....
March 24, 1950		June 16, 1948		July 8, 1948; Feb. 2, 1950.		
Municipally owned and operated by a Public Utilities Commission.		Municipally owned and operated by a Public Utilities Commission.		Municipally owned and operated by a Public Utilities Commission.		
Summerlea well and two Wilson wells.** Water at times purchased from North York and York Townships.		Lake Erie		Lake Ontario, 2 miles distant.		
Summerlea well—partly aerated and filtered to remove iron, partly zeolite-softened, pumped to system with no chlorination.† Wilson wells—Partly pressure-filtered through zeolite.†		Prechlorination, two mixing basins, a clarifier, rapid sand filtration (anthrafilt) pumped to system. Alum added at mixing basins.		Settling basins, slow sand filtration, chlorination, pumped to system.		
Reservoirs 300 and 500 Standpipe 156		Clear wells 70 Elevated tank 36		Clear well 150 Elevated tank 250		
1949		1947–48		1947	1949	
1·0 mainly from Sumlea well.	Industrial use estimated at 50% of total.	0·11 (When cannery operating 2·225)		0·71 { Max... 1·15 Min.....0·514	Domestic.... 0·410 Ind..... 0·274 Total..... 0·684	
An R.C.A.F. depot, and plants manufacturing industrial trailers, porcelain enamel, boots, sporting goods, die castings, electrical stoves and refrigerators, etc.		Fisheries, canneries and greenhouses. The largest fish company may use up to 1·0 m.g.d. but normally 0·015 m.g.d.		A provincial hospital, a tannery, a cannery and college. The first three used in 1947 about 0·325 m.g.d. when all operating. Other users are plants manufacturing hardware, tools, cutlery, lumber and jewel boxes.		
.....		.....		.....		
†† East York and North York Townships. ** Supply is varying mixture of softened and raw water. † During 1949, 19,200 g.p.d. sold to North York Township.		† Includes rural consumers. Plant built in 1946.				

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

ONTARIO

Municipality	WIARTON	WINDSOR
Population served:	1951	1949 / 1950 / 1951
In municipality	....(1,867*)	120,000 / 120,532 / 119,550*
Outside municipality	....	22,500 / 34,468 / ....
Total	1,900	142,500 / 155,000 / ....
Date(s) of survey	March 10, 1951	Feb. 18, and June 21, 1948; July 27, 1950
Ownership	Municipally owned and operated by a Public Utilities Commission.	Municipally owned and operated by a Public Utilities Commission.
Source of supply	Colpoy's Bay (Lake Huron), one mile distant...	Detroit River, above main business section of Detroit and Windsor.
Treatment	Chlorination; pumped to system	In 1950, prechlorination, mixing and settling basins, rapid sand filtration, chlorination, pumped to system. Intermittent alum addition prior to mixing basins.
Storage capacity (thousand gallons)	Open reservoir—278	In 1948; 10,000 total; 1 mg. standpipe under construction.
Consumption (average in m.g.d.)	1950: 0·65	1947 / 1949: Windsor 11·95 / 11·95 Industrial use 25·8%; Total 12·0 / 13·22 of total.
Industrial use	A knitting firm, a furniture plant and a fish hatchery.	A brewery, a distillery, C.N.R. and plants manufacturing acids and chemicals, automobiles and auto parts and supplies, machinery, hardware, tools, wire and wire goods, castings, structural steel, breakfast foods, paints, pharmaceuticals, textiles, scientific equipment, wooden boxes, paper bags, etc. A hsavily industrialized area, primarily an automobile center.
Remarks	....	In 1950, a 5 mg. reservoir under construction.

* Population in municipality according to preliminary data, Ninth Census of Canada, 1951.

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

ONTARIO

WINGHAM	WOODBRIDGE		WOODSTOCK	
1951	1950	1951	1948	1951
....(2,625*)	....	1,685*	13,000	15,486*
....	....	....	3,000	....
2,600	1,400	....	16,000	....
March 14, 1951	March 24, 1950		Aug. 23, 1948.	
Municipally owned and operated by a Public Utilities Commission.	Municipally owned and operated by a Public Utilities Commission.		Municipally owned and operated by a Public Utilities Commission.	
One artesian well which is the main supply and one standby deep well.	Three wells (60 and 70 feet deep), two close together which are normally used.		Three gravel wells, 16 to 24 feet deep and a deep well standby. Civic water is mixture of the shallow wells or springs.	
No treatment; pumped to system	No treatment; pumped to system		Pumped from reservoir to system with chlorination.	
Standpipe—135	Standpipe—160		Two ground reservoirs—2,000.	
1950	1949		1947	
0·30	0·936 (est.)		2·25 Industrial use 20% of total.	
A door factory, a foundry (heating and cooking apparatus), a glove factory, two furniture companies, two creameries, and three dairies.	Industrial use estimated at 77% of total. Cotton mills, a rubber product factory (balloons), and two woodworking plants.		Manufacture of machinery, iron castings, furniture, textiles (cottons, woollens, hosiery), cattle and poultry feed, auto supplies, veneers, paper products, tile, stoves, etc.; dairies.	
.....	.....		The textile plants further treat the water for many process uses.	

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS
ONTARIO

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS
QUEBEC

	YORK TOWNSHIP		VALLEYFIELD
Municipality			
Population served:	1949	1951	1951
In municipality	....	....	22,311*
Outside municipality	....	....	....
		Total township— 100,867*	
Total	90,000	93,250	22,000
Date(s) of survey	1949; 1951; data from "Water & Sewage" and "Municipal Utilities" directories.		June 13, 1951.
Ownership	Municipally owned and operated		Municipally owned and operated.
Source of supply	Treated Lake Ontario; purchased from Toronto, Ont.		St. Lawrence River.
Treatment	*See* Toronto		Chlorination, pumped to system by water turbines and electric pumps.
Storage capacity (thousand gallons)	None		None.
Consumption (average in m.g.d.)	1949		1950–51
	4·8		5·5
Industrial use	No data		Dairies, New York Central Railway and a military camp. Manufacture of textiles, pharmaceuticals, brass and copper products, asbestos goods. One of the larger textile companies and a distillery use the civic water only for drinking purposes.
Remarks			

* Population in municipality according to preliminary data, Ninth Census of Canada, 1951.

TABLE V

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

No.				
	Municipality	Acton		Agincourt
	Source(s)	Springs		Purchased from Scarborough Twp.
		Raw and Finished Water		
No.	Sampling Point	Pump at Spring		
1	Laboratory number	2767	5622	
2	Field number	300	A62	
3	Date of collection	Aug. 18/48	Mar. 13/52	
4	Storage period (days)	183	3	
5	Sampling temperature, °C	9·0	7·8	
6	Test temperature, °C	21·9 (19·2)	21·0	
7	Dissolved oxygen	.....	.....	
8	Carbon dioxide (CO_2)	(20)	.....	
9	pH	8·0 (7·5)	7·5	
10	Colour	0 (0)	5	
11	Turbidity	3	0	
12	Suspended matter, dried at 105°C	.....	.....	
13	Suspended matter, ignited at 550°C	.....	.....	
14	Residue on evaporation, dried at 105°C	478	863	
15	Ignition loss at 550°C	159	78·2	
16	Specific conductance (micromhos at 25°C)	774	1312	
17	Calcium (Ca)	65·8 (103)*	114	*See* Scarborough Twp.
18	Magnesium (Mg)	30·8	32·9	
19	Iron (Fe) Total	.....	.....	
20	Dissolved	0·03	0·01	
21	Alkaiis—as sodium (Na)	.....	.....	
22	sodium (Na)	36·4	116	
23	potassium (K)	1·8	1·2	
24	Carbonate (CO_3)	0	0	
25	Bicarbonate (HCO_3)	171 (303)	418	
26	Sulphate (SO_4)	34·9	48·1	
27	Chloride (Cl)	142	266	
28	Fluoride (F)	0	0·2	
29	Nitrite (NO_2)	.....	.....	
30	Nitrate (NO_3)	3·5	2·4	
31	Silica (SiO_2) Gravimetric	8·8	.....	
32	Colorimetric	7·8	8·3	
33	Carbonate hardness, as $CaCO_3$	140 (248)	343	
34	Non Carbonate hardness, as $CaCO_3$	151 (149)	76·6	
35	Total hardness, as $CaCO_3$	291 (397)*	419	
36	Sum of constituents	407 (504)*	845	
37	Saturation index	+0·4 (+0·4)*	+0·5	
	Remarks:	*Values corrected for loss of $CaCO_3$ on standing using field determined values. Soap consuming power in field 384 p.p.m. as $CaCO_3$.		

TABLE V

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

Ajax		Alexandria			Alliston		
Lake Ontario		Delisle River	Loch Garry		Wells		
Raw Water	Finished Water	Raw and Finished Water	Raw Water		Raw and Finished Water		
		At Pump	From Boat at 4' Depth, 200 yds. out.	From just below Surface, 100 feet out.	Town Tap		No.
	2799	3224	3220	.....	4177	4540	1
	352	382	383A	383B	585	651	2
	Feb. 24/49	June 9/49	June 9/49	June 8/49	Mar. 24/50	Sept. 14/50	3
	6	19	18	0	41	11	4
	2·8	18·0	18·0	.....	9·4	.....	5
	21·6	27·1	26·2	.....	22·0	20·5	6
	.....	.....	(9·3)	.....	.....	.....	7
	.....	(4·0)	(2·0)	.....	.....	.....	8
	8·1	8·1 (8·3)	8·3 (7·2)	.....	8·2	7·7	9
	10	110 (110)	35 (15)	.....	0	7	10
	3	2	algae	(10)	2	3	11
	.....	.....	.....	(algae)	.....	.....	12
	.....	.....	.....		.....	.....	13
	173	258	.....		253	265	14
	35·0	120	.....		33·0	43·4	15
	298	380	234		446	432	16
See Lake Ontario at Port Credit, New Toronto, etc.	40	67·6	38·0		34·2	32·1	17
	8·9	8·1	3·3		20·0	20·5	18
	.....	.....	.....		.....	.....	19
	0·21	0·1	.....		0·17	0·22	20
	.....	.....	.....		.....	.....	21
	8·7	3·0	1·1		36·0	33·0	22
	1·3	0·6	0·8		2·3	2·1	23
	0	0	0		0	0	24
	125	220	120		242	248	25
	29·6	19·6	11·5		9·4	1·8	26
	17·8	0	1·7		27·0	26·8	27
	0·05	.....	.....		0·20	0	28
	.....	.....	.....		.....	.....	29
	1·8	3·9	.....		1·1	2·2	30
	1·2	3·4	.....		18	.....	31
	1·2	2·1	2·2		19	16	32
	102	181 (164)	98·4 (90)		168	165	33
	34·4	21·4	10·1		0	0	34
	136	202	109		168	165	35
	171	214	118		269	255	36
	+0·3	+0·8	+0·5		+0·6	+0·01	37

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TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

No.						
	Municipality	Amherstburg				
	Source(s)	Detroit River				
		Raw Water				Finished Water
	Sampling Point	Pump at Plant				Plant Tap
1	Laboratory number	2380	2293	2428	2717	3775
2	Field number	588A	590A	689A	754A	528
3	Date of collection	May 15/48	July 15/48	Oct. 15/48	Jan. 13/49	Dec. 20/49
4	Storage period (days)	153	67	44	21	35
5	Sampling temperature, °C.	12·8	22·2	10·0	0	3·0
6	Test temperature, °C.	22·3	21·2	22·7	21·0	18·5
7	Dissolved oxygen					
8	Carbon dioxide (CO_2)					
9	pH	8·2	7·8	8·0	8·1	7·6
10	Colour	10	23	0	9	2
11	Turbidity	35	30	9	15	0·3
12	Suspended matter, dried at 105°C.		59	18	8·6	
13	Suspended matter, ignited at 550°C.		46	16	4·8	
14	Residue on evaporation, dried at 105°C.		181	135	170	185
15	Ignition loss at 550°C.		25·5	17·2	22·6	34·4
16	Specific conductance (micromhos at 25°C)	278	306	235	297	294
17	Calcium (Ca)	31·2	29·0	27·6	30·2	34·0
18	Magnesium (Mg)	8·8	8·7	8·7	8·3	7·3
19	Iron (Fe) Total		2·4	0·7	1·1	
20	Dissolved		0·05	0·02	0·20	0·04
21	Alkalis—as sodium (Na)					
22	sodium (Na)	12·0	18·3	9·3	16·2	13·5
23	potassium (K)	1·5	1·9	1·1	1·5	1·2
24	Carbonate (CO_3)	0	0	0	0	0
25	Bicarbonate (HCO_3)	100·0	110	103	106	106
26	Sulphate (SO_4)		16·5	12·7	21·2	29·5
27	Chloride (Cl)	17·2	31·5	14·2	28·7	22·9
28	Fluoride (F)		·15	0·05	0·04	0·05
29	Nitrite (NO_2)					
30	Nitrate (NO_3)		0·4	0·4	1·8	0·9
31	Silica (SiO_2) Gravimetric			2·8	2·6	5·4
32	Colorimetric	14·2	4·8	2·2	1·8	3·4
33	Carbonate hardness, as $CaCO_3$	82·0	90·0	84·0	87·0	87·0
34	Non-carbonate hardness, as $CaCO_3$	32·3	18·2	20·6	22·6	27·8
35	Total hardness, as $CaCO_3$	114	109	105	110	115
36	Sum of constituents		166	127	162	165
37	Saturation index	+0·14	−0·3	−0·08	+0·03	−0·5
	Remarks:	*See* also Station No. 30, Table VI, Part I.				

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

Ancaster Township	Arthur	Aurora	Aylmer				
Deep Wells	Deep Wells	Artesian Wells	Deep Wells				
Raw and Finished Water	Raw and Finished Water	Raw and Finished Water	Raw and Finished Water				
At Pump	At Pump	Mixed Supply, Town Tap	Well No. 1	Well No. 2	Well No. 3	Well No. 4	No.
4217	5087	4144	3059	2571	3060	2766	1
600	864	578	319	320	321	322	2
Mar. 28/50	Mar. 16/51	Mar. 22/50	Aug. 24/48	Aug. 24/48	Aug. 24/48	Aug. 24/48	3
48	74	33	208	107	208	177	4
9·4	5·0	6·0	13·0	12·5	13·0	13·5	5
23·0	21·3	20·0	23·2	23·9	24·0	21·9	6
.....	.....	.....	.....	.....	.....	.....	7
.....	.....	.....	(1·8)	(4·4)	(4·0)	(1·8)	8
8·2	7·7	7·8	8·4 (8·1)	7·2 (8·1)	8·3 (8·0)	8·1 (8·1)	9
0	2	0	(30)	20 (40)	(20)	5 (15)	10
3	5	1	very slight	algae	very slight	2	11
.....	3·5	.....	.....	.....	.....	.....	12
.....	1·4	.....	.....	.....	.....	.....	13
248	210	243	295	268	320	199	14
34·6	62·6	23·6	.....	16·4	.....	40·6	15
387	366	413	398	454	491	324	16
44·4	33·5	56·4	17·0	14·4	30·0	16·8	17
17·4	16·9	19·8	12·4	12·3	24·2	10·3	18
.....	0·37	.....	.....	.....	.....	.....	19
0·09	0·05	0	1·7	0·15	0·29	0·37	20
.....	.....	.....	.....	.....	.....	.....	21
7·7	22·0	9·4	58·0	69·0	40·0	41·2	22
1·4	0·7	1·3	1·6	1·4	1·7	1·6	23
2·4	0	0	0 (0)	0 (0)	0 (0)	0 (0)	24
151	228	270	239 (244)	256 (256)	234 (237)	212 (212)	25
60·0	8·8	16·8	8·2	0·8	63·4	7·6	26
7·0	5·0	0·9	0·7	22·5	0·4	1·8	27
0·10	0·70	0·10	.....	1·0	.....	1·3	28
.....	.....	.....	.....	.....	.....	.....	29
4·4	1·3	1·3	4·4	0	2·7	0·8	30
12	.....	21	.....	11	.....	14	31
14	11	18	14	12	16	9·0	32
128	153	221·5	93·3	86·5	174	84·3	33
54·4	0	0·5	0	0	0	0	34
182	153	222	93·3 (92·0)	86·5 (88·0)	174	84·3 (82·0)	35
233	201	260	232	260	294	195	36
+0·5	0	+0·4	+0·5	−0·7	+0·6	+0·1	37
			some H_2S	some H_2S	some H_2S	no H_2S	

71579—9½

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

No.	Municipality	Barrie		Barton Township	Beamsville	
	Source(s)	Artesian and Gravel Wall Wells		Purchased from Hamilton, Ont.	Wells and Springs	
		Raw and finished water			Raw and finished water	
	Sampling Point	Artesian Well; from Reservoir Tap*	Gravel Well; from Overflow Pipe		Town Tap (mixture of wells)	From Reservoir
1	Laboratory number	4176	4175		2621	5723
2	Field number	584	583		244	A68
3	Date of collection	Mar. 23/50	Mar. 23/50		July 9/48	June 9/52
4	Storage period (days)	42	42		180	9
5	Sampling temperature, °C.	8·0	9·0		19·0	.....
6	Test temperature, °C.	22·0	22·0		22·7 (21·1)	23·5
7	Dissolved oxygen	.....	.....		.....	.....
8	Carbon dioxide (CO_2)	.....	.....		.....	.....
9	pH	8·3	8·0		7·8 (7·5)	7·2
10	Colour	5	0		5 (6·5)	7
11	Turbidity	3	0·3		0·2 (clear)	6
12	Suspended matter, dried at 105°C.	.....	.....		.....	2·0
13	Suspended matter, ignited at 550°C.	.....	.....		.....	0
14	Residue on evaporation, dried at 105°C.	223	240		1412	1842
15	Ignition loss at 550°C.	34·2	34·8		160	184
16	Specific conductance (micromhos at 25°C.)	375	380		1644	2109
17	Calcium (Ca)	53·6	55·4		232 (255)*	364
18	Magnesium (Mg)	13·5	17·6	*See* Hamilton, Ont.	58·1	68·9
19	Iron (Fe) Total	.....	.....		.....	0·8
20	Dissolved	0·16	0·03		0·05	0·10
21	Alkalis—as sodium (Na)	.....	.....		.....	.....
22	sodium (Na)	6·0	7·3		70·4	75·0
23	potassium (K)	1·6	1·9		7·5	7·7
24	Carbonate (CO_3)	3·6	0		0 (0)	0
25	Bicarbonate (HCO_3)	234	232		83·0 (268)	297
26	Sulphate (SO_4)	13·5	23·2		788	982
27	Chloride (Cl)	0	13·5		49·0	56·2
28	Fluoride (F)	0	0		0·45	0·40
29	Nitrite (NO_2)	.....	.....		.....	.....
30	Nitrate (NO_3)	0	3·5		1·3	.....
31	Silica (SiO_2) Gravimetric	18	18		9·6	.....
32	Colorimetric	20	17		12	13·8
33	Carbonate hardness, as $CaCO_3$	189	190		68·0 (220)	243
34	Non-carbonate hardness, as $CaCO_3$	0	20·6		736 (650)	948
35	Total hardness, as $CaCO_3$	189	211		804 (876)*	1191
36	Sum of constituents	226	254		1260	1714
37	Saturation index	+0·8	+0·6		+0·4 (+1·0)	+0·55
	Remarks:	*Sampled after aeration at reservoir.			Earthy-taste. *Long storage may have permitted loss of calcium, but soap-consuming power, 876 p.p.m. as $CaCO_3$, checks reasonably well with determined hardness.	

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

Beaverton		Belle River		Belleville					Bertie Township	No.
Lake Simcoe		Lake St. Clair		Bay of Quinte (Lake Ontario)					Purchased partly from Crystal Beach and partly from Fort Erie, Ont.	
Raw Water	Finished Water	Raw Water	Finished Water	Raw Water			Finished Water			
At Sump Well	At Main Pump	At Plant Intake Pump	Plant Tap	—	Bay at Deseronto	—	Plant Tap		—	
4990	4974	3011	2771	.....	2477	.....	1379	4127		1
818	819	219	220	.....	237	.....	162	565		2
Mar. 8/51	Mar. 8/51	June 8/48	June 18/48	Sept. 20/45	July 7/48	May 26/44	Feb. 22/47	Mar. 21/50		3
33	27	295	249	.....	132	.....	13	29		4
2·2	3·3	.....	21·0	.....	.....	.....	.....	3·0		5
room	22·1	21·6	21·9 (21·0)	.....	21·3	.....	room	24·0		6
.....	.....	.....	.....	.....	(9·2)	.....	.....	.....		7
.....	.....	(1·5)	(1·5)	5·3	(7·9)	7·5	.....	.....		8
7·8	7·8	8·3 (8·3)	8·2 (7·7)	7·6	8·1 (8·3)	7·3	7·4	7·5		9
15	10	5 (25)	5 (10)	slight	15 (35)	slight	15	10		10
4	0·9	12·5	0·2 (clear)	.....	9 (7)	.....	2	5		11
.....	.....	15·0	.....	some	.....	trace	.....	.....		12
.....	.....	12·4	.....	.....	.....	trace	.....	.....		13
.....	175	143	141	149	.....	145	159	.....		14
.....	23·6	38·4	28·4	.....	.....	.....	.....	.....		15
298	297	248	245	.....	227	.....	.....	219		16
48·6	47·4	32·3	32·0	38·3	38·6	37·6	40·7	39·3		17
6·3	6·5	8·6	9·1	2·5	5·2	1·7	2·6	3·8		18
.....	.....	0·50	.....	.....	.....	.....	.....	.....	*See* Crystal Beach.	19
.....	0·05	0·07	0·03	.....	.....	.....	0·005	.....		20
.....	.....	.....	.....	.....	.....	.....	8·1	.....	*See* Fort Erie.	21
3·3	2·8	5·8	4·3	.....	3·0	.....	.....	2·0		22
1·6	1·2	1·2	1·1	.....	1·7	.....	.....	1·2		23
0	0	2·9 (0)	2·9 (0)	0	0	0	0	0		24
156	152	114 (115)	108 (105)	131	120	106	120	102		25
23·1	25·7	15·8	27·8	10·4	.....	16·2	22·2	41·4		26
4·5	5·3	6·4	7·5	0·5	1·0	4·2	2·3	1·0		27
.....	0·05	0·03	0·10	.....	.....	.....	.....	.....		28
.....	.....	.....	.....	.....	.....	.....	0	.....		29
1·3	0	1·3	0·5	.....	.....	.....	6·2	.....		30
.....	.....	4·8	1·2	3·4	.....	2·4	5·0	.....		31
2·9	5·2	6·0	1·6	.....	3·8	.....	.....	4·8		32
19·1	124	98·4	93·6	106	98·2 (102)	87·2	98·2	83·4		33
128	20·8	17·6	23·6	0	19·6	13·7	14·0	30·9		34
147	145	116	117	106	118	101	112	114		35
169	169	137	140	.....	.....	.....	141	144		36
+0·2	+0·1	+0·3	+0·2	−0·2	+0·2	−0·5	−0·4	−0·4		37
				Analysis supplied by city of Belleville.		Analysis supplied by city of Belleville. Aluminium =0·4 p.p.m.	Phosphate 0·02 p.p.m.			

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

No.	Municipality	Blenheim		Bobcaygeon
	Source(s)	Three Deep Wells		Spring
		Raw and Finished Water		Raw and Finished Water
	Sampling point	At Reservoir	At Reservoir	Town Tap
1	Laboratory number	2131	5755	4541
2	Field number	209	A119	652
3	Date of collection	June 16/48	July 4/52	Sept. 14/50
4	Storage period (days)	30	13	11
5	Sampling temperature, °C.	11·5	10·0	.....
6	Test temperature, °C.	room	30·8	20·0
7	Dissolved oxygen	.....	.....	.....
8	Carbon dioxide (CO_2)	(1·5)	.....	.....
9	pH	7·8 (7·9)	7·7	7·5
10	Colour	6 (7)	0	7
11	Turbidity	(clear)	5	0·4
12	Suspended matter, dried at 105°C.	.....	.....	.....
13	Suspended matter, ignited at 550°C.	.....	.....	.....
14	Residue on evaporation, dried at 105°C.	442	422	308
15	Ignition loss at 550°C.	19·4	25·4	31·8
16	Specific conductance (micromhos at 25°C)	765	735	484
17	Calcium (Ca)	17·0	16·3	94·6
18	Magnesium (Mg)	4·6	4·4	5·5
19	Iron (Fe)	.....	.....	.....
20	Dissolved	0·05	0·11	0·04
21	Alkalis—as sodium (Na)	.....	.....	.....
22	sodium (Na)	110	136	3·7
23	potassium (K)	3·5	3·2	1·5
24	Carbonate (CO_3)	0 (0)	0	0
25	Bicarbonate (HCO_3)	268 (283)	273	283
26	Sulphate (SO_4)	1·5	2·5	20·6
27	Chloride (Cl)	103	102	4·5
28	Fluoride (F)	2·3	2·0	0
29	Nitrite (NO_2)	0	.....	.....
30	Nitrate (NO_3)	0	0·1	24·8
31	Silica (SiO_2) Gravimetric	10	.....	.....
32	Colorimetric	11	14	8·6
33	Carbonate hardness, as $CaCO_3$	61·4	58·7	232
34	Non-carbonate hardness, as $CaCO_3$	0	0	26·6
35	Total hardness, as $CaCO_3$	61·4	58·7	259
36	Sum of constituents	385	450	303
37	Saturation index	−0·1	−0·1	+0·3
	Remarks:	Note high fluoride.		Note high nitrate.

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

Bowmanville		Bracebridge	Bradford			Brampton		No.
Springs and Wells (mixture)		Springs and Wells	Wells			Wells		
Raw and Finished Water		Raw and Finished Water	Raw and Finished Water			Raw and Finished Water		
Town Tap	Town Tap	Town Tap (mixed supply)	Pump at Well No.1	Pump at Well No. 2		Town Tap		
1854	4141	2368	4315	4130	4316	2849	5599	1
179	572	139	627	582	628	325	897	2
Mar. 2/48	Mar. 21/50	Sept. 22/47	May 15/50	May 23/50	May 15/50	Aug. 25/48	Feb. 29/52	3
8	34	387	40	27	40	206	5	4
15·0	17·2	13·7	.....	6·0	0	17·5	4·4	5
room	20·5	21·1	26·0	24·0	26·0	23·0 (33·0)	22·9	6
.....	.....	.....	.....	.....	.....	.....	.....	7
.....	.....	(5·0)	.....	.....	.....	(29·0)	.....	8
8·0	8·0	8·1 (6·7)	8·3	8·1	8·6	8·1 (7·3)	7·8	9
15	5	0 (5)	3	5	5	0 (<5)	2	10
2	0·4	7	7	3	0·9	slight algae	4	11
.....	.....	6·8	.....	.....	.....	.....	3·8	12
.....	.....	1·6	.....	.....	.....	.....	2·7	13
228	225	87·0	279	.....	240	303	393	14
89·5	13·2	26·5	42·4	.....	41·8	43·0	36·6	15
373	368	97·0	454	386	381	439	625	16
57·3	57·4	10·3	26·4	37·3	32·4	45·6 (114)*	103·5	17
15·5	12·3	2·6	15·8	12·5	12·3	26·2	20·0	18
.....	.....	0·10	.....	.....	0·61	.....	0·26	19
0·02	0·08	0·02	0·12	.....	0·09	0·01	0·03	20
.....	.....	.....	.....	.....	.....	.....	.....	21
2·5	3·7	4·8	26·0	39·0	37·5	4·8	3·5	22
1·0	1·0	1·6	1·1	1·1	1·2	1·9	1·3	23
0	2·9	0 (0)	6·0	2·4	16·8	0 (0)	0	24
229	205	34·6 (31·7)	229	242	207	116 (332)	328	25
18·1	30·0	8·4	9·1	.....	5·3	123	75·3	26
1·7	1·5	1·7	31·5	5·5	7·5	3·6	5·0	27
.....	0	0	0·10	.....	0·30	0	0	28
.....	.....	.....	.....	.....	.....	.....	.....	29
1·8	7·1	5·3	0·9	.....	1·3	0	1·6	30
12	12	18	18	.....	23	12	.....	31
8·4	11	22	17	19	21	14	10·5	32
188	172	28·4 (26·0)	131	144	131	95 (272)	269	33
18·8	21·4	8·0	0	0	0	127 (120)	71·5	34
207	194	36·4	131	144	131	222 (302)*	341	35
253 incl. zinc	228	73·7	322	.....	240	276 (451)*	382	36
+0·6	+0·5	−0·9 (−2·3)	+0·6	+0·6	+1·0	+0·3 (+0·5)	+0·75	37
High zinc (30 p.p.m.) in water from pipes. Water probably not run long enough from tap before sampling.		Note that long storage has had little apparent effect on this soft water except to increase the pH, thus decreasing the corrosiveness.	Some precipitation occurred on storage but analyses corrected for same. Residue on Evaporation and specific conductance as reported are low.	Some H_2S.	Some calcium may have precipitated owing to storage. Note high pH when tested.	*Values obtained from field results by correction for loss of $CaCO_3$ on storage.		

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

No.							
	Municipality	Brantford					Brantford Township
	Source(s)	Grand River					Purchased from City of Brantford, Ont.
		Raw Water			Finished Water		
	Sampling Point	Plant Intake			Plant Tap		—
1	Laboratory number	2281*	2294	2532	1382	1848	
2	Field number	573A	578A	706A	105	176	
3	Date of collection	Mar. 20/48	Aug. 12/48	Nov. 12/48	Mar. 4/47	Mar. 1/48	
4	Storage period (days)	174	39	12	9	4	
5	Sampling temperature, °C.	2·2	21·7	7·8	.....	.....	
6	Test temperature, °C.	23·5	21·1	21·5	room	room	
7	Dissolved oxygen	.....	.....	.....	.....	.....	
8	Carbon dioxide (CO_2)	.....	.....	.....	.....	.....	
9	pH	8·1	7·6	8·1	7·7	7·2	
10	Colour	25	30	13	10	20	
11	Turbidity	.....	15	3·0	0·8	4	
12	Suspended matter, dried at 105°C.	.....	14	.....	.....	.....	
13	Suspended matter, ignited at 550°C.	.....	.....	.....	.....	.....	
14	Residue on evaporation, dried at 105°C.	166	359	447	433	350	
15	Ignition loss at 550°C.	71·1	69·5	91·0	.....	104	
16	Specific conductance (micromhos at 25°C.)	266	531	654	.....	537	
17	Calcium (Ca)	41·6	70·0	96·8	98·6	76·3	*See* Brantford.
18	Magnesium (Mg)	6·6	23·0	25·8	24·5	19·3	
19	Iron (Fe) Total	.....	1·56	.....	.....	.....	
20	Dissolved	0·08	0·12	0·06	0·03	0·03	
21	Alkalis—as sodium (Na)	.....	.....	.....	15·2	.....	
22	sodium (Na)	3·0	11·3	11·3	.....	9·0	
23	potassium (K)	2·9	2·9	2·6	.....	2·0	
24	Carbonate (CO_3)	3·6	0	0	0	0	
25	Bicarbonate (HCO_3)	123	206	249	266	219	
26	Sulphate (SO_4)	16·4	88·1	134	112	26·5	
27	Chloride (Cl)	3·5	12·5	13·5	14·8	18·6	
28	Fluoride (F)	0·20	.....	0·20	.....	.....	
29	Nitrite (NO_2)	.....	.....	.....	0·02	.....	
30	Nitrate (NO_3)	9·8	1·6	2·7	8·8	1·3	
31	Silica (SiO_2) Gravimetric	4·6	.....	4·4	6·0	9·6	
32	Colorimetric	4·4	3·0	6·0	.....	3·4	
33	Carbonate hardness, as $CaCO_3$	107	169	204	218	180	
34	Non-carbonate hardness, as $CaCO_3$	24·0	101	144	129	90·1	
35	Total hardness, as $CaCO_3$	131	269	348	347	270	
36	Sum of constituents	153	314	415	412	270	
37	Saturation index	+0·3	+0·1	+0·9	+0·6	−0·1	
	Remarks:	*Flood sample; see also Station No. 68, Table IV, Part. I.					

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

Brighton	Brockville			Brussels	Burks Falls	Burlington		Burlington, Beach	
Springs	St. Lawrence River			Artesian Well	Deep Well	Lake Ontario		Purchased from Hamilton, and Burlington, Ont.	
Raw and Finished Water	Raw and Finished Water			Raw and Finished Water	Raw and Finished Water	Raw Water	Finished Water	——	
Town Tap	——	Town Tap	Plant Tap	Town Tap	Town Tap	——	Plant Tap	——	No.
2762	.....	1374	2467	5067	2335		3008		1
286	.....	157	200	852	135		324		2
Aug. 12/48	.....	Feb. 21/47	June 10/48	Mar. 14/51	Sept. 19/47		Aug. 25/48		3
189	.....	4	151	62	382		227		4
19·0	.....	.....	13·0	5·6	12·8		17·8		5
21·9 (21·0)	.....	room	19·0	20·0	21·9		21·9 (24·8)		6
.....	.....	.....	.....	.....	.....		.....		7
(8·8)	0	1·5	(1·5)	.....	(34·0)		(0)		8
8·4 (7·7)	.....	8·1	8·4 (7·8)	8·5	8·2 (6·5)		8·5 (8·1)		9
0 (<5)	5	0	3 (5)	2	10 (5)		3 (3)		10
0·9 (clear)	2	1	algae	2	clear		0·7 (rel. clear)		11
.....	.....	.....	.....	.....	.....		.....		12
.....	.....	.....	.....	.....	.....		.....		13
223	.....	181	.....	468	203		175		14
27·6	.....	.....	.....	88·8	64·0	*See* Lake Ontario	57·8	*See* Hamilton.	15
373	.....	.....	278	740	289	at Grimsby and	202	*See* Burlington.	16
60·8	.....	30·3	37·0	113	22·7	Hamilton.	39·2		17
11·0	.....	8·7	6·6	30·5	10·1		8·3		18
.....	.....	0·07	.....	.....	.....		.....		19
0·02	0·15	.....	.....	0·05	0·07		0·03		20
.....	.....	10·3	.....	.....	.....		.....		21
2·3	.....	.....	8·3	11·5	13·3		8·3		22
1·0	.....	.....	1·9	13·0	4·0		1·3		23
7·2 (0)	.....	0	6·2 (0)	7·7	0 (0)		4·8 (2·4)		24
215 (227)	.....	116	102 (112)	270	65·8 (62·2)		110 (105)		25
14·8	12·0	23·5	.....	205	21·4		21·1		26
1·0	13·0	18·0	18·1	3·6	16·5		19·2		27
0	.....	.....	.....	1·0	0·29		0·05		28
.....	.....	0	.....	.....	.....		.....		29
5·3	.....	0·8	.....	0·4	35·4		0·09		30
10	.....	0·5	.....	.....	20		4·2		31
8·8 (9·0)	.....	.....	8·3	7·9	18 (16)		2·0		32
188 (186)	91·0	94·8	94·0	234	54·0 (51·0)		98·4 (90·0)		33
9·1	3·0	39·1	15·6	173	44·1		33·6		34
197	94·0	134	110	407	98·1		132		35
218	.....	158	.....	527	174		160		36
+0·9	.....	+0·3	+0·4	+1·4	−0·2		+0·6		37
	Analysis by Permutit Co.			Note relatively high fluoride.	Note high nitrate.				

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

No.						
	Municipality	Cannington	Caledonia		Campbellford	
	Source(s)	Well	Wells		Trent River	
		Raw and Finished Water	Raw Water	Finished Water	Raw and Finished Water	
	Sampling Point	Town Tap	At Pump	Direct from Softener	Trent River above Trenton	Town Tap
1	Laboratory number	4973	4285	4297	3020	2770
2	Field number	317	617	616	233	287
3	Date of collection	Mar. 7/51	Mar. 31/50	Mar. 31/50	July 7/48	Aug. 12/48
4	Storage period (days)	28	73	73	278	194
5	Sampling temperature, °C	6·7	9·5	9·5	23·5	22·8
6	Test temperature, °C	22·3	25·0	24·8	20·4	21·9 (25·2)
7	Dissolved oxygen				(9·7)	
8	Carbon dioxide (CO_2)				(2·2)	(2·6)
9	pH	7·9	7·8	8·4	8·2 (8·4)	8·0 (8·0)
10	Colour	0	0	4	15 (45)	10 (40)
11	Turbidity	0·4	0·3	0·3	15 (10)	4 (<7)
12	Suspended matter, dried at 105°C					6·8
13	Suspended matter, ignited at 550°C					2·0
14	Residue on evaporation, dried at 105°C	210		1858		122
15	Ignition loss at 550°C	26·6		34·4		24·6
16	Specific conductance (micromhos at 25°C.)	400		2696	184	190
17	Calcium (Ca)	67·6	496*	21·2	30·0	30·8
18	Magnesium (Mg)	6·9	41·3	3·2	3·7	4·2
19	Iron (Fe) Total					0·25
20	Dissolved	0·02		0·09		0·03
21	Alkalis—as sodium (Na)					
22	sodium (Na)	1·5	20·2	610	2·8	1·8
23	potassium (K)	0·2	5·0	3·6	1·4	1·0
24	Carbonate (CO_3)	0	1·2	20·4	2·4 (0)	0 (0)
25	Bicarbonate (HCO_3)	225	373	295	96·4 (113·5)	97·6 (97·6)
26	Sulphate (SO_4)	18·1	1077	951	13·8	16·0
27	Chloride (Cl)	4·5	52·0	47·1	0	3·2
28	Fluoride (F)	0·05		0·60		0·30
29	Nitrite (NO_2)					
30	Nitrate (NO_3)	8·9	5·3	4·4		0·7
31	Silica (SiO_2) Gravimetric			14		4·0
32	Colorimetric	10·3	8·2	8·0	3·8	5·2
33	Carbonate hardness, as $CaCO_3$	184	308	66·1	83·0	80·0
34	Non-carbonate hardness, as $CaCO_3$	13·0	1100	0	7·2	14·1
35	Total hardness, as $CaCO_3$	197	1408*	66·1	90·2	94·1
36	Sum of constituents	229	1890	1815	105	111
37	Saturation index	+0·5	+1·5	+0·6	+0·1	0
	Remarks:		*Corrected for calcium lost as $CaCO_3$ on storage.			

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

CARDINAL			CAYUGA			CHATHAM			CHATHAM TOWNSHIP	
St. Lawrence River			Rock Well			Thames River			Purchased from Chatham, Ont.	
Raw Water		Finished Water	Raw Water	Finished Water		Raw Water		Finished Water		
From River at Gananoque	From River at Cornwall	Town Tap	At Pump	Town Tap	Town Tap	River at Plant Intake		Plant Tap		No.
2322	2409	2772	4317	4271	4288	2414	2440	2253		1
502A	510A	282	629	618	630	602A	605A	225		2
Aug. 3/48	Aug. 4/48	Aug. 10/48	April 19/50	Mar. 31/50	April 19/50	Mar. 15/48	June 15/48	June 22/48		3
59	79	196	66	62	54	224	135	70		4
.....	20·0	22·0	10·0	.....	8·9	0	21·1	.....		5
24·3	20·0	21·9 (24·0)	26·0	23·0	25·0	20·1	22·6	23·2		6
.....	.....	.....	.....	.....	.....	.....	.....	.....		7
.....	.....	(2·6)	.....	.....	.....	.....	.....	(35·2)		8
8·2	8·0	8·0 (8·2)	7·6	8·3	7·8	8·5	8·3	7·6 (7·2)		9
5	10	0 (<5)	2	5	15	15	10	15 (10)		10
2	2	2 (clear)	0·5	35	20	9·0	algae	(clear)		11
.....	.....	.....	.....	.....	.....	30·0	.....	.....		12
.....	.....	.....	.....	.....	.....	20·8	.....	.....		13
.....	.....	179	3109	.....	.....	314	.....	354		14
.....	.....	34·2	417	.....	.....	51·0	.....	40·8	*See* Chatham.	15
291	312	295	2974	3810	3902	450	547	508		16
38·5	38·6	37·2	299	541	508	74·4	71·0	73·6		17
9·1	8·0	8·2	150	119	145	15·1	20·3	19·7		18
.....	.....	.....	0·68	.....	18·5	0·64	.....	.....		19
.....	.....	0·05	0·09	.....	.....	0·03	.....	0·02		20
.....	.....	.....	.....	.....	.....	.....	.....	.....		21
8·5	8·3	8·5	66·0	133	140	8·8	16·5	15·9		22
1·5	1·5	1·3	4·0	4·2	4·3	2·7	2·9	2·7		23
0	0	0 (0)	0	49·2	0	5·0	10·6	0 (0)		24
112	120	117 (115)	393	381	425	223	225	220 (220)		25
18·5	20·6	28·0	1126	1662	1717	48·1	.....	82·0		26
.....	.....	20·0	44·5	43·5	91·0	10·8	27·2	25·0 (22·0)		27
.....	.....	0·10	2·0	.....	.....	0·20	.....	.....		28
.....	.....	.....	.....	.....	.....	.....	.....	.....		29
.....	.....	1·3	0	0	0	11·5	.....	13·2		30
.....	.....	1·4	.....	.....	.....	7·2	.....	.....		31
1·8	2·1	1·8	12	12	6·6	5·6	5·8	3·2		32
92·0	98·0	95·8	322	394	348	191	201	180 (180)		33
41·6	31·3	30·7	1042	1446	1516	46·7	59·7	84·7		34
134	129	126·5	1364	1840	1864	238	261	265		35
.....	.....	164	1897	2752	2840	292	.....	343		36
+0·3	+0·1	+0·1	+1·1	+2·1	+1·6	+1·1	+1·0	+0·2		37
See also Station No. 4. Table IV, Part I.			Note high fluoride.			*See* also Station No. 80. Table IV, Part I.				

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

No.	Municipality	Chesley			Chippawa		Clarkson	Clifford	Clinton
	Source(s)	Wells			Niagara River: purchased from Niagara Falls, Ont.		Supplied by Port Credit, Ont.	Wells	Wells
		Raw and Finished Water			Raw Water	Finished Water	—	Raw and finished water	Raw and finished water
	Sampling Point	Rock Well No. 1	Gravel Well No. 2 (At Pumps)	Gravel Well No. 3	—	Town Tap	—	At Pump	At Pump
1	Laboratory number	5049	5047	5048		2575		5236	5068
2	Field number	843	841	842		256		885	853
3	Date of collection	Mar. 13/51	Mar. 13/51	Mar. 13/51		July 14/48		Aug. 21/51	Mar. 14/50
4	Storage period (days)	53	53	53		148		20	62
5	Sampling temperature, °C	7·8	8·3	8·9		22·0		.....	7·2
6	Test temperature, °C	22·8	23·0	22·8		22·8 (23·3)		25·2	20·1
7	Dissolved oxygen	.....	.....	.....		.....		.....	.....
8	Carbon dioxide (CO_2)	.....	.....	.....		(4·0)		.....	.....
9	pH	7·8	7·8	7·8		8·2(7·9)		7·5	7·9
10	Colour	0	5	0		4 (5)		1	2
11	Turbidity	15	6	0·5		0·6(clear)		15	0·5
12	Suspended matter, dried at 105°C	.....	0·0	.....		.....		.....	.....
13	Suspended matter, ignited at 550°C	.....	2·3	.....		.....		.....	.....
14	Residue on evaporation, dried at 105°C	1390	248	256		170		390	316
15	Ignition loss at 550°C	180	76·2	55·2		39·2		69·0	95·4
16	Specific conductance (micromhos at 25°C)	1603	456	478		286		587	492
17	Calcium (Ca)	265	61·8	67·6	*See* Station No.	34·4	*See* Port Credit.	92·5	72·0
18	Magnesium (Mg)	80·0	23·5	24·0	22, Table IV,	8·3		22·5	20·5
19	Iron (Fe) Total	1·35	1·19	.....	Part I.	.....		1·3	.....
20	Dissolved	0·04	0·03	0·03		0·03		0·05	0·06
21	Alkalis—as sodium (Na)	.....	.....	.....		.....		.....	.....
22	sodium (Na)	21·4	5·2	3·3		8·0		6·0	5·3
23	potassium (K)	4·0	0·9	1·2		1·6		0·6	2·0
24	Carbonate (CO_3)	0	0	0		0 (0)		0	0
25	Bicarbonate (HCO_3)	184	274	307		115 (112)		309	301
26	Sulphate (SO_4)	805	29·6	19·8		25·6		61·2	32·0
27	Chloride (Cl)	33·7	2·0	3·5		18·2		5·9	5·7
28	Fluoride (F)	3·0	1·0	0·05		0·01		1·7	0·80
29	Nitrite (NO_2)	.....	.....	.....		.....		.....	.....
30	Nitrate (NO_3)	0·9	0·9	9·7		0·8		3·4	2·7
31	Silica (SiO_2) Gravimetric	.....	.....	.....		.....		.....	.....
32	Colorimetric	9·6	9·6	11		1·6		28	7·2
33	Carbonate hardness, as $CaCO_3$	151	225	251		94·0(92·0)		253	247
34	Non-carbonate hardness, as $CaCO_3$	838	26·0	16·2		26·1		69·7	17·1
35	Total hardness, as $CaCO_3$	989	251	267		120 (124)		323	264
36	Sum of constituents	1313	270	291		155		374	297
37	Saturation index	+0·8	+0·5	+0·6		+0·3		+0·4	+0·7
	Remarks:	Note high fluoride.				See also Niagara Falls, Ont.			

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

Cobourg				Colborne	Collingwood	Cooksville	Cornwall				Cornwall Township		No.
Lake Ontario				Springs	Georgian Bay (Lake Huron)	Purchased from Port Credit, Ont.	St. Lawrence River				Purchased from Cornwall, Ont.		
Raw Water		Finished Water		Raw and Finished Water	Raw and Finished Water	—	Raw and Finished Water				—		
At Pump		Plant Tap		Town Tap	Plant Tap		Direct from Intake			Town Tap	—		
4128	5709	4168	5710	4140	4992		2465	2137	2497	1375			1
569	A112	570	A113	568	825		498A	501A	668A	158			2
Mar. 21/50	May 29/52	Mar. 21/50	May 29/52	Mar. 21/50	Mar. 9/51		April 3/48	July 5/48	Oct. 1/48	Feb. 21/47			3
29	8	42	8	34	32		219	11	48	4			4
1·5	8·3	2·0	8·3	5·8	0·6		.....	.....	.....	.....			5
24·0	23·3	22·0	23·3	20·5	25·0		21·0	22·0	19·9	room			6
.....	.....	.....	.....	.....	.....		.....	.....	.....	.....			7
.....	.....	.....	.....	.....	.....		.....	.....	.....	3·0			8
8·3	8·1	8·0	8·0	8·1	7·7		8·6	8·1	8·1	8·0			9
0	3	0	3	0	5		3	8	0	0			10
5	2	0·7	0·6	0·2	5		0·3	0	2	2			11
.....	.....	.....	.....	.....	.....		.....	.....	.....	.....			12
.....	.....	.....	.....	.....	.....		.....	.....	.....	.....			13
.....	189	177	187	206	.....		163	182	179	168			14
.....	38·6	19·8	31·2	13·8	.....		36·6	24·4	.....	.....			15
296	299	302	303	351	187		247	297	289	.....			16
42·3	38·6	39·7	38·1	51·6	22·8		28·8	38·8	37·6	40·0			17
8·3	7·9	8·3	8·1	14·3	6·8	*See* Port Credit	7·9	7·7	7·9	8·7	*See* Cornwall.		18
.....	.....	.....	.....	.....	.....		.....	.....	.....	0·06			19
.....	0·1	0·03	0·03	0	.....		0·5	0·05	0·07	.....			20
.....	.....	.....	.....	.....	.....		.....	.....	.....	9·6			21
8·7	9·0	8·9	9·0	3·3	1·8		7·6	10·0	8·0	.....			22
1·3	1·6	1·2	0·8	1·0	0·9		1·5	1·5	1·3	.....			23
3·6	0·7	2·4	0	6·0	0		3·6	0	0	0			24
111	116	112	113	202	93·7		78·1	97·0	115	115			25
40·0	25·0	24·9	26·2	22·2	9·5		22·2	22·8	22·2	23·1			26
19·5	21·2	20·6	20·8	1·5	4·0		18·8	19·3	19·6	17·9			27
.....	0·2	0·10	0·1	0·05	.....		0·12	0·30	0·10	.....			28
.....	.....	.....	.....	.....	.....		.....	.....	.....	0			29
.....	0·6	0·8	0·8	7·1	0·9		0	0·5	0·6	3·1			30
.....	.....	2·8	.....	13	2·8		1·0	3·6	1·6	1·0			31
1·6	1·6	2·0	1·4	12	.....		3·6	1·2	0·2	.....			32
97·0	96·2	96·0	92·6	176	76·8		96·0	94·0	94·0	94·4			33
43·0	32·2	37·3	35·8	11·9	8·0		8·3	34·6	32·3	41·2			34
140	128	133	128	188	84·8		104	129	126	136			35
180	164	165	161	219	95·7		133	152	154	159			36
+0·5	+0·2	+0·1	+0·1	+0·5	−0·5		+0·5	+0·2	+0·1	+0·2			37
					For additional analyses see Station No. 38, Table IV, Part I.		For additional analysis of Cornwall water *see* Station No. 4, Table IV, Part I.						

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

No.	Municipality	Courtright	Crowland Township	Crystal Beach		Delhi	Deseronto		
	Source(s)	Wells	Purchased from Welland, Ont.	Lake Erie		Springs	Lake Ontario		
		Raw and Finished Water		Raw Water*	Finished Water	Raw and Finished Water	Raw and Finished Water		
	Sampling Point	Town Tap		From Lake at Fort Erie, Ont.	Plant Tap	Town Tap	At Intake	At Intake	At Distribution Pump
1	Laboratory number	2824		2578	2574	4284	2477	5730	5731
2	Field number	231		253	257	613	237	A114	A115
3	Date of collection	June 23/48		July 13/48	July 15/48	Mar. 31/50	July 7/48	June 17/52	June 17/52
4	Storage period (days)	259		149	147	73	132	8	8
5	Sampling temperature, °C	.....		22·0	22·0	7·7	24·8	20·0	20·0
6	Test temperature, °C	19·1 (27·2)		22·7	22·8 (24·5)	25·0	21·3 (26·2)	25·2	25·4
7	Dissolved oxygen	.....		.....	.....	.....	(9·2)	.....	.....
8	Carbon dioxide (CO_2)	(11·4)		(26·4)	(1·8)	.....	(8·0)	.....	.....
9	pH	8·3 (8·0)		7·6 (8·4)	7·9 (8·3)	8·0	8·1 (8·3)	7·8	7·7
10	Colour	5 (15)		2 (7)	0 (7)	0	15 (35)*	25	20
11	Turbidity	0·5 (clear)		2 (7)	2 (slight)	1	9 (<7)*	1	1
12	Suspended matter, dried at 105°C	.....		.....	.....	.....	.....	.....	.....
13	Suspended matter, ignited at 550°C	.....		.....	.....	.....	.....	.....	.....
14	Residue on evaporation, dried at 105°C	985		168	172	.....	.....	162	155
15	Ignition loss at 550°C	51·6	*See* Welland.	27·4	39·4	.....	.....	24·8	28·6
16	Specific conductance (micromhos at 25°C)	1829		292	287	400	227	230	229
17	Calcium (Ca)	27·0		35·6	34·4	60·0	38·6	39·2	39·4
18	Magnesium (Mg)	9·7		8·2	8·7	12·3	5·2	4·1	3·9
19	Iron (Fe) Total	.....		.....	.....	.....	.....	.....	.....
20	Dissolved	0·17		0·02	0·08	.....	.....	0·17	0·07
21	Alkalis—as sodium (Na)	.....		.....	.....	.....	.....	.....	.....
22	sodium (Na)	330		9·3	8·0	4·0	3·0	2·5	2·7
23	potassium (K)	3·7		1·6	1·5	0·8	1·7	1·2	1·1
24	Carbonate (CO_3)	7·2 (0)		0	0 (0)	1·2	0 (0)	0	0
25	Bicarbonate (HCO_3)	207 (217)		120	115 (112)	173	120 (124)	126	124
26	Sulphate (SO_4)	3·6		23·7	24·4	44·5	.....	10·5	11·0
27	Chloride (Cl)	473		18·5	20·0 (19·5)	14·0	1·0	3·4	4·8
28	Fluoride (F)	2·0		0·11	0·01	.....	.....	0·20	0·20
29	Nitrite (NO_2)	.....		.....	.....	.....	.....	.....	.....
30	Nitrate (NO_3)	0·6		0·4	0·3	21·3	.....	0·1	0·3
31	Silica (SiO_2) Gravimetric	9·8		1·6	1·4	.....	.....	.....	.....
32	Colorimetric	13		3·4	2·0 (2·0)	10	3·8	1·4	1·8
33	Carbonate hardness, as $CaCO_3$	107		98·0 (92·0)	94·0 (92·0)	144	98·2 (102)	103	101
34	Non-carbonate hardness, as $CaCO_3$	0		24·5	27·7	56·6	19·6	11·6	12·9
35	Total hardness, as $CaCO_3$	107		122·5	122	200	118	115	114
36	Sum of constituents	972		160	156	253	.....	125	126
37	Saturation index	+0·4		−0·3	−0·05	+0·5	+0·2	0	−0·1
	Remarks:	Note relatively high fluoride content.		*Note water taken from lake below Crystal Beach. For further analyses of Lake Erie *see* Table IV, Part I.			* Algae in water.		

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

Dresden	Dundas				Dunnville				Durham	Dutton	East York Township	No.
Deep Well	Spencer Creek				Grand River				Well	Lake Erie	Lake Ontario, treated	
Raw and Finished Water	Raw Water		Finished Water		Raw Water*		Finished Water		Raw and Finished Water	Water from same Plant as West Lorne, Ont.	Purchased from Scarborough Twp., Ont.	
Town Tap	Intake Well	Intake Well	Plant Tap	Plant Tap	Direct from Intake		Plant Tap		Town Tap			
2666	4240	5732	4241	5733	2459	2659	1857	2821	5050			1
229	598	A116	599	A117	542A	537A	182	261	844			2
June 23/48	Mar. 28/50	June 16/52	Mar. 28/50	June 16/52	July 8/48	Jan. 7/49	Feb. 16/48	July 16/48	Mar. 13/51			3
206	56	9	56	9	123	197	30	236	53			4
.....	.....	.....	.....	.....	.....	.....	.....	25·0	6·1			5
21·7 (24·5)	25·0	24·6	25·0	24·6	21·1	22·5	room	19·0 (24·8)	22·7			6
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....			7
(9·7)	.....	.....	.....	.....	.....	.....	.....	(19·4)	.....			8
7·5 (8·2)	7·6	8·0	7·1	7·3	8·0	7·7	7·8	8·5 (7·3)	7·8			9
5 (<10)	10	30	2	5	15	20	25	10 (30)	0			10
2	15	7	0·5	0·5	8	3	6	0·5 (8)	0·5			11
.....	.....	4·3	.....	.....	14·4	.....	.....	.....	.....			12
.....	.....	5·4	.....	.....	13·8	.....	.....	.....	.....			13
483	144	304	152	329	332	501	530	359	309			14
32·8	15·0	60·6	15·4	53·8	75·4	72·6	141	78·8	57·4			15
840	221	483	230	507	479	731	785	521	508			16
10·4	31·8	70·8	31·2	68·1	62·0	104	112	72·6	64·1			17
5·9	7·0	23·4	7·5	24·6	20·0	25·2	27·8	21·3	30·0			18
.....	1·75	0·78	.....	.....	0·15	.....	.....	.....	.....	*See* West Lorne.	*See* Scarborough	19
0·13	0·04	0·07	0·03	0·07	0·04	0·08	0·06	0·05	0·03		Township.	20
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....			21
173	0·8	3·0	1·6	3·6	8·5	15·3	16·0	8·5	2·1			22
2·1	1·1	1·1	1·2	1·1	2·2	3·3	2·5	2·0	0·8			23
0 (0)	0	1·2	0	0	0	0	0	6·0 (0)	0			24
320 (320)	100	290	53·7	237	180	237	281	165 (176)	288			25
0·7	24·1	23·6	58·2	70·2	85·9	160	163	118	53·1			26
113	0	2·8	4·0	6·3	10·5	20·7	23·6	10·8 (10·1)	2·7			27
2·0	0·20	0·60	0	0·20	0·25	0·22	.....	0·20	0·35			28
.....	.....	.....	.....	.....	.....	.....	0	.....	.....			29
0	4·4	0·1	2·2	0·1	0·9	4·4	0·6	0·9	5·3			30
12	4·2	.....	2·6	.....	2·6	2·0	8·0	2·0	.....			31
9·3	3·8	5·0	2·8	2·4	1·4	2·0	5·6	2·8	8·0			32
50·2	82·0	240	44·0	194	147	194	230	145 (144)	228			33
0	26·1	32·8	64·7	87·1	89·9	170	163	124	54·9			34
50·2	108	273	109	271	237	364	394	269	283			35
476	123	275	135	293	280	.....	492	324	308			36
−0·6	−0·4	+0·8	−1·1	0	+0·4	.....	+0·8	+1·0	+0·5			37

Some H_2S; slight odour.

*For additional analyses of raw water at Dunnville, *see* station No. 65, Table IV, Part I.

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

No.	Municipality	Elmira								
	Source(s)	Wells and Spring								
		Raw and Finished Water								
	Sampling Point	Spring		Well No. 2 Pump		Well Reservoir (Wells No. 3 and No. 4)			Artesian Well No. 5	
1	Laboratory number	2708	5639	2704	3777	2705	3690	4492	.....	5638
2	Field number	309	A70	311	536	195	537	659	.....	A69
3	Date of collection	Aug. 19/48	Mar. 21/52	Aug. 20/48	Dec. 15/49	Jan. 19/49	Dec. 15/49	Aug. 9/50	May 15/48	Mar. 21/52
4	Storage period (days)	160	6	160	19	8	19	28	.....	6
5	Sampling temperature, °C.	11·0	7·8	11·5	.....	8·9	.....	7·2	.....	10·0
6	Test temperature, °C.	22·0 (22·0)	21·2	21·8 (23·0)	18·6	21·8	15	25·5	.....	21·2
7	Dissolved oxygen	.....	.....	.....	.....	.....	.....	.....	.....	.....
8	Carbon dioxide (CO_2)	17·6	.....	(18·5)	.....	.....	.....	.....	.....	.....
9	pH	8·2 (7·4)	7·9	7·8 (7·4)	7·7	7·9	7·9	7·4	7·3	7·7
10	Colour	5 (<5)	5	20 (90)	0	5	5	8	.....	5
11	Turbidity	0·2 (clear)	2	5	0·5	7	5	5	.....	3·4
12	Suspended matter, dried at 105°C.	.....	.....	5·8	.....	3·0	1·6	.....	.....	1·9
13	Suspended matter, ignited at 550°C.	.....	.....	5·0	.....	1·6	0·6	.....	.....	1·2
14	Residue on evaporation, dried at 105°C.	324	352	714	748	605	598	626	646	619
15	Ignition loss at 550°C.	64·4	75·0	135	50·5	80·8	42·8	.....	108	55·8
16	Specific conductance (micromhos at 25°C)	543	587	961	1019	851	.....	794	.....	870
17	Calcium (Ca)	77·6	80·4	136 (150)*	158	126	122	123	121	126
18	Magnesium (Mg)	23·2	22·4	46·3	37·5	35·9	30·5	34·7	40·5	35·6
19	Iron (Fe) Total	.....	.....	0·61	.....	0·54	0·69	.....	.....	0·41
20	Dissolved	0·04	0·02	0·06	0·05	0·02	0·05	.....	0·34	0·05
21	Alkalis—as sodium (Na)	.....	.....	.....	.....	.....	.....	.....	37	.....
22	sodium (Na)	4·7	3·8	14·5	15·6	8·3	8·7	9·0	.....	8·8
23	potassium (K)	2·2	1·0	2·3	1·4	1·6	1·0	1·1	.....	1·2
24	Carbonate (CO_3)	12·0 (0)	0	0 (0)	0	5·8	0	0	0	0
25	Bicarbonate (HCO_3)	246 (264)	264	250 (293)	293	249	261	260	265	268
26	Sulphate (SO_4)	48·4	72·0	319	327	263	228	218	324	258
27	Chloride (Cl)	7·2	8·5	19·2	16·1	4·9	4·0	4·8	6	4·3
28	Fluoride (F)	0	0	0·60	0·60	0·50	0·45	.....	.....	0·70
29	Nitrite (NO_2)	.....	.....	.....	.....	.....	.....	.....	.....	.....
30	Nitrate (NO_3)	26·6	1·0	0·6	0·4	0	0·4	0	.....	0·1
31	Silica (SiO_2) Gravimetric	8·2	.....	15	12	13	16	.....	.....	.....
32	Colorimetric	6·6	8·2	11	15	10	15·8	13	5·8	13·4
33	Carbonate hardness, as $CaCO_3$	222	216	205 (240)*	240	214	213	213	218	220
34	Non-carbonate hardness, as $CaCO_3$	67·1	76·7	325 (325)	308	249	217	236	250	241
35	Total hardness, as $CaCO_3$	289	293	530 (565)*	548	463	430	449	468 (493)*	461
36	Sum of Constituents	331	327	673 (708)*	717	578	541	543	665	577
37	Saturation index	+1·2	+0·6	+0·7 (+0·4)	+0·7	+0·8	+0·6	+0·4	+0·3	+0·6
	Remarks:			Clear but develops cloudiness (perhaps iron) in storage. *Corrected for loss of calcium on storage.					Analysis by Ont. Dept. of Health. *Soap hardness.	

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

Elmvale	Elora	Essex								
Wells	Well	Deep Wells								
Raw and Finished Water	Raw and Finished Water	Raw and Finished Water								
Town Tap	Town Tap	Garrow Well		Broome Well		Howe Well		Final Reservoir Water		No.
4977	4936	3063	5640	3062	5641	3061	5642	2668	5643	1
823	790	216	A71	215	A72	217	A73	218	A74	2
Mar. 9/51	Feb. 26/51	June 18/48	Apr. 5/52	June 18/48	Apr. 5/52	June 18/48	Apr. 5/52	June 18/48	Apr. 5/52	3
26	17	306	10	306	10	306	10	211	10	4
3·9	.....	13·8	.....	12·0	.....	12·8	.....	.....	.....	5
20·3	22·5	22·3	22·0	22·3	24·5	22·3 (18·5)	22·0	21·7	22·0	6
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	7
.....	.....	(6·0)	.....	(7·0)	.....	(5·0)	.....	(5·0)	.....	8
7·6	7·2	8·3 (7·3)	7·6	8·0 (7·4)	7·5	8·1 (7·2)	7·4	8·1 (7·2)	7·9	9
0	5	(100)*	5	(60)*	5	(50)*	5	5 (25)	5	10
0·6	2	some*	3	clear, then cloudy*	3·7	rel. clear, then cloudy*	3	4	15	11
.....	.....	.....	2·1	.....	3·9	.....	.....	5·6	1·9	12
.....	.....	.....	0·8	.....	0·5	.....	.....	4·0	0·5	13
247	284	730	1297	1445	1332	825	981	1108	1136	14
37·4	51·0	.....	162	.....	231	.....	110	142	118	15
403	492	.....	1686	.....	2231	.....	1341	1487	1485	16
51·0	58·5	87·0	162	182 (194)*	237	95·0 (115)*	112	140 (142)*	138	17
15·5	27·0	43·1	77·5	92·3	103	52·4	56·5	63·5	65·0	18
.....	.....	0·75	0·54	1·7	0·31	0·76	.....	0·35	0·48	19
0·02	0·06	.....	0·04	.....	0·03	.....	0·09	0·04	0·04	20
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	21
11·8	5·9	80·0	107	100	134	82·0	102	103	102	22
1·9	0·8	1·4	3·4	3·8	5·2	7·8	3·2	2·4	2·8	23
0	0	10·8 (0)	0	0 (0)	0	4·3 (0)	0	0 (0)	0	24
234	300	137 (166)	145	132 (168)	127	162 (232)	178	144 (151)	172	25
16·6	21·9	340	616	773	928	355	410	523	499	26
5·3	3·2	69·0	129	121	190	95·0	104	117	121	27
0	0·10	.....	3·0	.....	2·5	.....	2·5	2·1	3·0	28
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	29
5·4	2·7	2·7	0	0	0	0	0	0	0	30
.....	12·8	.....	14·0	.....	12·0	.....	16·8	12	14·6	31
17	13·5	15	11·9	13	11·8	22	12·6	10	12·7	32
191	246	130 (136)	119	108 (138)	104	140 (190)	146	118 (124)	141	33
0	11·0	265	604	730 (730)	909	313 (313)	365	492 (492)	470	34
191	257	395	723	838 (868)*	1013	453 (503)*	511	610 (616)*	611	35
240	282	717	1183	1351	1674	793	891	1032	1028	36
+0·1	−0·1	+0·9	+0·3	+0·7	+0·4	+0·7	+0·1	+0·7	+0·6	37
		*Strong H_2S, colloidal sulphur.		* Strong H_2S, colloidal sulphur.		* Strong H_2S, colloidal sulphur.		Only slight odor after aeration. Note fluoride content.		

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TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

No.	Municipality	Etobicoke Township		Exeter			
	Source(s)	Deep Wells		Deep Wells and Springs			
		Raw Water	Finished Water (partially softened)	Raw and Finished Water			
	Sampling Point	Plant Taps		Abbott Well	Kestle Well	Moodie Well	Springs
1	Laboratory number	3687	3686	3909	3908	3907	3910
2	Field number	532	531	552	551	550	553
3	Date of collection	Dec. 19/49	Dec. 19/49	Feb. 16/50	Feb. 16/50	Feb. 16/50	Feb. 16/50
4	Storage period (days)	15	15	5	5	5	5
5	Sampling temperature, °C	.....	.....	.....	.....	.....	.....
6	Test temperature, °C	15·0	15·0	22·0	22·0	22·0	22·0
7	Dissolved oxygen	.....	.....	.....	.....	.....	.....
8	Carbon dioxide (CO_2)	.....	.....	.....	.....	.....	.....
9	pH	7·6	7·6	7·5	7·4	7·5	7·6
10	Colour	5	5	0	2	2	0
11	Turbidity	10	0·9	8	10	25	0·4
12	Suspended matter, dried at 105°C	1·2	.....	17	42	43	.....
13	Suspended matter, ignited at 550°C	0·4	.....	12	29	39	.....
14	Residue on evaporation, dried at 105°C	501	534	618	387	322	303
15	Ignition loss at 550°C	37·4	14·4	102	63·0	76·5	57·5
16	Specific conductance (micromhos at 25°C)	714	802	913	647	541	516
17	Calcium (Ca)	109	36·4	116	97·6	81·2	79·5
18	Magnesium (Mg)	28·0	9·0	41·3	20·6	22·0	17·8
19	Iron (Fe) Total	2·8	.....	5·5	4·7	2·2	.....
20	Dissolved	0·07	0·21	0·01	0·03	0·03	0·03
21	Alkalis—as sodium (Na)	.....	.....	.....	.....	.....	.....
22	sodium (Na)	16·3	156	22·5	10·8	3·7	3·9
23	potassium (K)	2·9	41·7	6·2	3·7	1·4	1·1
24	Carbonate (CO_3)	0	0	0	0	0	0
25	Bicarbonate (HCO_3)	328	332	355	324	297	276
26	Sulphate (SO_4)	118	119	182	46·1	51·0	22·2
27	Chloride (Cl)	23·5	55·5	22·0	23·9	3·7	6·1
28	Fluoride (F)	0·05	0·05	1·2	0·35	0·50	0·20
29	Nitrite (NO_2)	.....	.....	.....	.....	.....	.....
30	Nitrate (NO_3)	0·4	0	1·8	4·9	Trace	24·8
31	Silica (SiO_2) Gravimetric	15	16	6·0	10	8·5	8·5
32	Colorimetric	19	17	8·0	6·5	6·7	7·3
33	Carbonate hardness, as $CaCO_3$	269	128	291	265	243	226
34	Non-carbonate hardness, as $CaCO_3$	116	0	169	63·1	49·9	45·4
35	Total hardness, as $CaCO_3$	385	128	460	328	293	272
36	Sum of constituents	479	599	576	374	316	299
37	Saturation index	+0·4	−0·1	+0·5	+0·3	+0·3	+0·3
	Remarks:		Phosphate = 0·2 p.p.m. owing to polyphosphates added.				Note high nitrate.

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

Fenelon Falls	Fergus		Fonthill	Forest	Forest Hill	Fort Erie		No.
Springs	Deep Wells		Springs	Deep Wells	Lake Ontario, treated	Lake Erie and Niagara River		
Raw and Finished Water	Raw and Finished Water		Raw and Finished Water	Raw and Finished Water	Purchased from Toronto, Ont.	Raw and Finished Water		
Town Tap	Town Tap (No. 1 Well)		Town Tap	At Pump	—	Pump at South Station (Lake Erie)	Pump at North Station (Niagara River)	
2752	2707	5645	2579	3904		2578	2478	1
291	312	A79	259	547		253	252	2
Aug. 13/48	Aug. 20/48	Apr. 2/52	July 15/48	Feb. 8/50		July 13/48	July 13/48	3
181	160	13	137	13		149	126	4
15·0	15·5	.....	18·5	.....		22·0	25·8	5
21·3 (18·5)	21·9 (20·0)	24·0	22·7 (19·5)	22·4		22·7 (26·0)	21·5 (26·0)	6
.....	.....	.....	.....	.....		.....	.....	7
(29·0)	(12·3)	.....	(6·2)	.....		(2·6)	1·8	8
7·9 (7·2)	7·7 (7·4)	7·8	8·3 (8·2)	8·1		7·6 (8·4)	8·1 (8·4)	9
0 (<5)	0 (5)	5	0 (5)	0		2 (7)	5 (8)	10
0·3 (clear)	0·3 (clear)	0	2	0·5		2 (<7)	4 (<7)	11
.....	.....	.....	.....	.....		.....	.....	12
.....	.....	.....	.....	.....		.....	.....	13
269	757	820	313	600		168	.....	14
36·4	122	110	69·8	33·0		27·4	.....	15
417	1013	1070	507	1042		292	283	16
81·2	138 (155)*	160	66·0	20·5		35·6	36·5	17
5·2	47·4	46·0	28·2	8·0		8·2	8·1	18
.....	.....	.....	.....	.....	*See* Toronto.	.....	.....	19
0·01	0·03	0·05	0·05	0·11		0·02	.....	20
.....	.....	.....	.....	.....		.....	.....	21
3·3	20·3	17·0	7·0	220		9·3	8·8	22
2·7	2·3	1·5	1·1	1·0		1·6	1·6	23
0 (0)	0 (0)	0	1·2 (0)	7·7		0 (0)	0 (0)	24
217 (271)	200 (251)	246	238 (246)	424		120 (112)	110 (117)	25
18·8	357	371	37·8	4·1		23·7	.....	26
8·0	24·3	21·2	11·5 (10·9)	129		18·5 (18)	18·0 (17·9)	27
0·07	0·70	0·6	0·09	1·8		0·11	.....	28
.....	.....	.....	.....	.....		.....	.....	29
9·8	0·9	1·2	16	0·7		0·4	.....	30
5·4	9·8	11·2	11	16		.....	.....	31
6·0	8·4	11·0	16	11		3·4 (2·0)	1·4	32
178	164 (206)	202	197 (202)	84·0		98·0 (92·0)	89·8 (96·0)	33
45·7	374 (374)	388	83·7	0		24·5	34·7	34
224 (224)*	538 (580)*	589	281	84·0		123	125	35
242	699 (740)*	752	302	613		160	.....	36
+0·5	+0·5 (+0·3)*	+0·8	+0·9	+0·5		−0·3	+0·1	37

*Soap-consuming power.

*Calculated from field results.

Note nitrate content.

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TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

No.	Municipality	Galt						Gananoque			
	Source(s)	Wells						St. Lawrence River			
		Raw and Finished Water						Raw and Finished Water			
	Sampling Point	Analyses by Ont. Dept. of Health Laboratories				Analysis by Permutit Co. of Canada, Ltd.	Town Tap	At Plant Intake			
1	Laboratory number						3683	2426	2132	2296	2800
2	Field number						526		508A		
3	Date of collection	Apr. 7/31	1938	1939	1942	1941	Dec. 15/49	Mar. 4/48	June 4/48	Sept. 7/48	Jan. 4/49
4	Storage period (days)						19	238	42	13	57
5	Sampling temperature, °C							1·1	11·1	20·6	1·1
6	Test temperature, °C					room	15·0	22·0	room	21·2	21·8
7	Dissolved oxygen										
8	Carbon dioxide (CO_2)					4·0					
9	pH					8·0	7·6	8·6	8·3	7·9	7·9
10	Colour				10	5	0	0	10	15	0
11	Turbidity					3	0·3	5	2	2	0·8
12	Suspended matter, dried at 105°C							7·6		3·4	
13	Suspended matter, ignited at 550°C							5·2		1·2	
14	Residue on evaporation, dried at 105°C	463			475		475	185	153	191	169
15	Ignition loss at 550°C	141					44·6	96·0	26·6	50·0	50·0
16	Specific conductance (micromhos at 25°C.)						671	281	238	288	287
17	Calcium (Ca)	100			96·5	96·8	100	37·0	33·2	37·0	37·0
18	Magnesium (Mg)	25·0			35·4	30·7	26·5	9·0	0·2	10·5	9·3
19	Iron (Fe) Total							0·09			
20	Dissolved		0·10	0·15	0·10	0·10	0·05	0·03	0·05	0·01	0·06
21	Alkalis—as sodium (Na)	6·3									
22	sodium (Na)						8·9	9·3	6·0	8·3	7·8
23	potassium (K)						1·7	1·5	1·0	1·5	1·6
24	Carbonate (CO_3)	0	0	0	0	0	0	1·2	4·8	0	0
25	Bicarbonate (HCO_3)	276	268	286	286	286	293	110	80·5	115	122
26	Sulphate (SO_4)	149			110	102	123	24·7	16·5	21·0	26·6
27	Chloride (Cl)	7·0	4·0	7·0	11·3	10·0	11·5	17·5	13·6	18·5	16·6
28	Fluoride (F)		0·38			0·60	0·38	0·10	0·20	0·10	0·10
29	Nitrite (NO_2)	0·002									
30	Nitrate (NO_3)	0·2					4·0	0·2	0·35	0·3	4·4
31	Silica (SiO_2) Gravimetric	7·6			15·5		12	4·0	4·2		1·8
32	Colorimetric						14	4·8	4·0	2·2	1·2
33	Carbonate hardness, as $CaCO_3$	226	220	234	234	234	240	94·0	74·0	94·0	100
34	Non-carbonate hardness, as $CaCO_3$	127	260	166	153	134	119	35·5	35·4	41·6	30·4
35	Total hardness, as $CaCO_3$	353	480	400	387	368	359	130	109	136	130
36	Sum of constituents	424			394	381	434	159	126	156	165
37	Saturation index						+0·3	+0·7	+0·3	0	0
	Remarks:	Soap hardness= 443 p.p.m.						*See* also Station 9, Table IV, Part I this report.			

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

Georgetown		Glencoe	Goderich			Grantham Township	Gravenhurst	Grimsby				No.
Springs and Well		Deep Wells	Lake Huron			—	Deep Wells	Lake Ontario				
Raw and Finished Water		Raw and Finished Water	Raw Water		Finished Water	Treated Welland Canal Water	Raw and Finished Water	Raw Water		Finished Water		
Springs (Town Tap)	Deep Well (Town Tap)	Town Tap (Mixed Wells)	At Intake Pump		Plant Tap	Purchased partly from City of Merritton and partly from City of St. Catharines, Ont.	Town Tap	Intake Well		Plant Filter	Plant Tap	
2348	5650	2667	2416	2545	3774		2337	2389	2494	1883	2551	1
301	A78	270	632A	635A	527		140	520A	525A	184	243	2
Aug. 18/48	Apr. 5/52	July 19/48	Apr. 19/48	July 19/48	Dec. 5/49		Sept. 23/47	Feb. 14/48	July 6/48	Feb. 14/48	July 9/48	3
213	19	180	189	133	50		378	245	94	38	144	4
16·5	.....	23·5	6·0	18·0	.....		12·7	1·2	15·6	2·0	18·0	5
23·0 (20·0)	24·0	21·8 (26·0)	20·0	18·5	19·0		21·9	18·3	19·9	room	20·4 (24·0)	6
.....	.....	.....	.....	.....	.....		.....	.....	.....	.....	.....	7
(9·7)	.....	(3·5)	.....	.....	.....		(36·0)	.....	.....	.....	(7·9)	8
8·4 (8·0)	7·7	8·7 (8·2)	8·7	8·0	8·0		7·3	8·1	8·2	8·1	7·6 (7·4)	9
0 (30)	5	15 (10)	7	15	5		8 (5)	4	0	10	0 (5)	10
3	0	6	algae	2	20		3 (clear)	1	2	1	0·5 (clear)	11
.....	.....	5·8	.....	.....	16		.....	.....	.....	.....	.....	12
.....	.....	2·6	.....	.....	13		.....	.....	.....	.....	.....	13
169	335	415	148	125	153		132	.....	191	183	181	14
35·8	61·6	24·4	29·4	19·0	26·0		54·6	.....	34·8	61·8	30·0	15
292	590	722	253	209	242		179	306	297	296	294	16
34·6 (72·1)*	81·8	10·0	32·2	27·7	29·7	*See* Merritton;	14·4	41·5	38·8	37·6	36·6	17
16·5	26·8	3·9	10·8	8·2	6·9	*See* St. Catharines.	4·5	8·0	8·3	9·1	8·8	18
.....	.....	0·28	.....	.....	0·50	.....	.....	.....	.....	.....	.....	19
0·03	0·03	0·04	0·04	0·07	0·09		0·06	.....	0·08	0	0·01	20
.....	.....	.....	.....	.....	.....		.....	.....	.....	.....	.....	21
2·2	9·0	152	5·0	3·3	4·3		8·3	7·8	7·8	8·0	9·0	22
1·3	1·9	1·7	1·5	0·9	1·0		4·2	1·7	1·7	1·5	1·7	23
4·8 (0)	0	12·0 (0)	7·2	0	2·6		0 (0)	0	0	0	0 (0)	24
138 (262)	307	268 (293)	107	104	109		18·3 (15·9)	122	117	123	110 (110)	25
18·1	55·1	3·0	21·1	15·5	24·5		24·4	.....	26·8	27·8	30·0	26
3·7	16·3	82·6	5·3	4·9	7·6		9·4	18·0	18·7	19·0	18·0 (17·9)	27
0	0·20	2·6	0·23	0	0·10		0·21	.....	0·10	.....	0·10	28
.....	.....	.....	.....	.....	.....		.....	.....	.....	0·05	.....	29
2·2	2·0	0·8	1·8	0·7	1·1		2·7	.....	0·9	0·4	0·9	30
9·0	.....	8·6	2·2	4·6	4·8		12	.....	1·4	2·8	1·0	31
9·9	12	9·0	0·6	4·4	3·5		11 (11)	1·0	.....	2·4	0·8	32
121 (215)	252	41·0	99·8	35·4	94·0		15·0	100	96·0	101	90·0	33
33·3 (33)	62·3	0	24·9	17·4	8·5		39·3	36·6	35·0	30·5	37·6	34
154 (248)*	314	41·0	125	103	103		54·3	137	131	131	128	35
160 (255)	357	410	140	117	135		39·1	.....	162	167	160	36
+0·6 (+0·65)	+0·5	+0·6	+0·7	−0·1	0		−1·7	+0·2	+0·3	+0·3	−0·4	37
*Calculated from field results.		Note high fluoride.	See also Station No. 36, Table IV, Part I.					*See* also Station No. 20, Table IV, Part I.				

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

No.										
	Municipality	Guelph								
	Source(s)	Deep Wells								
		Raw and Finished Water								
	Sampling Point	Town Tap	Park St. Well		Metcalfe St. Well		Emma St. Well	Arkell Springs		
1	Laboratory number	1394	2672	**	2670	**		2701		**
2	Field number	169	295	.....	297	.....		296		.....
3	Date of collection	Mar. 14/47	Aug. 16/48	May 16/50	Aug. 16/48	May 16/50		Aug. 16/48		May 16/50
4	Storage period (days)	14	152	.....	152	.....		164		.....
5	Sampling temperature, °C	.....	11·0	.....	11·0	.....		14·0		.....
6	Test temperature, °C	room	21·8 (20·0)	.....	21·9 (20·0)	.....		22·5	(19·0)	.....
7	Dissolved oxygen	.....	.....	.....	.....	.....		.....		.....
8	Carbon dioxide (CO_2)	.....	(30·8)	.....	(18·5)	.....			(17·6)	.....
9	pH	7·4	7·5 (7·4)	7·5	7·8 (7·3)	7·5		8·0	(7·7)	7·5
10	Colour	.....	10 (5)	.....	20 (5)	.....		5	(5)	.....
11	Turbidity	.....	0·1 (clear)	.....	0·8 (clear)	.....		2	(clear)	clear
12	Suspended matter, dried at 105°C	.....	.....	.....	.....	.....		.....		.....
13	Suspended matter, ignited at 550°C	.....	.....	.....	.....	.....	Very little used	.....		.....
14	Residue on evaporation, dried at 105°C	660	645	626	594	565	because of hard-	296		...308
15	Ignition loss at 550°C	.....	82·2	134	85·4	144	ness.	49·8		133
16	Specific conductance (micromhos at 25°C.)	.....	900	.....	854	.....	*See* previous re-	488		.....
17	Calcium (Ca)	142	136	123·6	110 (137)*	125	port, Mines Bul-	69·6		68·4
18	Magnesium (Mg)	37·2	35·4	32·6	34·7	37·4	letin No. 819.	23·9		24·4
19	Iron (Fe) Total	.....	.....	.....	.....	.....		.....		.....
20	Dissolved	0·06	0·04	0·03	0·07	trace		0·02		0·03
21	Alkalis—as sodium (Na)	16·2	.....	.....	.....	.....		.....		.....
22	sodium (Ma)	.....	10·3	.....	19·0	.....		2·1		.....
23	potassium (K)	.....	2·1	.....	2·2	.....		1·4		.....
24	Carbonate (CO_3)	0	0 (0)	0	0 (0)	0		0	(0)	0
25	Bicarbonate (HCO_3)	286	284 (283)	254	223 (305)	309		281	(276)	256
26	Sulphate (SO_4)	241	235	204	211	181		34·1		25·2
27	Chloride (Cl)	22·8	21·2	21	43·8	28		2·5	(2·0)	7·0
28	Fluoride (F)	.....	0·30	.....	0·30	.....		0		.....
29	Nitrite (NO_2)	0	.....	.....	.....	.....		.....		.....
30	Nitrate (NO_3)	0·3	0·5	.....	0·4	.....		8·9		.....
31	Silica (SiO_2) Gravimetric	6·5	5·4	18	9·0	15		8·8		9·0
32	Colorimetric	.....	7·8	.....	8·0	.....		7·2		.....
33	Carbonate hardness, as $CaCO_3$	234	233 (232)	208	183 (250)	253		230	(226)	210
34	Non-carbonate hardness, as $CaCO_3$	274	252	236	233 (235)	213		41·9		62
35	Total hardness, as $CaCO_3$	508	485	444	416 (485)*	466		272		272
36	Sum of constituents	607	589	.....	540 (608)*	.....		289		.....
37	Saturation index	+0·4	+0·5	+0·5	+0·6 (+0·3)	+0·5		+0·7		+0·2
	Remarks:	$PO_4 = 0$		Aluminium (Al) = 1·3 p.p.m.	*Calculated from field results.					Aluminium (Al) = 0·1 p.p.m.

** Analyses by Dineen, Phillips, and Roberts, Brantford, Ont.; supplied by city of Guelph.

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

Guelph Township	Hagersville		Hamilton			
Wells and Springs	Park Well		Lake Ontario			
	Raw and Finished Water		Raw Water	Finished Water		
Purchased from City of Guelph, Ont.	Town Tap		At Intake Well	Plant Tap	Composite Analysis based on many Determinations—Hamilton City Laboratory	No.
	4287	5743	1381	2744		1
	615	A118	164	242		2
Oct. 12/49	Mar. 31/50	June 25/52	Mar. 3/47	July 9/48		3
	73	12	4	216		4
	8·0			22·0		5
	25·0	26·0	room	21·8	room	6
						7
			0 (2·0)	(4·4)	0 to 2·0	8
	7·9	7·3	8·0	8·3 (7·9)	7·4 to 8·3	9
	5	0	5	0 (10)		10
	0·9	0·7	0·5	1 (clear)	<0·5	11
						12
						13
		1335	182	176	190	14
		272		25·2	45·0	15
	829	1546		303		16
See Guelph	142	298	38·6	39·8	37·0	17
	43·0	41·9	8·3	10·4	7·5	18
						19
0·12		0·05	0·02	0·03	0·007	19
			11·6		4·5	21
	18·5	13·6		8·6		22
	3·4	4·0		1·6		23
0	2·4	0	0	2·4 (6·0)	0	24
395	317	307	119	117 (110)	116	25
	271	622	22·2	24·5	23·0	26
35	56·0	24·2	18·8	18·6	18·5	27
		1·2		0·10		28
			0·05			29
	0	0	3·0	1·8		30
			1·5	2·6		31
	7·2	8·2		2·1	0·5	32
324	265	252	97·1	100	98·0	33
186	267	664	33·4	42·1	27·0	34
510	532	916	131	142	125	35
	700	1164	161	168	148	36
	+1·0	+0·7	+0·2	+0·4	−0·5 to +0·4	37
	Analyses by Ont. Dept. of Health, Toronto.		Phosphate = 0·03 p.p.m. For additional analyses of raw Lake Ontario see Station No. 20, Table IV.		Aluminium — 0·05 p.p.m.	

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

No.								
	Municipality	HAMILTON						
	Source(s)	Lake Ontario						
		Finished Water						
	Sampling Point	Analyses Supplied by Hamilton Waterworks Dept.						
1	Laboratory number							
2	Field number							
3	Date of collection	Before Mar. 1933	Nov. 1933	Oct. 1934	Jan. 1935	Apr. 15/35	Dec. 3/35	Feb. 6/36
4	Storage period (days)							
5	Sampling temperature							
6	Test temperature, °C.							
7	Dissolved oxygen							
8	Carbon dioxide (CO_2)				1·0		0	
9	pH	7·9	8·0	8·1	8·1	7·9	8·0	
10	Colour							
11	Turbidity							
12	Suspended matter, dried at 105°C.							
13	Suspended matter, ignited at 550°C.							
14	Residue on evaporation, dried at 105°C.	105	203	198	197	197	229	
15	Ignition loss at 550°C.	38	58	64	59	54	77	
16	Specific conductance (micromhos at 25°C.)							
17	Calcium (Ca)	26·7		45·8	40·0	42·2	37·9	37·2
18	Magnesium (Mg)	7·0	6·0	7·2	8·1		7·8	7·8
19	Iron (Fe) Total	0·245	0·007	0·014	0·21	0·21	0·007	0·042
	Dissolved							
21	Alkalis—as sodium (Na)	7·3	9·6	9·6	8·2		8·9	
22	sodium (Na)							
23	potassium (K)							
24	Carbonate (CO_3)	0	0	0	0	0	0	
25	Bicarbonate (HCO_3)	117·1	119·6	112·2	108·6		122·0	
26	Sulphate (SO_4)	26·9	24·0	20·4	19·4		20·4	20·4
27	Chloride (Cl)	20·0	13·0	13·0	12·5	13·5	14·2	
28	Fluoride (F)							
29	Nitrite (NO_2)							
30	Nitrate (NO_3)							
31	Silica (SiO_3) Gravimetric	trace	trace					
32	Colorimetric							
33	Carbonate hardness, as $CaCO_3$	95·5		92·0	89·0		100	
34	Non-carbonate hardness, as $CaCO_3$	0		52·0	44·2		30·0	
35	Total hardness, as $CaCO_3$	95·5		144	133		130	
36	Sum of constituents	147		151	142		149	
37	Saturation index	−0·1		+0·3	+0·2		+0·1	
38	Aluminium (Al)	1·5	0·53	0·05	0·05		0·11	
39	Soap consuming power as $CaCO_3$, p.p.m.	122	118	110			115	
	Remarks:							

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

HAMILTON													
Lake Ontario													
Finished Water													
Analyses Supplied by Hamilton Waterworks Dept.													No.
													1
													2
Nov. 1936	Jan. 1938	May, 1940	Nov. 5/41	Nov. 24/41	Jan. 12/42	July 19, 1944	1945; Feb-Dec. incl.			1946; Jan.-Dec. incl.			3
													4
													5
							Max.	Min.	Av.	Max.	Min.	Av.	6
													7
0	0	1·1											8
													9
8·0	8·2	8·2					8·1	7·4	7·8	8·1	7·3	7·8	10
													11
													12
													13
													14
190	225	217		194	180	190							15
32	76	63		50	32	45							16
													17
35·0	35·8	37·5	37·2		36·1	37·2							18
6·6	8·4	7·3	7·8		7·3	7·2							19
0·014	0·031	0·035	0		0	0·007							20
													21
					8·9	8·9							22
													23
													24
0	0	0	0		0	0	0	0	0	0	0	0	25
124·4	122·0	119·6	119·6		119·6	119·6	122·0	109·8	116·0	117·1	110·0	115·0	26
17·9	19·8	21·6	22·7		21·8	22·8				21·7	14·4	18·7	27
15·0	15·5	16·0	15·5			16·5	19·0	16·0	17·9	20·0	17·5	18·6	28
													29
													30
													31
1·0	1·0			1·0	1·0	0·05							32
													33
102	104	98·0			98·0	98·0							34
13·0	20·0	28·0			27·0	27·0							35
115	124	126			125	125							36
136	140	142	142		133	152							37
+0·1	+0·3	+0·3											38
0	0·185	0·08	0·05										39
113	106	110	115		115		138·0	116·0	127·5	135·0	114·0	124·8	40
							Data compiled from results of 5 to 15 samples per month.						

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

No.										
	Municipality	Hamilton *(Continued)*								
	Source(s)	Lake Ontario								
		Finished Water								
	Sampling Point	Analyses Supplied by Hamilton Waterworks Dept.								
1	Laboratory number									
2	Field number	1947; January			1947; February			1947; March		
3	Date of collection									
4	Storage period (days)									
5	Sampling temperature, °C	Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.
6	Test temperature, °C									
7	Dissolved oxygen									
8	Carbon dioxide (CO_2)									
9	pH	7·9	7·3	7·7	8·0	7·7	7·9	8·0	7·9	7·9
10	Colour									
11	Turbidity									
12	Suspended matter, dried at 105°C									
13	Suspended matter, ignited at 550°C									
14	Residue on evaporation, dried at 105°C									
15	Ignition loss at 550°C									
16	Specific conductance (micromhos at 25°C.)									
17	Calcium (Ca)									
18	Magnesium (Mg)									
19	Iron (Fe) Total									
20	Dissolved									
21	Alkalis—as sodium (Na)									
22	sodium (Na)									
23	potassium (K)									
24	Carbonate (CO_3)	0	0	0	0	0	0	0	0	0
25	Bicarbonate (HCO_3)	116·5	112·9	115·4	117·1	112·9	115·9	117·1	114·5	115·9
26	Sulphate (SO_4)	22·1	18·1	20·0	21·1	18·4	19·5	19·7	18·1	18·8
27	Chloride (Cl)	19·0	18·0	18·5	19·5	18·0	19·0	19·0	17·5	18·3
28	Fluoride (F)									
29	Nitrite (NO_2)									
30	Nitrate (NO_3)									
31	Silica (SiO_2) Gravimetric									
32	Colorimetric									
33	Carbonate hardness, as $CaCO_3$									
34	Non-carbonate hardness, as $CaCO_3$									
35	Total hardness, as $CaCO_3$									
36	Sum of constituents									
37	Saturation index									
38	Soap consuming power as $CaCO_3$, p.p.m	135·0	125·0	129·0	135·0	129·0	132·0	133·0	126·0	129·0
	Remarks:									

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

Hanover	Harriston	Hespeler				Humberstone	
Ruhl Lake	Deep Well	Wells				Treated Welland Canal	
Raw and Finished Water	Raw and Finished Water	Finished Water				Purchased from Port Colborne, Ont.	
Plant Tap	Town Tap	Plant Tap	Plant Tap	Plant Tap	Plant Tap	——	No.
4883	5075	1855	2697	3776	4353		1
672	860	180	197	534	648		2
Feb. 5/51	Mar. 16/51	Mar. 1/48	Jan. 20/49	Dec. 20/49	July 4/50		3
7	67	10	7	35	2		4
.....	4·4	18·0	.....	.....	.....		5
24·0	21·7	room	22·0	18·6	24·0		6
.....	.....	.....	.....	.....	.....		7
.....	.....	.....	.....	.....	.....		8
7·6	7·7	7·6	7·7	7·3	7·4		9
0	3	15	4	0	0		10
0·2	1	4	3	0·4	0·2		11
.....	.....	.....	.....	.....	.....		12
.....	.....	.....	.....	.....	.....		13
261	324	549	572	567	.....		14
40·8	54·0	148	96·6	97·5	.....		15
447	497	796	784	793	822		16
61·3	72·4	101	105	106	106	*See* Port Colborne.	17
22·5	19·5	38·9	37·4	32·3	34·0		18
.....	.....	.....	.....	.....	.....		19
0·02	0·08	0·08	0·24	0·05	.....		20
.....	.....	.....	.....	.....	.....		21
6·0	5·8	14·0	11·2	16·5	17·2		22
1·6	1·4	2·5	2·2	3·1	3·2		23
0	0	0	0	0	0		24
288	294	318	295	301	304		25
17·3	42·4	159	163	168	172		26
1·5	1·7	24·3	22·5	23·2	24·9		27
0	0·5	.....	0·65	0·68	.....		28
.....	.....	0·8	.....	.....	.....		29
1·4	0	0·6	0·9	2·2	.....		30
.....	.....	6·5	12·6	13·5	.....		31
8·4	10	8·4	11·8	13·5	12		32
236	241	260	242	247	249		33
9·1	20·0	153	174	150	155		34
245	261	413	416	397	404		35
262	299	506	500	514	519		36
+0·3	+0·4	+0·6	+0·6	+0·1	+0·3		37
.....	.....	.....	.....	.....	.....		38

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

No.	Municipality	Huntsville		Ingersoll		Iroquois
	Source(s)	Lake Vernon		Wells and Springs		St. Lawrence River
		Raw Water	Finished Water	Raw and Finished Water		Raw and Finished Water
	Sampling Point	At Pump	Plant Tap	Wells—at Pump	Springs—at Pump	Plant Tap
1	Laboratory number	2133	2144	2709	2673	4125
2	Field number	133	134	316	317	563
3	Date of collection	Sept. 19/47	Sept. 19/47	Aug. 23/48	Aug. 23/48	Mar. 20/50
4	Storage period (days)	299	305	157	145	30
5	Sampling temperature, °C	19·0	19·2	10·0	11·0	.....
6	Test temperature, °C	room	room	22·0	21·9	30·0
7	Dissolved oxygen	.....	.....	.....	.....	.....
8	Carbon dioxide (CO_2)	2·5	(12·0)	(14·1)	(1·8)	.....
9	pH	7·3 (6·7)	6·8 (5·6)	7·6 (7·5)	8·1 (8·1)	8·2
10	Colour	40 (60)	15 (7)	5 (10)	10 (10)	2
11	Turbidity	7	(clear)	0·1 (clear)	1 (clear)	0·5
12	Suspended matter, dried at 105°C	.....	.....	.....	.....	.....
13	Suspended matter, ignited at 550°C	.....	.....	.....	.....	.....
14	Residue on evaporation, dried at 105°C	38·4	41·6	552	338	.....
15	Ignition loss at 550°C	9·6	7·4	62·2	45·4	.....
16	Specific conductance (micromhos at 25°C)	.....	60·6	849	548	294
17	Calcium (Ca)	4·8	4·0	75·6	87·0	40·3
18	Magnesium (Mg)	1·3	1·3	39·4	21·6	8·0
19	Iron (Fe) Total	.....	.....	.....	.....	.....
20	Dissolved	0·04	0·02	0·04	0·05	.....
21	Alkalis—as sodium (Na)	.....	.....	.....	.....	.....
22	sodium (Na)	2·0	4·5	56·0	2·5	9·3
23	potassium (K)	1·0	1·0	2·9	1·5	1·4
24	Carbonate (CO_3)	0 (0)	0 (0)	0 (0)	6·2 (0)	2·4
25	Bicarbonate (HCO_3)	12·2 (9·8)	9·8 (9·8)	277 (271)	299 (308)	112
26	Sulphate (SO_4)	6·9	17·9	188	29·1	36·7
27	Chloride (Cl)	4·7	0	32·4	2·8	19·0
28	Fluoride (F)	0·40	0·10	2·0	0·05	.....
29	Nitrite (NO_2)	.....	.....	.....	.....	.....
30	Nitrate (NO_3)	0·6	0	1·3	17·7	.....
31	Silica (SiO_2) Gravimetric	5·2	.....	11	9·4	.....
32	Colorimetric	4·6	5·5	8·6	10	5·0
33	Carbonate hardness, as $CaCO_3$	10·0	8·0	227	256	96·0
33	Non-carbonate hardness, as $CaCO_3$	7·3	7·3	124	49·4	37·6
35	Total hardness, as $CaCO_3$	17·3	15·3	351	305	134
36	Sum of constituents	32·3	39·1	545	326	177
37	Saturation index	−2·3	−3·0	+0·4	+0·9	+0·5
	Remarks:			Some H_2S present. Note high fluoride.		

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

Kincardine		Kingston			Kingsville		
Lake Huron		Lake Ontario			Lake Erie		
Raw Water	Finished Water	Raw and Finished Water			Raw Water	Finished Water	
—	Plant Tap	—	Town Tap	Plant Tap	Lake at West Lorne, Ont.	Plant Tap	No.
	4998	.....	1372	2147	2469	2553	1
	847	.....	156	192	207	212	2
	Mar. 13/51	.....	Feb. 21/47	July, 1948	June 15/48	June 17/48	
	31	.....	4	About 14	146	166	4
	4·4	.....	.....	.....	11·8	17·5	5
	20·3	room	room	room	19·0	20·3	6
	.....	.....	.....	.....	(11·0)	.....	7
	.....	.....	1·9	.....	(1·5)	(2·0)	8
	7·7	5·0	8·1	8·0	8·2 (8.1)	8·2 (7·6)	9
	2	35	0	8	15 (20)	0 (20)	10
	2	5	1	.....	25	2	11
	.....	.....	.....	.....	.....	.....	12
	.....	.....	.....	.....	.....	.....	13
	.....	.....	179	188	.....	150	14
	.....	.....	.....	17·0	.....	33·6	15
	229	.....	.....	295	297	229	16
See Analyses of Lake	31·7	40·0	42·9	39·8	38·0	29·5	17
Huron at Goderich, Table	7·8	6·1	12·0	8·9	7·7	8·7	18
IV, Part I.	.....	.....	.....	.....	.....	.....	19
	.....	.....	0·05	0	.....	0·03	20
	.....	.....	7·6	.....	.....	.....	21
	3·0	.....	.....	10·1	9·3	5·7	22
	1·3	.....	.....	1·4	1·7	1·4	23
	0	0	0	4·8	0 (0)	0 (0)	24
	115	110	117	120	102 (117)	112 (107)	25
	16·9	19·2	25·1	47·9	.....	17·4	26
	6·4	16·0	19·1	18·9	20·0	13·0	27
	.....	.....	0	.....	.....	0·10	28
	.....	.....	0	.....	.....	.....	29
	0	.....	0·9	7·9	.....	0·8	30
	.....	.....	5·0	2·0	.....	6·5	31
	2·0	.....	.....	1·4	4·6	3·2	32
	94·0	90·0	95·8	98·0	83·8	92·0	33
	17·2	35·0	60·6	37·8	42·8	17·4	34
	111	125	156	136	127	109	35
	126	.....	170	201	.....	139	36
	−0·5	.....	+0·3	+0·2	+0·2	+0·1	37
		Analyses by Permutit Co. of Canada, Ltd.					

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

No.	Municipality	Kitchener								
	Source(s)	Wells								
		Raw and Finished Water								
	Sampling Point	Strange St. Reservoir			Shoemaker Ave. Reservoir			Lancaster St. Well		
1	Laboratory number	2700	5652	.....	2694	5653	.....	2549	.....	
2	Field number	304	A83	CW 243†	303	A84	CW 242†	305	CW 246†	
3	Date of collection	Aug. 19/48	Apr. 3/52	Nov. 9/44	Aug. 19/48	Apr. 3/52	Nov. 9/44	Aug. 19/48	Nov. 9/44	
4	Storage period (days)	161	21	.....	161	21	.....	103	.....	
5	Sampling temperature, °C	15·0	11·1	.....	13·0	11·1	.....	18·0	.....	
6	Test temperature, °C	22·6	24·0	room	23·0 (21·5)	24·0	room	20·4 (22·7)	room	
7	Dissolved oxygen	.....	.....	.....	.....	.....	.....	.....	.....	
8	Carbon dioxide (CO_2)	(24·6)	.....	.....	(32·6)	.....	.....	(24·6)	.....	
9	pH	8·1* (7·5)	7·7	.....	7·8 (7·4)	7·7	.....	7·6 (7·5)	.....	
10	Colour	5 (5)	5	.....	8 (5)	5	.....	5 (5)	.....	
11	Turbidity	1	0·4	.....	9	0·4	.....	3	.....	
12	Suspended matter, dried at 105°C	.....	.....	.....	2·8	.....	.....	.....	.....	
13	Suspended matter, ignited at 550°C	.....	.....	.....	0·8	.....	.....	.....	.....	
14	Residue on evaporation, dried at 105°C	350	482	445	472	450	456	591	614·0	
15	Ignition loss at 550°C	61·4	98·8	112	47·2	52·4	88·0	67·2	161·1	
16	Specific conductance (micromhos at 25°C.)	512	767	.....	675	665	.....	793	.....	
17	Calcium (Ca)	47·6* (97·7)**	100	87·8	102	100	80·1	104	107·8	
18	Magnesium (Mg)	30·3	32·3	27·1	28·8	30·5	26·3	37·2	34·4	
19	Iron (Fe) Total	.....	.....	0·08	0·07	.....	0·10	.....	0·36	
20	Dissolved	0·02	0·07	0	0·01	0·06	0	0·06	0	
21	Alkalis—as sodium (Na)	.....	.....	9·3	.....	.....	4·2	.....	22·8	
22	sodium (Na)	12·0	26·1	.....	4·3	5·0	.....	8·7	.....	
23	potassium (K)	1·7	2·0	.....	1·5	1·6	.....	1·3	.....	
24	Carbonate (CO_3)	4·8 (0)	0	0	0 (0)	0	0	0 (0)	0	
25	Bicarbonate (HCO_3)	156 (305)	313	305	309 (312)	307	293	264 (261)	251·3	
26	Sulphate (SO_4)	117	126	119	129	119	136	226	235·5	
27	Chloride (Cl)	14·2	30·0	13·0	3·0	5·5	4·0	4·0	14·0	
28	Fluoride (F)	0·05	0·2	.....	0·10	0	.....	0·10	.....	
29	Nitrite (NO_2)	.....	.....	.....	.....	.....	.....	.....	.....	
30	Nitrate (NO_3)	5·3	5·6	.....	1·7	1·2	.....	0	.....	
31	Silica (SiO_2) Gravimetric	11·8	.....	12·2	14	.....	13·8	15	12	
32	Colorimetric	11·8	15·0	.....	15	16·1	.....	12	.....	
33	Carbonate hardness, as $CaCO_3$	128·0 (250)	256	250	253 (256)	252	240	216	206·0	
34	Non-carbonate hardness, as $CaCO_3$	116 (118)	127	80·6	121	123	68·1	197	204·5	
35	Total hardness, as $CaCO_3$	224* (368)**	383	331	374	375	308	413	410·5	
36	Sum of constituents	322 (440)	492	418	437	431	410	526	551	
37	Saturation index	+0·4 (+0·4)	+0·6	.....	+0·7	+0·6	.....	+0·4	.....	
38	Aluminum (Al)	.....	.....	0·22	.....	.....	1·35	.....	0·22	

Remarks:

* Note loss of Ca** as $CaCO_3$ owing to increasing pH with loss in hardness.

** Calcium and total hardness calculated from original alkalinity of 250 p.p.m. as $CaCO_3$.

† Analyses by Ontario Department of Health.

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

Lakeview	La Salle	Leamington		Leaside	Lindsay			
Treated Lake Ontario	Treated Detroit River	Wells		Treated Lake Ontario	Scugog River			
Purchased from Port Credit, Ont.	Purchased from Windsor, Ont.	Raw and Finished Water		Purchased from Toronto, Ont.	Raw Water		Finished Water	
		Plant Tap			At Plant Intake		At Main Pump	No.
		Mixed Wells	2 Wells					
		2248	5644		2425	2471	2803	1
		211	A76		345	278	277	2
		June 16/48	Apr. 4/52		Oct. 19/48	July 21/48	July 21/48	3
		76	11		7	110	224	4
		13·0	.....		.....	.....	22·5	5
		room	24·0		20·7	18·9	22·0	6
		.....	.....		.....	.....	.....	7
		(4·0)	.....		.....	.....	(14·1)	8
		7·7 (7·5)	7·7		7·8	7·3	7·8 (7·3)	9
		25 (30)	15		27	30	15 (70)	10
		(25)*	20*		6	5	algae*	11
		.....	5·3		.....	.....	.....	12
		.....	4·8		.....	.....	.....	13
		339	372		.....	.....	161	14
		98·4	34·8		.....	.....	51·2	15
		439	609		309	237	255	16
See Port Credit.	*See* Windsor.	56·4 (85·2)**	87·2	*See* Toronto.	43·0	37·7	39·8	17
		30·6	28·0		9·7	6·7	7·9	18
		.....	2·1		.....	.....	.....	19
		0·04	0·07		.....	.....	0·03	20
		.....	.....		.....	.....	.....	21
		8·3	7·3		4·9	3·0	3·0	22
		2·1	1·4		2·4	1·2	1·0	23
		3·6 (0)	0		0	0	0 (0)	24
		259 (354)	358		176	131	127 (124)	25
		65·8	57·8		.....	.....	22·8	26
		0	1·5		1·0	0·05	5·9	27
		.....	0·5		.....	.....	0·10	28
		.....	.....		.....	.....	.....	29
		0·5	0·2		.....	.....	2·2	30
		.....	28		.....	.....	1·4	31
		32	26		4·5	2·3	2·0	32
		218 (200)	293		144	107	104 (102)	33
		49 (49)	39·7		3·2	15	27·8	34
		267 (339)**	332		147	122	132	35
		327 (397)**	386		.....	.....	148	36
		+0·3 (+0·4)**	+0·6		+0·1	−0·6	−0·05	37
		.....	.....		.....	.....	.....	38

* Turbidity due to colloidal sulphur or iron oxide deposition.
** Corrected for loss of $CaCO_3$ on storage.

* Algal growth on storage.

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

No.	Municipality	Listowel	London						
	Source(s)	Artesian Wells	Wells and Springs						
		Raw and Finished Water	Raw and Finished Water						
	Sampling Point	—	Springbank—At Pump			Lambeth Wells			Adair Well at Pump
						Wells Nos. 1 & 2	Well No. 3	——	
1	Laboratory number	5073	2669	5046		2698	2749		2748
2	Field number	858	273	A80		272	333		331
3	Date of collection	Mar. 15/51	July 20/48	Apr. 4/52	July 16/41	July 20/48	Jan. 25/49	July 16/41	Jan. 25/49
4	Storage periods (days)	68	179	11		191	16		16
5	Sampling temperature, °C.	8·3	14·0	8·9		11·0			
6	Test temperature, °C.	21·7	21·9	24·0		23·0	21·0		21·3
7	Dissolved oxygen								
8	Carbon dioxide (CO_2)		(29·9)		12	(25·0)		14	
9	pH	8·2	8·0 (7·5)	7·8	7·5	8·1 (7·5)	7·8	7·5	7·6
10	Colour	3	5 (5)	5	5	0	3 (5)	9	5	5
11	Turbidity	5	0·2 (clear)	0	5	1 (clear)	some*	5	1
12	Suspended matter, dried at 105°C.	7·2							
13	Suspended matter, ignited at 550°C.	4·7							
14	Residue on evaporation, dried at 105°C.	178	233	323	305	319	292		336
15	Ignition loss at 550°C.	48·4	43·8	58·6	52	31·6	35·6		29·4
16	Specific conductance (micromhos at 25°C.)	407	390	982		490	469		527
17	Calcium (Ca)	45·2	48·0 (80·0)*	83·1	70·5	74·1	84·8	67·6	70·8	91·4
18	Magnesium (Mg)	21·5	21·1	17·5	19·0	18·9	14·0	18·2	20·2	15·3
19	Iron (Fe) Total	0·13						0·40		
20	Dissolved	0·07	0·03	0·04	0·1		0·06	0·20	0·5	0·09
21	Alkalis—as sodium (Na)					5·1				
22	sodium (Na)	11·6	3·0	3·5			3·3	8·1		3·1
23	potassium (K)	1·2	1·1	0·7			1·7	1·3		1·9
24	Carbonate (CO_3)	3·8	2·4 (0)	0	0		0 (0)	0	0	0
25	Bicarbonate (HCO_3)	270	178 (283)	287	266		280 (276)	278	276	296
26	Sulphate (SO_4)	7·4	36·7	29·2	31·2	34·3	40·8	32·8	40·7	54·1
27	Chloride (Cl)	1·2	6·4	5·2	10	2·7	4·9	1·1	4·0	3·4
28	Fluoride (F)	0·5	0·10	0·10			0	0·50		0·05
29	Nitrite (NO_2)									
30	Nitrate (NO_3)	0·9	14·2	24·8			1·3	0·4		0·8
31	Silica (SiO_2) Gravimetric		11	10		10·7	8·4	16		
32	Colorimetric	7·2	9·4	8·9			9·0	14		7·6
33	Carbonate hardness, as $CaCO_3$	201	150 (232)	235	218		229 (226)	228	226	243
34	Non-carbonate hardness, as $CaCO_3$	0	56·6 (56·0)	43·9	36		40·0	15·4	34	47·9
35	Total hardness, as $CaCO_3$	201	207 (288)*	279	254	263	269	243	260	291
36	Sum of constituents	234	232 (314)*	315			298	283		323
37	Saturation index	+0·7	+0·4	+0·6			+1·0	+0·5		+0·5
	Remarks:		* Calcium and total hardness calculated from original alkalinity (232), assuming some $CaCO_3$ precipitation on storage.		Analyses supplied by London P.U.C.		* Turbidity present owing to precipitation of iron by aeration.	Analysis supplied by London P.U.C.	

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

LONDON *(cont'd)*										
Wells and Springs										
Raw and Finished Water										
Uptigrove Well at Pump	Beck Wells (5) at Pump (Horton St. or Ridout St. Wells)			Foster Wells at Pump (Crystal Park Wells)			Crossian Well at Pump (Oxford St.)	Riverside Drive Well at Pump	East End Wells (8) at Reservoir	No.
2751	.....	2696	5647	.....	2695	5651	2750	2851	2853	1
327	.....	274	A81	.....	275	A82	334	365	364	2
Jan. 25/49	.....	July 20/48	Apr. 4/52	.....	July 20/48	Apr. 4/52	Jan. 25/49	Feb. 28/49	Feb. 2/49	3
16	.....	191	11	.....	191	20	16	19	19	4
.....	.....	16·8	10·6	.....	17·0	9·4	.....	.....	.....	5
21·0	.....	22·5	24·0	.....	23·0	24·0	21·0	22·9	22·9	6
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	7
.....	.....	(22·0)	.....	.....	(45·8)	.....	.....	.....	.....	8
7·7	.....	8·1 (7·75)	7·9	.....	8·0 (7·3)	7·4	7·7	7·7	7·4	9
10	.....	4 (5)	5	.....	3 (25)*	15	0	4	0	10
3	some	0·7 (clear)	0·6	slight	6*	15*	1	0·4	1	11
.....	.....	.....	.....	.....	.....	8·6	.....	.....	.....	12
.....	.....	.....	.....	.....	.....	6·1	.....	.....	.....	13
305	772	405	633	590	464	502	310	388	506	14
34·8	72	63·4	79·4	40	46·6	37·6	47·8	68·2	85·6	15
483	.....	554	918	.....	607	851	505	485	647	16
81·2	143	56·2 (131)*	139	141	75·6 (126)**	132	74·4	89·0	95·6	17
14·0	44·1	33·4	40·0	35·6	34·5	34·5	21·1	19·8	31·6	18
.....	.....	.....	.....	.....	.....	1·5	.....	.....	.....	19
0·38	.....	0·03	0·06	.....	0·01	0·03	0·10	0·02	0·03	20
.....	36·2	.....	.....	12·4	.....	.....	.....	.....	.....	21
3·3	.....	10·3	13·0	.....	9·4	9·0	7·3	4·7	13·0	22
2·2	.....	2·2	2·3	.....	2·0	2·6	1·9	1·8	2·2	23
0	.....	0 (0)	0	.....	0 (0)	0	0	0	0	24
272	254	129 (356)	362	.....	197 (351)	430	300	296	274	25
42·8	9·8	173	214	170	187	144	37·6	78·8	162	26
5·0	.....	9·1	15·0	1·0	2·5	1·6	3·5	5·5	10·0	27
0·12	.....	0·55	0·7	.....	0·30	0·40	0·35	0·10	0·30	28
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	29
1·8	.....	1·7	1·4	.....	0·35	Trace	0·8	11·5	3·5	30
7·8	14	12	12	12	10	.....	11	8·0	10	31
8·2	.....	12	12	.....	10	17	9·8	9·3	12	32
223	.....	106 (292)	296	.....	162 (288)**	353	246	242	224	33
36·9	.....	172 (172)	215	.....	169 (169)**	117	26·3	61·5	144	34
260	540	278 (464)*	512	499	331 (457)**	470	272	304	368	35
293	.....	362 (549)*	615	.....	419 (546)**	553	305	366	465	36
+0·4	.....	+0·4 (+0·9)	+1·1	.....	+0·6 (+0·3)	+0·6	+0·4	+0·6	+0·2	37
	Analysis supplied by London P.U.C.	* Calcium and total hardness calculated using original total alkalinity, assuming loss of $CaCO_3$ on long storage.		Analysis supplied by London P.U.C.	* Iron in sample settled quickly to give colour and turbidity. ** Calcium and total hardness calculated using original total alkalinity, assuming loss of $CaCO_3$ on storage.					

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TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

No.	Municipality	London (cont'd)			Long Branch	Lucknow	Markdale	Markham	Meaford	
	Source(s)	Wells and Springs			Treated Lake Ontario	Deep Wells	Small Creek	Well (artesian)	Lake Huron (Georgian Bay)	
		Raw and Finished Water			Purchased from New Toronto, Ont.	Raw and Finished Water	Raw and Finished Water	Raw and Finished Water	Raw Water	Finished Water
	Sampling Point	North End Wells (10)		Mixed Wells		Town Tap	Town Tap	Plant Tap		Town Tap
		Well No. 1	At Reservoir	—						
1	Laboratory number	2753	2754	.....		5052	4980	4142		4982
2	Field number	329	332	.....		848	827	576		830
3	Date of collection	Jan. 25/49	Jan. 25/49	July 16/41		Mar. 14/51	Mar. 9/51	Mar. 22/50		Mar. 10/51
4	Storage period (days)	16	16	.....		52	27	33		26
5	Sampling temperature, °C	.....	.....	.....		3·9	7·8	7·5		2·2
6	Test temperature, °C	21·0	21·0	.....		20·0	22·0	20·5		21·8
7	Dissolved oxygen	.....	.....	.....		.....	.....	.....		.....
8	Carbon dioxide (CO_2)	.....	.....	27		.....	.....	.....		.....
9	pH	7·9	7·6	7·3		7·9	7·9	7·7		7·7
10	Colour	0	0	10		2	0	0		0
11	Turbidity	3	0·3	10		0·8	2	0·4		2
12	Suspended matter, dried at 105°C	.....	.....	.....		.....	.....	.....		.....
13	Suspended matter, ignited at 550°C	.....	.....	.....		.....	.....	.....		.....
14	Residue on evaporation, dried at 105°C	1014	588	.....		.....	253	234		198
15	Ignition loss at 550°C	141	84·6	.....		.....	67·6	14·4		34·0
16	Specific conductance (micromhos at 25°C)	1241	857	.....		517	388	391		334
17	Calcium (Ca)	170	120	132		73·9	52·5	49·1		44·5
18	Magnesium (Mg)	67·5	35·6	31·5	*See* New Toronto	22·5	23·0	12·8	*See* monthly	13·0
19	Iron (Fe) Total	.....	.....	1·2		.....	.....	.....	analyses of	.....
20	Dissolved	0·10	0·04	.....		0·03	0·05	0·12	Lake Huron at	0·13
21	Alkalis—as sodium (Na)	.....	.....	.....		.....	.....	.....	Collingwood,	.....
22	sodium (Na)	28·8	13·2	.....		10·3	1·6	19·7	Table IV,	6·5
23	potassium (K)	4·0	2·2	.....		1·6	0·9	1·3	Part I.	1·7
24	Carbonate (CO_3)	0	0	0		0	0	0		0
25	Bicarbonate (HCO_3)	287	303	372		283	266	239		178
26	Sulphate (SO_4)	484	202	154		58·4	9·4	22·6		16·0
27	Chloride (Cl)	19·4	12·6	7·0		4·8	3·0	6·7		10·0
28	Fluoride (F)	1·6	0·55	.....		2·0	0·05	0·10		0·05
29	Nitrite (NO_2)	.....	.....	.....		.....	.....	.....		.....
30	Nitrate (NO_3)	2·0	4·4	.....		3·5	15·1	0		4·9
31	Silica (SiO_2) Gravimetric	7·6	.....	.....		.....	.....	16		.....
32	Colorimetric	8·6	8·0	.....		10	5·9	15		4·3
33	Carbonate hardness, as $CaCO_3$	235	248	305		232	218	175 (196)*		146
34	Non-carbonate hardness, as $CaCO_3$	468	198	153		45·0	7·8	0		18·5
35	Total hardness, as $CaCO_3$	703	446	458		277	226	175		165
36	Sum of constituents	927	548	.....		327	243	246		189
37	Saturation index	+0·9	+0·5	.....		+0·6	+0·5	+0·2		0
	Remarks:	Note fluoride content.		Analysis supplied by London, P.U.C.		Note fluoride content; slight odour of H_2S on standing in pipes.	Note high nitrate content.	*Total alkalinity.		

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

Merritton		Midland	Mildmay	Milton		Milverton			Mimico	
Welland Canal (Lake Erie)		Creek and Springs	Artesian Well	Springs		Deep Wells			Treated Lake Ontario	
Raw Water	Finished Water	Raw and Finished Water	Raw and Finished Water	Raw and Finished Water		Raw and Finished Water			Purchased from New Toronto, Ont.	
From Canal	Plant Tap	Town Tap	Town Tap	Town Tap		Direct at Well				No.
						Old Well	New Well			
2644	2527	4975	5076	3012	5858	5019	3949	5072		1
245	251	821	861	302	A75	869	556	857		2
July 10/48	July 12/48	Mar. 8/51	Mar. 16/51	Aug. 18/48	Aug. 8/52	Apr. 12/51	Feb. 10/50	Mar. 15/51		3
186	135	27	67	234	13	14	18	68		4
22·0	25·0	2·2	8·3	.....	26·7	.....	.....	4·4		5
22·7	21·5 (31·0)	20·3	21·5	21·6 (22·5)	24·7	23·0	21·0	21·9		6
.....	.....	.....	.....	.....	.....	.....	.....	.....		7
(2·6)	(4·0)	.....	.....	(14·1)	.....	.....	.....	.....		8
8·2 (8·3)	8·2 (8·0)	7·7	7·8	8·3 (7·6)	7·7	7·6	7·8	7·5		9
5 (10)	0 (<5)	35	2	0 (5)	5	2	5	3		10
5·5 (15)	0·9 (clear)	3	2	0·2	0·8	20*	25	6		11
.....	.....	.....	.....	.....	.....	.....	5·2	12·3		12
.....	.....	.....	.....	.....	.....	.....	2·4	8·8		13
.....	188	166	344	161	786	.....	931	878		14
.....	53·2	37·0	125	50·0	55·6	.....	89·5	110		15
274	294	226	546	282	475	2402	1069	1190		16
33·0	36·8	32·7	73·2	17·4 (68·1)*	62·7	529	181	195		17
7·9	10·5	7·3	28·0	24·5	23·4	95·0	44·0	41·5	*See* New Toronto.	18
.....	.....	.....	.....	.....	.....	.....	1·0	0·80		19
.....	0·05	0·08	0·07	0·04	0·22	.....	0·03	0·07		20
.....	.....	.....	.....	.....	.....	.....	.....	.....		21
8·8	8·3	3·3	3·3	3·5	3·2	25·0	26·0	25·6		22
1·5	1·4	1·0	1·1	1·9	1·6	3·0	1·6	1·8		23
0 (0)	1·2 (0)	0	0	4·8 (0)	0	0	0	0		24
107 (117)	110 (107)	103	306	126 (290)	267	254	227	251		25
.....	29·6	19·8	62·6	27·0	32·7	1481	490	507		26
18·5 (18·7)	19·2	7·3	2·5	3·6 (3·1)	5·0	5·6	1·9	1·9		27
.....	0·11	0	0·20	0	0·10	.....	1·05	1·0		28
.....	.....	.....	.....	.....	.....	.....	.....	.....		29
.....	0·9	2·7	0	4·4	5·0	.....	1·1	0·9		30
.....	1·6	.....	.....	7·4	.....	.....	.....	.....		31
7·6	1·6	10	8·8	9·2	7·6	12	10	9·7		32
88·0	92·0 (88·0)	84·2	251	112 (238)	219	208	186	206		33
26·9	43·0	27·4	47·0	32·6 (33)	33·5	1503	446	451		34
115	135	112	298	144 (271)*	252	1711	632	657		35
.....	167	135	330	158 (285)*	273	2276	867	908		36
+0·2	+0·2	−0·4	+0·5	+0·7	+0·4	+1·1	+0·7	+0·5		37

*Calcium and total hardness calculated from original total alkalinity (238 p.p.m.), assuming $CaCO_3$ precipitated on storage.

* Precipitate is mostly iron oxide. High iron may be due to pick-up from standing in pipes since this well is not used very much.

71579—11½

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

No.	Municipality	Mitchell	Morrisburg	Mount Forest	Napanee		
	Source(s)	Deep Well	St. Lawrence River	Deep Wells	Napanee River		
		Raw and Finished Water	Raw and Finished Water	Raw and Finished Water	Raw Water		Finished Water
	Sampling Point	Town Tap	Town Tap	Plant Tap	From Canal	At Intake Pump	Plant Tap
1	Laboratory number	3948	1373	5078	1383	3684	3685
2	Field number	555	155	863	166	529	530
3	Date of collection	Feb. 7/50	Feb. 21/47	Mar. 16/51	Mar. 6/47	Dec. 15/49	Dec. 15/49
4	Storage period (days)	21	4	67	7	19	19
5	Sampling temperature, °C	.....	.....	7·8	.....	.....	15·0
6	Test temperature, °C	21·4	room	21·3	room	room	room
7	Dissolved oxygen	.....	.....	.....	.....	.....	.....
8	Carbon dioxide (CO_2)	.....	2·1	.....	.....	.....	.....
9	pH	8·2	8·0	7·9	7·3	8·0	8·1
10	Colour	10	0	2	80	10	10
11	Turbidity	6	1	0·7	2	4	4
12	Suspended matter, dried at 105°C	2·6	.....	.....	.....	1·2	3·8
13	Suspended matter, ignited at 550°C	0·4	.....	.....	.....	0·6	0·8
14	Residue on evaporation, dried at 105°C	368	172	120	196	213	223
15	Ignition loss at 550°C	43·5	.....	65·0	.....	17·6	19·0
16	Specific conductance (micromhos at 25°C)	562	.....	548	.....	277	276
17	Calcium (Ca)	54·6	38·6	69·2	47·2	56·6	56·2
18	Magnesium (Mg)	26·0	9·2	26·0	10·5	6·3	6·5
19	Iron (Fe) Total	1·8	.....	.....	.....	0·14	0·10
20	Dissolved	0·09	0·05	0·08	0·09	0·02	0·03
21	Alkalis—as sodium (Na)	.....	4·4*	.....	8·1	.....	.....
22	sodium (Na)	34·0	.....	7·4	.....	3·9	3·9
23	potassium (K)	1·0	.....	1·2	.....	1·6	1·6
24	Carbonate (CO_3)	9·6	0	0	0	2·4	4·8
25	Bicarbonate (HCO_3)	219	117	270	130	153	134
26	Sulphate (SO_4)	106	20·2	76·1	32·1	32·5	44·3
27	Chloride (Cl)	3·7	18·2	4·1	4·2	4·0	5·0
28	Fluoride (F)	1·6	.....	0·50	.....	0·10	0·05
29	Nitrite (NO_2)	.....	0	.....	0	.....	.....
30	Nitrate (NO_3)	1·0	1·3	0	3·1	7·1	4·4
31	Silica (SiO_2) Gravimetric	12	0·5	.....	6·0	4·6	3·0
32	Colorimetric	11	.....	9·0	.....	4·6	4·6
33	Carbonate hardness, as $CaCO_3$	195	95·5	221	113·6	130	118
34	Non-carbonate hardness, as $CaCO_3$	47·8	38·7	58·4	147·4	37·5	48·9
35	Total hardness, as $CaCO_3$	243	134	280	261·0	167	167
36	Sum of constituents	358	150	327	180	195	197
37	Saturntion index	+0·7	+0·2	+0·6	−0·4	+0·5	+0·5
	Remarks:		* Calculated.				

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

Nelson Township	New Hamburg		Newmarket			New Toronto		Niagara (Niagara-on-the-Lake)			
Treated Lake Ontario	Springs		Wells			Lake Ontario		Niagara River			
Purchased from Burlington, Ont.	Raw and Finished Water		Raw and Finished Water			Raw Water	Finished Water	Raw Water	Finished Water		
—	At Springs		Cotter St. Well At Pump	Sirgley Well At Pump	Water St. Well At Pump	At Intake Well	Town Tap	From River at Plant	Plant Tap		No.
	4512	4884	4145	4146	4147	1380	5000	2474	2577	5693	1
	610	783	579	580	581	163	865	247	248	A98	2
	July 15/50	Feb. 6/51	Mar. 23/50	Mar. 23/50	Mar. 23/50	Mar. 1/47	Mar. 19/51	July 12/48	July 12/48	May 10/52	3
	02	6	32	32	32	6	25	127	150	12	4
	.....	0·6	9	9·0	8·0	.....	5·0	22·0	22·5	3·3	5
	26·5	24·0	20·2	20·0	20·0	room	20·4	20·9	22·6	22·0	6
	.....	.....	.....	.....	.....	.....	.....	(11·2)	.....	.....	7
	.....	.....	.....	.....	.....	.....	.....	(1·8)	(6·2)	.....	8
	7·9	8·0	8·4	8·0	8·4	8·1	7·9	8·2 (8·5)	7·7 (7·5)	7·8	9
	5	10	7	10	5	5	0	5 (5)	8 (10)	5	10
	0·8	0·8	0·5	3	0·4	0·5	2	3 (7)	1	0·6	11
	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	12
	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	13
	263	292	344	381	347	177	.....	.....	183	195	14
	58·0	31·8	18·0	31·0	21·4	.....	.....	.....	40·2	39·8	15
	401	466	601	617	597	.....	298	291	302	305	16
	56·0	72·9	47·3	47·5	41·7	..... 39·3	38·6	37·8	35·2	38·8	17
See Burlington	24·5	17·5	17·1	19·5	16·8	7·2	7·5	8·2	8·2	8·2	18
	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	19
	0·06	0·13	0·07	0·13	0·20	0·03	.....	.....	.....	0·06	20
	.....	.....	.....	.....	.....	11·1	.....	.....	.....	.....	21
	2·2	2·0	63·0	70·0	68·0	.....	9·3	8·5	9·3	8·8	22
	0·6	0·8	1·3	2·0	1·7	.....	0·8	1·6	1·5	1·8	23
	2·9	6·7	16·8	7·2	15·1	0	0	0 (0)	0 (0)	0	24
	243	264	207	299	210	118	112	112 (115)	118 (132)	110	25
	26·7	26·7	12·5	11·2	10·9	21·0	25·3	.....	27·3	27·7	26
	2·0	1·5	77·3	43·3	76·7	18·5	20·4	19·2	20·5	23·7	27
	0	0·10	0·15	0·20	0·20	0	.....	.....	0·14	0·1	28
	.....	.....	.....	.....	.....	0	.....	.....	.....	.....	29
	14·2	1·4	0	9·7	3·1	3·5	0	.....	0·3	0·6	30
	.....	.....	20	26	20	4·5	.....	.....	.....	.....	31
	7·8	12	18	19	18	.....	1·2	1·2	1·4	0·3	32
	204	227	188	199	173	97·0	91·4	91·6	97·0	90·0	33
	36·9	26·6	0	0	0	30·7	35·7	36·5	24·5	40·5	34
	241	254	188	199	173	128	127	129	122	131	35
	257	272	355	377	356	163	158	.....	162	164	36
	+0·5	+0·8	+0·8	+0·5	+0·8	+0·3	−0·1	+0·2	−0·2	.....	37

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

No.						
	Municipality	Niagara Falls				Niagara Township
	Source(s)	Niagara River				Purchased from Niagara, Ont., and Niagara Falls, Ont.
		Raw Water		Finished Water		
	Sampling Point	At Intake	At Intake	Town Tap	Town Tap at Chippawa	
1	Laboratory number	2358	2498	1849	2575	
2	Field number	529A	534A	177	256	
3	Date of collection	Feb. 16/48	July 4/48	Feb. 16/48	July 14/48	
4	Storage period (days)	235	137	18	148	
5	Sampling temperature, °C	.....	.....	.....	.....	
6	Test temperature, °C	23·9	20·0	room	22·8	
7	Dissolved oxygen	.....	.....	.....	.....	
8	Carbon dioxide (CO_2)	.....	.....	.....	(4·0)	
9	pH	8·2	8·5	7·9	8·2 (7·9)	
10	Colour	0	10	10	4 (5)	
11	Turbidity	4	3	1	0·6	
12	Suspended matter, dried at 105°C	.....	7·2	.....	.....	
13	Suspended matter, ignited at 550°C	.....	4·0	.....	.....	
14	Residue on evaporation, dried at 105°C	.....	168	175	170	*See* Niagara, and Niagara Falls.
15	Ignition loss at 550°C	.....	23·0	56·4	39·2	
16	Specific conductance (micromhos at 25°C)	303	275	294	286	
17	Calcium (Ca)	40·5	34·9	38·3	34·4	
18	Magnesium (Mg)	10·3	8·2	8·8	8·3	
19	Iron (Fe) Total	.....	0·25	.....	.....	
20	Dissolved	.....	0·04	0·01	0·03	
21	Alkalis—as sodium (Na)	.....	.....	.....	.....	
22	sodium (Na)	8·3	8·5	8·5	8·0	
23	potassium (K)	1·5	1·5	1·5	1·6	
24	Carbonate (CO_3)	0	1·9	0	0 (0)	
25	Bicarbonate (HCO_3)	127	105	124	115 (112)	
26	Sulphate (SO_4)	.....	21·1	25·9	25·6	
27	Chloride (Cl)	18·2	20·1	18·5	18·2	
28	Fluoride (F)	.....	0·05	.....	0·10	
29	Nitrite (NO_2)	.....	.....	0	.....	
30	Nitrate (NO_3)	.....	0	0·45	0·8	
31	Silica (SiO_2) Gravimetric	.....	1·4	3·8	.....	
32	Colorimetric	6·2	0·2	2·0	1·6	
33	Carbonate hardness, as $CaCO_3$	104	88·0	102	94·0	
34	Non-carbonate hardness, as $CaCO_3$	39·5	32·8	29·9	26·1	
35	Total hardness, as $CaCO_3$	144	121	132	120	
36	Sum of constituents	.....	149	167	155	
37	Saturation index	+0·4	+0·5	+0·1	+0·3	
	Remarks:					

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

North Grimsby Township	North York Township				Norwich	Norwood	
Treated Lake Ontario	Wells and Don River				Wells	Well	
Purchased from Grimsby, Ont.	Plant No. 1—Well		Plant No. 2—Well		Raw and Finished Water	Raw and Finished Water	
	Raw Water	Finished Water	Raw Water	Finished Water			
——	At Pump	Plant Tap	At Pump	Plant Tap	Town Tap	Town Tap	No.
	4238	4237	4239	4236	2671	4972	1
	596	595	597	594	269	816	2
	Mar. 27/50	Mar. 27/50	Mar. 27/50	Mar. 27/50	July 17/48	Mar. 7/51	3
	57	57	57	57	182	28	4
	9·4	9·4	9·4	9·4	14·8	7·2	5
	25·0	22·0	25·0	22·0	21·9 (20·0)	22·3	6
	.....	.....	.....	.....	.....	.....	7
	.....	.....	.....	.....	(11·4)	.....	8
	8·2	8·1	8·4	8·3	7·9 (7·6)	7·6	9
	0	0	5	3	10 (8)	0	10
	2	0·5	6	0·4	4	0·5	11
	.....	.....	6·4	.....	4·2	.....	12
	.....	.....	5·6	.....	3·2	.....	13
	220	395	.....	348	258	264	14
	26·0	23·0	.....	21·2	33·4	34·4	15
	348	603	487	532	442	429	16
See Grimsby.	40·0	37·0	71·0	55·0	43·6	71·5	17
	17·5	11·3	19·3	15·8	22·5	7·0	18
	.....	.....	0·64	.....	0·27	.....	19
	0·16	0·07	0·35	0·06	0·03	0·04	20
	.....	.....	.....	.....	.....	.....	21
	11·0	80·0	17·1	47·0	15·0	2·3	22
	1·7	1·1	1·9	1·7	1·0	0·7	23
	2·4	0	7·2	2·4	0 (0)	0	24
	195	371	321	349	251 (249)	242	25
	15·2	16·5	9·9	9·9	30·6	20·4	26
	8·5	21·0	8·0	8·0	3·5	5·7	27
	0	0	0·05	0	0·60	0	28
	.....	.....	.....	.....	.....	.....	29
	1·8	0·6	0·5	2·7	0·7	2·7	30
	23	21	28	26	14	.....	31
	20	17	24	24	11	7·5	32
	164	139	257	202	201	198	33
	7·8	0	0	0	0	8·8	34
	172	139	257	202	201	207	35
	214	371	317	340	253	237	36
	+0·6	+0·7	+1·3	+1·0	+0·4	+0·3	37

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

No.	Municipality	Oakville				Ojibway	Orangeville
	Source(s)	Lake Ontario				Treated Detroit River	Springs
		Raw Water		Finished Water		Purchased from Windsor, Ont.	Raw and Finished Water
	Sampling Point	Lake at New Toronto	Intake at Port Credit	Plant Tap	Plant Tap		Town Tap
1	Laboratory number	1380	2623	2550	5670		4178
2	Field number	163	240	203	A94		586
3	Date of collection	Mar. 1/47	July 8/48	June 12/48	Apr. 23/52		Mar. 24/50
4	Storage period (days)	6	181	171	6		41
5	Sampling temperature, °C	.....	8·8	14·0	6·7		6·7
6	Test temperature, °C	room	22·6	20·4	24·0		22·0
7	Dissolved oxygen	.....	.....	.....	.....		.....
8	Carbon dioxide (CO_2)	.....	(3·7)	(1·0)	.....		.....
9	pH	8·1	8·3 (8·2)	8·4 (8·0)	8·1		8·2
10	Colour	5	10 (8)	0 (20)	5		0
11	Turbidity	0·5	4	0	5		0·5
12	Suspended matter, dried at 105°C	.....	4·0	.....	1·9		.....
13	Suspended matter, ignited at 550°C	.....	2·0	.....	1·7		.....
14	Residue on evaporation, dried at 105°C	177	178	142	185		253
15	Ignition loss at 550°C	.....	29·8	26·8	36·2		36·6
16	Specific conductance (micromhos at 25°C.)	.....	297	234 (288)*	299		432
17	Calcium (Ca)	39·3	39·0	24·6 (30·6)*	39·5	*See* Windsor.	63·8
18	Magnesium (Mg)	7·2	8·5	8·9	8·0		17·3
19	Iron (Fe) Total	.....	0·32	.....	0·54		.....
20	Dissolved	0·03	0·03	0·02	0·04		0·03
21	Alkalis—as sodium (Na)	11·1	.....	.....	.....		.....
22	sodium (Na)	.....	8·0	8·6	9·0		2·9
23	potassium (K)	.....	1·6	1·5	1·4		1·0
24	Carbonate (CO_3)	0	1·9 (0)	0 (0)	2·9		2·4
25	Bicarbonate (HCO_3)	118	114 (117)	80·5 (117)	114		249
26	Sulphate (SO_4)	21·0	24·0	24·8	26·0		20·0
27	Chloride (Cl)	18·5	18·2	18·5	0·1		3·0
28	Fluoride (F)	0	0·10	0·08	.....		0
29	Nitrite (NO_2)	0	.....	0	.....		.....
30	Nitrate (NO_3)	3·5	1·3	0	4·0		8·0
32	Silica (SiO_2) Gravimetric	4·5	.....	3·8	.....		12
32	Colorimetric	.....	3·4	4·0	4·1		12
33	Carbonate hardness, as $CaCO_3$	97·0	96·8	66·0 (96·0)	98·0		208
34	Non-carbonate hardness, as $CaCO_3$	30·7	35·5	32·0 (32·1)*	33·5		22·4
35	Total hardness, as $CaCO_3$	128	132	98·0 (128)*	132		230
36	Sum of constituents	163	162	131 (161)*	172		253
37	Saturation index	+0·3	+0·4	+0·1 (0)*	+0·3		+0·8
	Remarks:			* Corrected for loss of $CaCO_3$ on storage.			

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

Orillia								Oshawa		
Wells and Lake Couchiching								Lake Ontario		
Wells				Lake Couchiching				Raw Water	Finished Water	
Well No. 1		Mixed Wells		Raw Water		Finished Water		Plant Intake	Town Tap	No.
At Pump		Direct from Reservoir		Direct from Lake	At Pump	Plant Tap	Plant Tap			
2365	5673	2019	2768	2115	5674	2143	5672	1378	4170	1
142	A92	189	343	144	A93	143	A91	161	573	2
Sept. 24/47	Apr. 29/52	Mar. 21/48	Jan. 24/49	Sept. 24/47	Apr. 29/52	Sept. 24/47	Apr. 29/52	Feb. 24/47	Mar. 22/50	3
385	9	72	24	292	9	300	9	11	41	4
14·0	11·7	.....	.....	14·3	10·0	15·0	.....	.....	9·5	5
21·0	22·5	room	21·0	room	22·5	room	22·5	room	22·0	6
.....	.....	.....	.....	(9·6)	.....	.....	.....	.....	.....	7
(10·0)	.....	.....	.....	(2·0)	.....	(4·0)	.....	.....	.....	8
8·2 (7·6)	7·7	8·1	8·1	7·6 (8·4)	8·0	7·9 (7·9)	7·8	8·1	8·0	9
0 (5)	5	.....	0	5 (20)	5	30 (10)	10	5	0	10
4	0·4	.....	1	(7)	5	clear	3	0·7	0·4	11
9·0	.....	.....	.....	.....	4·4	.....	.....	.....	.....	12
3·4	.....	.....	.....	.....	2·9	.....	.....	.....	.....	13
155	322	290	255	160	161	152	162	178	182	14
49·5	50·8	57·0	93·8	26·6	23·6	13·2	26·2	.....	23·0	15
224	511	457	427	267	259	255	253	.....	293	16
23·9*(64·5)**	81·0	69·7	65·2	35·6	43·5	38·0	43·7	39·3	30·5	17
12·5	16·0	11·0	13·6	6·0	5·7	6·7	5·6	8·3	8·3	18
0·01	.....	.....	.....	.....	0·17	.....	.....	.....	.....	19
0·01	0·03	0·11	0·03	0·02	0·02	0·03	0·03	0·02	0·03	20
.....	.....	20·5	.....	.....	.....	.....	.....	11·6	.....	21
6·9	10·5	.....	7·8	.....	3·3	5·0	3·3	.....	8·9	22
1·3	0·5	.....	1·5	.....	0·5	3·0	0·8	.....	1·1	23
0 (0)	0	12·0	0	0 (0)	0	0 (0)	0	0	2·4	24
108* (232)	279	196	232	140 (132)	139	120 (132)	139·1	118	109	25
27·2	35·4	30·0	27·2	19·8	21·1	20·0	21·4	23·9	29·8	26
4·5 (4·0)	16·5	15·0	10·3	3·6	5·1	4·2	5·7	17·6	18·7	27
0·05	0	.....	0·05	.....	0·1	.....	0·05	.....	0·10	28
.....	.....	.....	.....	.....	.....	.....	.....	0	.....	29
4·9	4·0	3·5	3·5	2·6	trace	2·6	trace	2·7	0·9	30
14·5	.....	12	8·6	4·8	.....	.....	.....	0·5	3·0	31
15·4	10·5	17	7·8	6·8	3·3	5·5	2·4	.....	1·8	32
88·6 (190)	229	181	190	114	114	98·0	114	97·0	93·0	33
22·4 (22·6)	39·1	33·4	28·5	0	18·0	24·5	18·1	35·3	39·8	34
111* (213)**	268	219	219	114	132	123	132	132	133	35
150 (252)	312	275	252	.....	151	144	152	162	166	36
0 (+0·2)**	+0·5	+0·8	+0·7	−0·2	+0·2	+0·1	0	+0·3	+0·1	37

* Note loss of calcium and hardness due to long storage.

** Corrected values calculated from field results.

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

No.	Municipality	Owen Sound				Paisley			Palmerston
	Source(s)	Springs	Sydenham River			Deep Well			Wells
		Raw and Finished Water	Raw Water	Finished Water		Raw and Finished Water			Raw and Finished Water
	Sampling Point	Town Tap	River above Town	Town Tap		—	—	Town Tap	Town Tap
1	Laboratory number	4983	4995	1856	5034			5045	5074
2	Field number	833	834	181	832			839	859
3	Date of collection	Mar. 12/51	Mar. 12/51	Feb. 24/48	Mar. 12/51	Oct. 23/45	Oct. 30/45	Mar. 12/51	Mar. 15/51
4	Storage period (days)	24	32	15	51			54	68
5	Sampling temperature, °C	7·2	0·6		7·0			5·6	8·9
6	Test temperature, °C	21·7	21·7	room	21·7	room	room	23·0	21·7
7	Dissolved oxygen								
8	Carbon dioxide (CO_2)								
9	pH	7·5	7·8	7·6	7·2	7·0	7·6	7·5	7·6
10	Colour	0	25	35	25			0	2
11	Turbidity	0·9	4	2	2			150	0·9
12	Suspended matter, dried at 105°C							36	
13	Suspended matter, ignited at 550°C							23	
14	Residue on evaporation, dried at 105°C	261		264	223			2332	344
15	Ignition loss at 550°C	55·4		114	79·8			211	66·0
16	Specific conductance (micromhos at 25°C)	438	391	437	379			2383	552
17	Calcium (Ca)	59·8	56·3	59·2	53·3	573	690	547	67·5
18	Magnesium (Mg)	21·3	15·5	24·9	17·8	55·6	77	72·5	29·0
19	Iron (Fe) Total					0·6		5·5	
20	Dissolved	0·06		0·02	0·06			0·07	0·09
21	Alkalis—as sodium (Na)								
22	sodium (Na)	2·2	1·5	2·5	1·6			16·6	8·3
23	potassium (K)	0·8	1·1	1·5	1·0			2·0	1·6
24	Carbonate (CO_3)	0	0	0	0	0		0	0
25	Bicarbonate (HCO_3)	267	244	275	234	224		236	306
26	Sulphate (SO_4)	20·9	10·3	18·1	9·5	2088	1285	1438	44·9
27	Chloride (Cl)	2·5	2·8	2·1	3·5	27·2	17	13·7	12·1
28	Fluoride (F)	0		0	0			2·0	0·30
29	Nitrite (NO_2)								
30	Nitrate (NO_3)	11·5	2·7	0·8	2·7			0·9	2·2
31	Silica (SiO_2) Gravimetric			6·0		7·5			
32	Colorimetric	7·0	3·2	5·0	3·5			15	8·8
33	Carbonate hardness, as $CaCO_3$	218·4	200	226	192	200		193	251
34	Non-carbonate hardness, as $CaCO_3$	18·4	4·2	28·0	14·2	1458		1469	37·1
35	Total hardness, as $CaCO_3$	237	204	254	206	1658	2040	1662	288
36	Sum of constituents	257	214	251	208			2224	326
37	Saturation index	+0·1	+0·4	+0·3	−0·3			+0·9	+0·3
	Remarks:				Boron=0 p.p.m.	Analyses supplied by Town of Paisley.		Note high fluoride.	

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

PARIS				PARKHILL	PARRY SOUND		PENETANGUISHENE	
Springs				Deep Well	Georgian Bay (Lake Huron)		Well	
Raw and Finished Water				Raw and Finished Water	Raw Water	Finished Water	Raw and Finished Water	
Spring No. 1		Spring No. 2		At Pump	Directly Off Shore	Town Tap	Towa Tap	No.
4313	5668	4314	5669	3905	4937*	.....	4976	1
623	A89	624	A90	548	791	.....	822	2
Apr. 14/50	Apr. 24/52	Apr. 14/50	Apr. 24/52	Feb. 10/50	Feb. 26/51	.....	Mar. 8/51	3
71	5	71	5	11	17	.....	27	4
7·2	6·1	7·2	6·1	8·9	0·6	.....	5·6	5
26·0	24·0	26·0	24·0	22·0	23·0	.....	20·3	6
.....	.....	.....	.....	.....	.....	10·3	.....	7
.....	.....	.....	.....	.....	.....	0	.....	8
8·1	8·1	7·9	7·8	7·6	7·0	8·0	7·6	9
4	5	2	5	0	4	.....	0	10
0·2	0·2	0·2	0·4	0·4	3	.....	0·3	11
.....	.....	.....	.....	.....	.....	0	.....	12
.....	.....	.....	.....	.....	.....	.....	.....	13
245	281	262	313	1067	49·4	102	177	14
60·4	54·6	51·0	60·4	77·5	20·6	.....	20·8	15
397	449	437	516	1478	59·3	.....	292	16
67·4	66·0	95·4	77·0	115	6·2	22·8	43·2	17
16·5	18·5	21·5	22·7	41·5	1·5	6·4	10·5	18
.....	.....	.....	.....	.....	.....	.....	.....	19
0·06	0·01	0·03	0·02	0·04	0·15	0·02	0·02	20
.....	.....	.....	.....	.....	.....	.....	.....	21
6·2	4·6	4·0	3·5	152	0·8	.....	3·3	22
1·4	0·6	1·3	1·8	2·1	0·4	.....	1·0	23
4·8	4·8	2·4	0	0	0	0	0	24
225	245	347	302	165	14·6	76·3	178	25
30·3	29·1	32·8	29·1	491	10·4	13·2	14·5	26
10·0	6·7	4·0	6·8	94·4	0·5	2·9	1·3	27
0·05	0·05	0	0·05	1·6	.....	.....	0·05	28
.....	.....	.....	.....	.....	.....	.....	.....	29
24·8	4·0	15·9	14·4	0	0·9	0·6	1·8	30
12	.....	11	.....	.....	3·8	5·2	.....	31
11	14·0	9·8	10·9	11	3·7	.....	12	32
192	209	289	248	135	12·0	62·5	146	33
44·2	31·7	37·7	37·9	323	9·6	20·7	5·4	34
236	241	327	286	458	21·6	83·2	151	35
284	269	359	315	990	31·9	.....	176	36
+0·8	+0·8	+0·9	+0·6	+0·2	−2·5	.....	−0·1	37
				Hydrogen sulphide present.	* This sample is partly Seguin River water. The river enters Bay nearby and at time of sampling was in flood from heavy rain.	Analysis supplied by town of Parry Sound.		

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

No.													
	Municipality	Peterborough											
	Source(s)	Otonabee River											
		Raw Water			Finished Water	Raw Water							
	Sampling Point	Direct from Plant Intake			Town Tap	—							
1	Laboratory number	3022	2311	2723	3007								
2	Field number	280	326	196	279								
3	Date of collection	July 22/48	Aug. 26/48	Jan. 19/49	July 14/48	1947 Jan.	Feb.	Mar.	Apr.	May	June	July	
4	Storage period (days)	263	32	269	269								
5	Sampling temperature, °C	22·8	26·1	0	20·8	0·56	0·56	0·73	2·76	10·7	18·4	22·3	
6	Test temperature, °C	20·6	23·3	21·0	22·0						room	room	
7	Dissolved oxygen	(8·9)											
8	Carbon dioxide (CO_2)	(4·4)	(0·9)		(7·9)								
9	pH	8·2 (8·0)	7·7 (8·2)	7·6	7·9 (7·6)	8·0	7·9	7·9	7·87	7·75	7·95	8·0	
10	Colour	15 (35)	20 (20)	15	5 (20)	16	17·3	29·6	20·1	28·2	30·8	37·4	
11	Turbidity	0·4	5	0·9	1								
12	Suspended matter, dried at 105°C		10										
13	Suspended matter, ignited at 550°C		6·4										
14	Residue on evaporation, dried at 105°C		116	110	110								
15	Ignition loss at 550°C		49·0	42·2	42·2								
16	Specific conductance (micromhos at 25°C.)	173	178	173	176								
17	Calcium (Ca)	30·0	31·8	29·2	28·6								
18	Magnesium (Mg)	3·1	3·1	4·0	3·5								
19	Iron (Fe) Total		0·10										
20	Dissolved		0·07	0·10	0·04								
21	Alkalis—as sodium (Na)												
22	sodium (Na)	2·3	1·8	1·6	1·8								
23	potassium (K)	1·0	0·9	1·4	0·8								
24	Carbonate (CO_3)	0 (0)	0 (0)	0	0 (0)	0	0	0	0	0	0	0	
25	Bicarbonate (HCO_3)	92·7 (89·1)	90·3 (92·7)	91·5	90·3 (87·8)	109·9	108·2	113·4	99·4	103·2	97·4	108·6	
26	Sulphate (SO_4)	20·6	11·5	14·6	12·3								
27	Chloride (Cl)	0	0	0	1·3								
28	Fluoride (F)		0·20	0	0·07								
29	Nitrite (NO_2)												
30	Nitrate (NO_3)		0·9	0·2	0·4								
31	Silica (SiO_2) Gravimetric		5·6	2·6	3·2								
32	Colorimetric	5·6	4·6	1·4	3·6								
33	Carbonate hardness, as $CaCO_3$	76·0	74·0	75·0	74·0 (72·0)								
34	Non-carbonate hardness, as $CaCO_3$	13·5	18·1	14·3	11·8								
35	Total hardness, as $CaCO_3$	89·5	92·1	89·3	85·8								
36	Sum of constituents	109	100	98·7	96·8								
37	Saturation index	+0·1	−0·3	−0·5	−0·2								
38	Filter alum added												
	Remarks:												

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

PETERBOROUGH—*con.*																			
Otonabee River																			
Raw Water						Finished Civic Supply													
—						—													No.
																			1
																			2
Aug.	Sept.	Oct.	Nov.	Dec.	Av. 1947	1947	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Av. 1947	3
																			4
24·4	20·6	16·2	6·2	0	10·3														5
room											room	room							6
																			7
																			8
8·1	8·1	8·0	7·67	7·9	7·93		8·0	7·9	7·9	7·6	7·3	7·4	7·45	7·4	7·38	7·4	7·9		7·59	9
32·4	31·5	30·1	25·1	16·6	25·5		9·2	9·2	10·6	12·4	12·2	11·9	12·7	10·0	11·7	11·1	11·7	13·3	11·3	10
																				11
																				12
																				13
																				14
																				15
																				16
																				17
																				18
																				19
																				20
																				21
																				22
																				23
0	0	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0	0	24
112·8	99·8	97·6	91·6	101·7	97·1		109·9	108·2	113·4	97·4	91·0	87·2	86·6	96·1	93·9	90·9	88·2	101·7	87·35	25
																				26
																				27
																				28
																				29
																				30
																				31
																				32
																				33
																				34
																				35
																				36
																				37
							0	0	0	0·5	0·82	0·85	0·80	0·5	0·5	0·5	0·5	0	0·41	38

Data supplied by Peterborough Waterworks plant.

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

No.	Municipality	Petrolia			Picton		Point Edward	Port Colborne	
	Source(s)	Lake Huron			Bay of Quinte (Lake Ontario)		St. Clair River	Lake Erie	
		Raw Water		Finished Water	Raw Water	Finished Water	Purchased from Sarnia, Ont.	Raw Water	Finished Water
	Sampling Point	At Plant Basin		Plant Tap		Plant Tap			Plant Tap
1	Laboratory number	2476	3945	3946		2775			2576
2	Field number	233	545	546		285			258
3	Date of collection	June 24/48	Feb. 20/50	Feb. 25/50		Aug. 11/48			July 15/48
4	Storage period (days)	145	3	3		195			147
5	Sampling temperature, °C	.....	.....	.....		.....			23·5
6	Test temperature, °C	21·1	21·6	21·6		21·9			22·8
7	Dissolved oxygen	.....	.....	.....		.....			.....
8	Carbon dioxide (CO_2)	(7·0)	.....	.....		(17·6)			(2·6)
9	pH	8·1 (7·9)	7·6	7·4		8·1 (7·0)			8·1 (8·1)
10	Colour	0 (10)	20	8		5 (<5)			2 (8)
11	Turbidity	6 (s1 <7)	25	25		0·4			0·9
12	Suspended matter, dried at 105°C	.....	24	22		.....			.....
13	Suspended matter, ignited at 550°C	.....	19	18		.....			.....
14	Residue on evaporation, dried at 105°C	.....	130	131		171			183
15	Ignition loss at 550°C	.....	22·6	22·8		25·6			43·2
16	Specific conductance (micromhos at 25°C.)	212	212	217	*See* Belleville	285	*See* Sarnia.	*See* other an-	298
17	Calcium (Ca)	28·6	29·3	29·1	and nearby	38·7		alyses of raw	35·6
18	Magnesium (Mg)	7·3	7·1	7·2	municipalities	7·6		Lake Erie wa-	8·2
19	Iron (Fe) Total	.....	0·63	0·50	using Lake	.....		ter in vicinity.	.....
20	Dissolved	.....	0·12	0·03	Ontario.	0·04			0·02
21	Alkalis—as sodium (Na)	.....	.....	.....		.....			.....
22	sodium (Na)	3·7	3·7	3·3		6·0			9·3
23	potassium (K)	1·3	1·0	0·8		1·3			1·6
24	Carbonate (CO_3)	0 (0)	0	0		3·6 (0)			0 (0)
25	Bicarbonate (HCO_3)	100 (97·6)	107	95·6		96·1 (100)			112 (117)
26	Sulphate (SO_4)	.....	16·5	24·7		37·4			26·6
27	Chloride (Cl)	6·2	4·7	5·0		16·6			22·2
28	Fluoride (F)	.....	0·10	0·05		0			0·15
29	Nitrite (NO_2)	.....	.....	.....		.....			.....
30	Nitrate (NO_3)	.....	1·1	0·6		0·4			1·8
31	Silica (SiO_2) Gravimetric	.....	4·2	3·4		.....			0
32	Colorimetric	5·0	2·2	2·4		1·6			0·4
33	Carbonate hardness, as $CaCO_3$	82·0	87·6	78·4		84·8			92·0 (96·0)
34	Non-carbonate hardness, as $CaCO_3$	19·5	14·7	23·8		43·1			30·5
35	Total hardness, as $CaCO_3$	102	102	102		128			122·5
36	Sum of constituents	.....	119	121		161			161
37	Saturation index	0	−0·5	−0·7		+0·1			+0·1
	Remarks:								

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

Port Credit		Port Dalhousie	Port Dover		Port Elgin	Port Hope				
Lake Ontario		Welland Canal	Springs		Wells and Springs	Lake Ontario				
Raw Water	Finished Water	Purchased from St. Catharines, Ont.	Raw and Finished Water		Raw and Finished Water	Raw Water				
At Intake Pump	At Distribution Pump		Town Tap		Plant Tap	At Plant Intake				No.
2623	2627		2554	5667	5027	2565	2542	2499	2652	1
240	241		263	A88	837	514A	517A	670A	747A	2
July 8/48	July 8/48		July 16/48	Apr. 23/52	Mar. 12/51	Apr. 5/48	July 5/48	Sept. 7/48	Jan. 1/49	3
181	181		137	6	49	248	147	42	4	4
8·8	9·5		15·5	10·0	7·2	0·56	8·9	15·6	1·7	5
room	22·7		20·3 (22·8)	24·0	23·0	room	room	room	room	6
										7
(3·7)	(5·3)		(10·6)							8
8·3 (8·2)	8·3 (7·7)		8·2 (7·7)	8·0	7·7	8·1	8·3	7·7	8·1	9
10 (8)	15 (5)		0 (7)	5	5	5	0	5	2	10
4	0·9		1	0·7	2	18	1	0·4	6	11
4·0						20			13	12
2·0						12			11	13
178	183		164	253	733	191	181	185	181	14
29·8	33·6		33·0	23·4	117	27·4	33·8	24·4	20·2	15
297	300		261	403	997	322	295	292	302	16
39·0	38·9		27·2 (59·3)*	63·8	160	43·2	38·8	38·2	41·0	17
8·5	8·7		15·2	14·4	30·5	8·7	8·9	8·2	8·4	18
0·32		*See*				0·46			0·26	19
0·03	0·05	St. Catharines	0·22	0·10	0·05	0·03	0·10	0·11	0·02	20
										21
8·0	8·7		3·3	1·6	11·6	10·3	8·0	8·5	8·0	22
1·6	1·8		1·1	0·6	3·2	1·8	1·6	1·7	1·5	23
1·9 (0)	4·6 (0)		0 (0)	4·8	0	1·0	2·9	0	2·4	24
114 (117)	114 (120)		122 (220)	215	261	142	117	115	131	25
24·0	24·7		30·0	34·2	326	23·7	22·6	23·7	23·4	26
18·2	19·5		1·5	3·9	12·5	16·7	18·0	20·1	15·5	27
0·10	0·10		0	0·10	0·20	0·05	0·10	0·10	0·10	28
										29
1·3	0·8		4·4	3·6	0·9	2·7	0·9	0·7	1·8	30
			12				3·0	1·8	6·0	31
3·4	3·9			13	11	4·4	2·6	0·2	5·2	32
96·8	101 (98·0)		100 (180)	184	214	118	99·0	94·0	111	33
35·5	32·1		30 (30)	34·4	311	25·6	34·4	35·0	25·9	34
132	133		130 (210)*	218	525	144	133	129	137	35
162	168		155 (235)*	246	685	183	163	160	172	36
+0·5	+0·4		+0·1 (+0·2)*	+0·6	+0·7	+0·4	+0·5	−0·2	+0·35	37

* Using field results, corrected for loss of $CaCO_3$ on storage.

See also Station No. 13, Table IV, Part I.

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

No.			
	Municipality	Port Hope *(Cont'd)*	Port McNicoll
	Source(s)	Lake Ontario	Georgian Bay
		Finished Water	Raw and Finished Water
	Sampling Point	Town Tap	—
1	Laboratory number	4169	
2	Field number	571	
3	Date of collection	Mar. 21/50	
4	Storage period (days)	42	
5	Sampling temperature, °C	7·5	
6	Test temperature, °C	22·0	
7	Dissolved oxygen	.....	
8	Carbon dioxide (CO_2)	.....	
9	pH	8·3	
10	Colour	0	
11	Turbidity	0·4	
12	Suspended matter, dried at 105°C	.....	
13	Suspended matter, ignited at 550°C	.....	
14	Residue on evaporation, dried at 105°C	174	
15	Ignition loss at 550°C	18·4	
16	Specific conductance (micromhos at 25°C.)	299	
17	Calcium (Ca)	40·3	*See* Victoria Harbour.
18	Magnesium (Mg)	8·6	
19	Iron (Fe) Total	.....	
20	Dissolved	0·03	
21	Alkalis—as sodium (Na)	.....	
22	sodium (Na)	8·7	
23	potassium (K)	1·1	
24	Carbonate (CO_3)	6·7	
25	Bicarbonate (HCO_3)	106	
26	Sulphate (SO_4)	27·7	
27	Chloride (Cl)	18·5	
28	Fluoride (F)	0·10	
29	Nitrite (NO_2)	.....	
30	Nitrate (NO_3)	1·3	
31	Silica (SiO_2) Gravimetric	3·2	
32	Colorimetric	1·9	
33	Carbonate hardness, as $CaCO_3$	98·0	
34	Non-carbonate hardness, $CaCO_3$	37·9	
35	Total hardness, $CaCO_3$	136	
36	Sum of constituents	168	
37	Saturation index	+0·4	
	Remarks:		

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

Port Perry		Port Rowan		Port Stanley		Prescott	
Well		Lake Erie (Long Point Bay)		Lake Erie		St. Lawrence River	
Raw and Finished Water		Raw Water	Finished Water	Raw Water	Finished Water	Raw and Finished Water	
Town Tap		—	—	At Intake	Plant Tap	Plant Tap	No.
4286	5671	5744	5745	2376	1880	2468	1
619	A95	A104	A105	545A	183	283	2
Apr. 5/50	Apr. 24/52	July 5/52	July 5/52	Feb. 17/48	Feb. 17/48	Aug. 10/48	3
68	5	6	6	239	36	90	4
10·0	.....	.....	.....	2·0	.....	21·1	5
25·0	24·0	27·3	27·3	room	room	19·1	6
.....	.....	.....	.....	.....	.....	.....	7
.....	.....	.....	.....	.....	.....	(2·5)	8
8·1	7·9	7·8	8·1	8·1	7·7	7·4 (8·2)	9
10	10	20	10	7	10	5 (5)	10
1	6	15	2·5	8	4	2	11
.....	1·2	.....	.....	.....	.....	.....	12
.....	1·2	.....	.....	.....	.....	.....	13
.....	261	.....	231	.....	192	.....	14
.....	32·2	.....	55·4	.....	57·6	.....	15
362	441	353	333	320	310	292	16
68·0*	60·5	47·7	44·5	40·5	39·3	35·8	17
19·5	20·5	10·4	10·9	7·6	9·7	7·3	18
.....	0·95	.....	.....	.....	.....	.....	19
.....	0·03	.....	0·19	.....	0·08	.....	20
.....	.....	.....	.....	.....	.....	.....	21
5·6	4·5	6·3	6·2	8·8	7·5	9·0	22
1·0	1·2	1·2	1·2	1·4	0·5	2·0	23
7·2	6·0	0	2·4	0	0	0 (0)	24
297	272	159	142	112	115	114 (115)	25
21·2	18·8	27·8	29·4	.....	36·7	.....	26
0	1·7	13·6	15·7	18·5	18·3	20·0	27
.....	0	.....	0·1	.....	.....	.....	28
.....	.....	.....	.....	.....	0·7	.....	29
1·1	0	trace	trace	.....	0·5	.....	30
.....	.....	.....	.....	.....	.....	.....	31
18	19	1·1	1·1	1·8	3·0	1·0	32
250	233	131	120	92·0	94·2	93·6	33
0	2·2	31·1	35·4	40·5	42·9	25·8	34
250*	235	162	156	133	137	119	35
288*	267	184	182	.....	173	.....	36
+0·6	+0·6	+0·2	+0·5	+0·3	−0·15	−0·6	37

* Corrected for $CaCO_3$ deposited during storage.

Aluminium—about 0·2 p.p.m.

See also monthly data on Lake Erie at Port Stanley, Table IV, Part I of this report.

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TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

No.					
	Municipality	Preston			
	Source(s)	Springs and Wells			
		Raw and Finished Water			
	Sampling Point	Top Spring*	Well No. 1		
1	Laboratory number	2555			2706
2	Field number	306			308
3	Date of collection	Aug. 19/48	Sept. 12/46	Dec. 3/47	Aug. 19/48
4	Storage period (days)	103			161
5	Sampling temperature, °C.	10·0			10·0
6	Test temperature, °C.	20·2			22·0 (19·0)
7	Dissolved oxygen				
8	Carbon dioxide (CO_2)	(8·8)			(20·2)
0	pH	7·5 (7·6)			7·8 (7·4)
10	Colour	5 (sl. <5)			0 (<5)
11	Turbidity	2			0·3
12	Suspended matter, dried at 105°C.				
13	Suspended matter, ignited at 550°C.				
14	Residue on evaporation, dried at 105°C.	287			1800
15	Ignition loss at 550°C.	59·4			166
16	Specific conductance (micromhos at 25°C)	484			1994
17	Calcium (Ca)	68·4			366 (408)*
18	Magnesium (Mg)	20·0			81·5
19	Iron (Fe) Total		Trace	0·6	
20	Dissolved	0·01			0·03
21	Alkalis—as sodium (Na)				
22	sodium (Na)	4·8			28·8
23	potassium (K)	2·0			3·0
24	Carbonate (CO_3)	0	0	0	3·6 (0)
25	Bicarbonate (HCO_3)	268 (266)	241·6	241·6	96·1 (237)
26	Sulphate (SO_4)	27·8			1119
27	Chloride (Cl)	7·5	53·0	50·0	47·5
28	Fluoride (F)	0·10			1·0
29	Nitrite (NO_2)				
30	Nitrate (NO_3)	11·5			0·6
31	Silica (SiO_2) Gravimetric	7·5			14
32	Colorimetric	6·1			10
33	Carbonate hardness, as $CaCO_3$	220 (218)	198	198	84·8 (194)
34	Non-carbonate hardness, as $CaCO_3$	32·9	912	667	1163 (1161)
35	Total hardness, as $CaCO_3$	253			1247 (1355)*
36	Sum of constituents	282			1709 (1820)*
37	Saturation index	+0·1			+0·7 (+0·6)*
38	Soap consuming power, as p.p.m. $CaCO_3$		1110	865	
	Remarks:	* Top and bottom spring considered to be same water.	Analyses by Ont. Dept. of Health.		Slight odour of H_2S. *Calculated on field alkalinity results assuming loss of $CaCO_3$ during storage.

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

PRESTON											
Springs and Wells											
Raw and Finished Water											
Wells No. 2 and No 3**			Well No. 2		Mixture—Town Tap						No.
			2552	5655							1
			307	A87							2
Apr. 14/47	May 13/47	Nov. 5/47	Aug. 19/48	Apr. 22/52	Dec. 3/47	Feb. 2/48	Feb. 5/48	Mar. 2/48	Apr. 5/48	June 5/48	3
			103	2							4
			15·7	3·3							5
			20·3	22·0							6
											7
											8
			7·3 (7·4)	7·8							9
			0 (<5)	0							10
			2	0							11
											12
											13
			347	433			986				14
			56·8	55·8			50·4				15
			597	655							16
			93·0	104			244				17
			21·2	23·7			44·1				18
											19
trace	0	0·26	0·13	0·02	0·70	0·04	0·04	0·04	0·16	0·16	20
							28·8				21
			4·5	2·0							22
			2·1	1·6							23
0	0	0	0 (0)	0	0	0	0	0	0	0	24
268	278	275	283 (281)	286	268	256	258·6	256·2	258·6	270·8	25
			76·6	111			58·5				26
7	9	16·1	4·2	10·5	18·0	28·0	28·0	11·0	25·0	25·0	27
			0·10	0·20							28
											29
			6·2	12·0							30
			13·5								31
			8·6	9·1			5·1				32
220	228	226	232 (230)	234	220	210	212	210	212	222	33
175	28	161	87·1	124	280	322	566	86	208	310	34
			319	358							35
			356	415							36
			+0·1	+0·7							37
395	256	387			500	532	778	296	420	532	38

Analyses by Ont. Dept. of Health.

** Well No. 3 considered to be same as Well No. 2.

Aluminium—0·6 p.p.m.

Analyses by Ontario Dept. of Health.

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TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

No.	Municipality	Queenston	Richmond Hill	Ridgetown	Ridgeway	Riverside	Rodney	Sandwich East Township
	Source(s)	Treated Niagara River	Well	Wells	Lake Erie	Treated Detroit River	Treated Lake Ontario	Treated Detroit River
		Supplied by Niagara Falls, Ont.	Raw and Finished Water	Raw and Finished Water	Raw and Finished Water	Purchased from Windsor Utilities Commission and from Tecumseh Waterworks	Supplied from West Lorne Waterworks Plant	Supplied by Windsor Utilities Commission and Tecumseh Waterworks
	Sampling Point	—	Town Tap	Well Reservoir	Town Tap	—	—	—
1	Laboratory number		4143	2566	5028			
2	Field number		577	208	870			
3	Date of collection		Mar. 22/50	June 15/48	Apr. 23/51			
4	Storage period (days)		33	177	7			
5	Sampling temperature, °C		18	11·8	.....			
6	Test temperature, °C		20·2	24·0 (19·0)	22·0			
7	Dissolved oxygen		.....	(11·6)	.....			
8	Carbon dioxide (CO_2)		.....	(1·0)	.....			
9	pH		8·0	8·4 (8·2)	7·7			
10	Colour		0	5 (5)	40			
11	Turbidity		0·3	0·7	8			
12	Suspended matter, dried at 105°C		.....	.....	.....			
13	Suspended matter, ignited at 550°C		.....	.....	.....			
14	Residue on evaporation, dried at 105°C		208	220	.....			
15	Ignition loss at 550°C		10·0	28·0	.....			
16	Specific conductance (micromhos at 25°C)		342	355	318			
17	Calcium (Ca)	*See* Niagara	45·5	8·8	39·4			
18	Magnesium (Mg)	Falls.	16·8	4·3	12·0*	*See* Windsor and	*See* West Lorne.	*See* Windsor and
19	Iron (Fe) Total		.....	.....	.....	Tecumseh.		Tecumseh.
20	Dissolved		0·05	0·09	.....			
21	Alkalis—as sodium (Na)		.....	.....	.....			
22	sodium (Na)		4·8	64·0	.....			
23	potassium (K)		1·3	1·7	.....			
24	Carbonate (CO_3)		4·8	2·4 (0)	0			
25	Bicarbonate (HCO_3)		194	184 (188)	127			
26	Sulphate (SO_4)		29·0	0·7	.....			
27	Chloride (Cl)		0	21·5	21·6			
28	Fluoride (F)		0	1·2	.....			
29	Nitrite (NO_2)		.....	Trace	.....			
30	Nitrate (NO_3)		0	0·6	.....			
31	Silica (SiO_2) Gravimetric		21	.....	.....			
32	Colorimetric		19	14	.....			
33	Carbonate hardness, as $CaCO_3$		167	39·7	104			
34	Non-carbonate hardness, as $CaCO_3$		15·8	0	44·4			
35	Total hardness, as $CaCO_3$		183	39·7	148			
36	Sum of constituents		219	211	.....			
37	Saturation index		+0·4	+0·1	−0·2			
	Remarks:				*Calculated from total hardness.			

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

Sandwich South Township	Sandwich West Township	Sarnia		Sarnia Township	Scarborough Township			Seaforth		Shelburne	
Treated Detroit River	Treated Detroit River	St. Clair River		St. Clair River	Lake Ontario			Well No. 1	Well No. 4	Well	
Supplied by Windsor Utilities Commission	Supplied by Windsor Utilities Commission	Raw and Finished Water		Supplied by Sarnia Waterworks	Raw Water	Finished Water		Raw and Finished Water		Raw and Finished Water	
—	—	Plant Intake		—	Plant Intake	Plant Tap		Town Tap	At Pump	Town Tap	No.
		2475	2290		4171	2801	4129	5069	5070	4979	1
		232	613A		574	346	575	854	855	826	2
		June 23/48	July 15/48		Mar. 22/50	Feb. 23/49	Mar. 22/50	Mar. 14/51	Mar. 15/51	Mar. 9/51	3
		146	67		41	7	28	62	61	27	4
		18·2	17·8		4·0	.....	5·5	4·4	.....	5·0	5
		21·2	21·3		22·2	21·8	24·0	20·2	21·0	20·3	6
		.....	.....		.....	.....	.....	.....	.....	.....	7
		(17·6)	.....		.....	.....	.....	.....	.....	.....	8
		8·3 (6·9)	8·2		7·9	7·9	8·2	8·1	8·1	7·6	9
		0 (5)	8		0	5	0	2	2	0	10
		4 (8)	0·6		7	2	0·3	0·5	40	4	11
		.....	.....		31	.....	.....	.....	61	1·4	12
		.....	.....		29	.....	.....	.....	47	0	13
		.....	126		182	174	.....	266	267	259	14
		.....	22·5		21·4	74·6	.....	76·0	81·6	64·2	15
		218	203		296	297	298	560	612	435	16
See Windsor.	*See* Windsor.	29·2	26·0	*See* Sarnia.	39·2	39·4	43·8	89·9	69·9	49·4	17
		7·7	9·0		8·0	8·9	8·0	19·5	23·0	24·0	18
		.....	.....		1·8	.....	.....	.....	3·4	0·32	19
		.....	0·08		0·07	0·12	.....	0·04	0·09	0·06	20
		.....	.....		.....	.....	.....	.....	.....	.....	21
		3·3	3·8		8·5	8·5	9·2	7·5	12·5	6·3	22
		1·3	1·8		1·1	1·4	1·3	3·2	6·0	0·9	23
		0 (0)	0		0	0	3·1	3·6	1·2	0	24
		105 (105)	88·1		116	122	107	208	333	258	25
		.....	11·5		26·0	27·8	37·3	61·9	49·6	23·7	26
		6·3	6·5		18·6	19·4	19·5	10·6	21·0	6·0	27
		.....	0		0·05	0·09	.....	0·8	0·8	1·5	28
		.....	.....		.....	.....	.....	.....	.....	.....	29
		.....	0·8		1·3	1·8	.....	1·5	3·6	0·5	30
		.....	.....		5·6	1·0	.....	.....	.....	.....	31
		5·5	4·6		2·0	1·0	1·4	5·4	9·0	17	32
		86·4	72·0		95·0	100	92·6	250	269	212	33
		18·2	30·0		35·7	34·8	49·6	54·5	0	10·3	34
		105	102		131	135	142	305	269	222	35
		.....	108		167	169	176	351	361	257	36
		+0·2	+0·1		0	0	+0·4	+0·9	+0·9	+0·1	37
		For additional analyses *see* St. Clair River at Sarnia, Table IV, Part I, this report.									

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

No.					
	Municipality	Simcoe			
	Source(s)	Springs and Well			
		Raw and Finished Water			
	Sampling Point	Springs Plant Tap	Gravel Well at Pump	Mixed Supply from Town Tap	
1	Laboratory number	2769	4291	3014	5754
2	Field number	264	614	265	A86
3	Date of collection	July 17/48	Mar. 31/50	July 17/48	July 9/52
4	Storage period (days)	215	73	226	8
5	Sampling temperature, °C	16·0	11·1	17·0	.....
6	Test temperature, °C	22·0 (21·2)	24·8	21·6 (20·8)	20·6
7	Dissolved oxygen	.....	.....	.....	.....
8	Carbon dioxide (CO_2)	(15·8)	.....	(14·1)	.....
9	pH	7·5 (7·6)	7·95	8·2 (7·6)	7·7
10	Colour	5 (5)	0	0 (4)	0
11	Turbidity	0·7 (clear)	0	0·1 (clear)	3
12	Suspended matter, dried at 105°C	.....	.....	.....	.....
13	Suspended matter, ignited at 550°C	.....	.....	.....	.....
14	Residue on evaporation, dried at 105°C	270	263	176	269
15	Ignition loss at 550°C	99·2	104	30·2	61·6
16	Specific conductance (micromhos at 25°C.)	441	414	281	432
17	Calcium (Ca)	69·6	62·0	33·2 (69·2)*	64·5
18	Magnesium (Mg)	13·5	10·0	13·5	15·4
19	Iron (Fe) Total	.....	.....	.....	.....
20	Dissolved	0·02	0·04	0·03	0·06
21	Alkalis—as sodium (Na)	.....	.....	.....	.....
22	sodium (Na)	3·3	3·3	4·0	3·5
23	potassium (K)	1·1	0·7	0·8	0·5
24	Carbonate (CO_3)	0 (0)	0	2·4 (0)	0
25	Bicarbonate (HCO_3)	236 (234)	222	117 (232)	220
26	Sulphate (SO_4)	40·6	32·0	31·4	42·6
27	Chloride (Cl)	2·4	1·4	2·4	4·7
28	Fluoride (F)	0	0·10	0·10	trace
29	Nitrite (NO_2)	.....	.....	.....	.....
30	Nitrate (NO_3)	4·4	10·2	7·5	1·6
31	Silica (SiO_2) Gravimetric	8·6	13	12	.....
32	Colorimetric	9·2	11	13	16
33	Carbonate hardness, as $CaCO_3$	194 (192)	182	100 (190)	188
34	Non-carbonate hardness, as $CaCO_3$	35·1	50·7	38·4 (38)	36·5
35	Total hardness, as $CaCO_3$	229	233	138 (228)*	225
36	Sum of constituents	261	251	166 (257)*	262
37	Saturation index	+0·1	+0·6	+0·2 (+0·2)*	+0·4
	Remarks:	* Corrected for loss of $CaCO_3$ caused by long storage.			

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

Southampton	South River	Stamford Township			Stavebank	
Lake Huron	Springs	Wells and Niagara River			Treated Lake Ontario	
Finished Water	Raw and Finished Water	Well No. 1	Well No. 2	Niagara River, treated	Supplied by Port Credit Waterworks	
Town Tap	Town Tap					No.
4985	4963	4292	4293			1
836	793	625	626			2
Mar. 12/51	Feb. 28/51	June 2/50	June 2/50			3
24	19	10	10			4
7·8	3·3	.....	.....			5
21·7	21·3	24·8	24·8			6
.....	.....	.....	.....			7
.....	.....	.....	.....			8
7·9	6·1	7·5	7·7			9
15	15	2	2			10
3	5	0·2	0			11
.....	1·2	.....	.....			12
.....	0	.....	.....			13
294	130	558	387			14
54·2	32·6	178	156			15
472	212	777	571			16
65·1	10·4	93·5	70·7	Purchased from Niagara Falls, Ont.; *see* Niagara Falls.	*See* Port Credit.	17
18·5	2·5	45·5	28·6			18
.....	0·52	.....	.....			19
0·10	0·02	0·05	0·06			20
.....	.....	.....	.....			21
8·2	16·7	12·0	8·4			22
5·2	6·9	1·7	1·2			23
0	0	0	0			24
237	12·7	281	226			25
51·7	8·7	166	68·5			26
11·4	26·6	20·8	12·9			27
0·05	0·1	0·10	0·05			28
.....	.....	.....	.....			29
1·8	14·2	2·7	53·2			30
.....	.....	14	11			31
5·0	8·0	12	12			32
194	10·4	230	186			33
44·5	25·8	191	108			34
239	36·2	421	294			35
285	100	495	367			36
+0·5	−3·3	+0·4	+0·4			37
			Note high nitrate.			

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

No.	Municipality	Staynor		St. Catharines	
	Source(s)	Creek and Well		Lake Erie (Welland Canal)	
		Raw and Finished Water		Raw Water	Finished Water
	Sampling Point	Creek Town Tap	Well At Pump	At Sump Well	From Distribution Main
1	Laboratory number	4978	5106	2580	2573
2	Field number	824	877	250	249
3	Date of collection	Mar. 9/51	May 11/51	June 12/48	June 12/48
4	Storage period (days)	26	29	150	150
5	Sampling temperature, °C	1·1	.....	26·0	23·2
6	Test temperature, °C	20·3	25·5	22·6	22·8 (31·8)
7	Dissolved oxygen	.....	.....	.....	.....
8	Carbon dioxide (CO_2)	.....	.....	(2·5)	(7·0)
9	pH	7·6	7·7	8·1 (8·45)	8·3 (7·7)
10	Colour	8	7	7 (8)	1 (<5)
11	Turbidity	4	15	1 (<7)	0·1
12	Suspended matter, dried at 105°C	3·5	4·9	.....	.....
13	Suspended matter, ignited at 550°C	1·7	3·3	.....	.....
14	Residue on evaporation, dried at 105°C	226	275	171	173
15	Ignition loss at 550°C	30·0	94·0	28·4	31·0
16	Specific conductance (micromhos at 25°C.)	359	498	293	293
17	Calcium (Ca)	61·0	58·2	35·2	36·0
18	Magnesium (Mg)	11·5	22·0	9·0	8·6
19	Iron (Fe) Total	.....	1·2	.....	.....
20	Dissolved	0·04	0·18	0·02	0·06
21	Alkalis—as sodium (Na)	.....	.....	.....	.....
22	sodium (Na)	1·8	7·5	8·5	8·8
23	potassium (K)	0·7	1·8	1·6	1·4
24	Carbonate (CO_3)	0	0	0 (0)	0 (0)
25	Bicarbonate (HCO_3)	212	292	115 (112)	129 (117)
26	Sulphate (SO_4)	14·6	7·2	30·3	30·8
27	Chloride (Cl)	2·7	6·3	16·5	19·0
28	Fluoride (F)	0	0	0·12	0·10
29	Nitrite (NO_2)	.....	.....	.....	.....
30	Nitrate (NO_3)	1·8	0·4	0·4	0·5
31	Silica (SiO_2) Gravimetric	.....	.....	.....	.....
32	Colorimetric	11	14	3·0	2·2
33	Carbonate hardness, as $CaCO_3$	174	236	94·0	106 (96·0)
34	Non-carbonate hardness, as $CaCO_3$	25·5	0	30·8	19·3
35	Total hardness, as $CaCO_3$	200	236	125	125
36	Sum of constituents	210	262	161	171
37	Saturation index	+0·1	+0·4	+0·2	+0·4
	Remarks:				

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

Stirling		St. Marys	Stoney Creek		
Wells		Wells	Lake Ontario		
Raw and Finished Water		Raw and Finished Water	Raw Water	Finished Water	
Rock Well	Gravel Well	Town Tap	—	Town Tap	No.
Creamery Tap	Town Tap				
4121	4122	2703		4131	1
566	567	276		601	2
Mar. 21/50	Mar. 21/50	July 20/48		Mar. 23/50	3
27	27	191		22	4
10·0	4·5	17·0		9·4	5
23·3	23·3	22·2 (23·5)		24·0	6
.....	.....	.....		.....	7
.....	.....	(35)		.....	8
7·9	8·3	7·8 (7·3)		8·1	9
7	0	5 (5)		2	10
3	0·3	0·5		5	11
.....	.....	.....		.....	12
.....	.....	.....		.....	13
512	295	560		.....	14
25·8	12·6	137		.....	15
790	490	807		318	16
108	73·4	108	*See* analyses of Lake Ontario	40·3	17
25·3	17·5	41·3	such as at Hamilton, Ont.	9·0	18
.....	.....	.....		.....	19
0·05	0·01	0·04		.....	20
.....	.....	.....		.....	21
34·0	8·0	11·8		8·0	22
6·9	3·8	3·5		1·3	23
0	15·8	0 (0)		2·4	24
369	252	312 (317)		115	25
76·7	38·7	191		47·4	26
40·6	6·0	10·6		15·5	27
0·15	0·25	1·0		.....	28
.....	.....	.....		.....	29
4·4	0·8	1·8		.....	30
14	12	9·6		.....	31
15	14	7·6		2·0	32
302	233	256 (260)		98·0	33
71·4	21·9	183		39·7	34
374	255	439		138	35
493	302	532		183	36
+1·0	+1·0	+0·7		+0·3	37
Slight odour.					

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

No.	Municipality	Stouffville		Stratford	
	Source(s)	Springs		Avon River and Wells	
		Raw and Finished Water		Raw and Finished Water	
	Sampling Point	Town Tap		Avon River At Pump	Mixed Wells Town Tap
1	Laboratory number	2763	5654	4296	5071
2	Field number	294	A85	612	856
3	Date of collection	Aug. 14/48	Apr. 22/52	Mar. 30/50	Mar. 15/51
4	Storage period (days)	187	2	74	68
5	Sampling temperature, °C	18·5	22·0	2·5	8·9
6	Test temperature, °C	21·9 (22·2)		24·8	20·3
7	Dissolved oxygen				
8	Carbon dioxide (CO_2)	(16·7)			
9	pH	8·0 (7·8)	7·9	8·2	8·1
10	Colour	3 (5)	0	15	3
11	Turbidity	1	0	10	3
12	Suspended matter, dried at 105°C			18	6·0
13	Suspended matter, ignited at 550°C			13	2·9
14	Residue on evaporation, dried at 105°C	232	283	203	731
15	Ignition loss at 550°C	38·6	40·2	81·6	85·0
16	Specific conductance (micromhos at 25°C)	359	445	311	977
17	Calcium (Ca)	52·2 (73·7)*	77·2	49·1	166
18	Magnesium (Mg)	12·1	14·9	8·2	33·0
19	Iron (Fe) Total			0·26	0·43
20	Dissolved	0·03	0·01	0·06	0·07
21	Alkalis—as sodium (Na)				
22	sodium (Na)	3·1	4·0	2·5	19·9
23	potassium (K)	1·3	1·2	1·9	1·9
24	Carbonate (CO_3)	0 (0)	0	7·2	1·2
25	Bicarbonate (HCO_3)	193 (259)	262	147	265
26	Sulphate (SO_4)	26·4	24·1	26·7	358
27	Chloride (Cl)	2·5 (2·3)	5·2	0	2·1
28	Fluoride (F)	0		0·15	1·6
29	Nitrite (NO_2)				
30	Nitrate (NO_3)	7·97	16·0	8·0	1·2
31	Silica (SiO_2) Gravimetric	19		6·0	
32	Colorimetric	17	13·8	4·1	8·9
33	Carbonate hardness, as $CaCO_3$	158 (212)	215	133	219
34	Non-carbonate hardness, as $CaCO_3$	21·9 (22)*	38·9	23·4	328
35	Total hardness, as $CaCO_3$	180 (234)*	254	156	547
36	Sum of constituents	220 (274)*	286	182	724
37	Saturation index	+0·4 (+0·5)	+0·6	+0·6	+1·1
	Remarks:	*Values calculated from field value for alkalinity; water apparently lost $CaCO_3$ on storage.		Note high fluoride in wells.	

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

Strathroy		St. Thomas				
Wells		Kettle Creek				
Raw and Finished Water		Raw Water		Finished Water		
Mixed Wells		At Intake		Town Tap		No.
Town Tap						
2764	5689	2572	5691	2567	5692	1
271	A96	204	A106	205	A107	2
July 19/48	May 9/52	June 14/48	May 8/52	June 14/48	May 9/52	3
213	6	178	7	178	6	4
18·0	11·1	19·8	14·4	19·5	.....	5
21·6 (23·0)	22·3	24·0	22·3	23·9	22·3	6
.....	.....	(10·9)	.....	.....	.....	7
(18·5)	.....	(1·5)	.....	(3·5)	.....	8
8·2 (7·6)	7·6	8·4 (8·2)	8·0	8·4 (7·7)	7·8	9
5 (6)	10	30 (50)	10	5 (35)	10	10
0·3	0·4	30 (15)	0·4	17 (12)	1·7	11
.....	.....	33	.....	21	.....	12
.....	.....	19	.....	11	.....	13
243	307	215	254	199	263	14
66·2	55·6	43·0	32·6	38·8	34·2	15
342	473	352	410	326	427	16
45·2 (82·6)*	74·8	43·2 (55·1)*	60·5	42·3 (64·6)*	63·5	17
14·0	14·5	14·9	12·9	15·4	13·0	19
.....	.....	0·32	.....	0·21	.....	19
0·02	0·05	0·02	0·05	0·03	0·05	20
.....	.....	.....	.....	.....	.....	21
8·1	6·6	9·0	7·8	10·0	7·8	22
4·0	3·6	2·2	2·6	2·1	2·6	23
0 (0)	0	6·7 (0)	0	1·2 (0)	0	24
120 (234)	229	182 (232)	225	150 (220)	217	25
38·8	34·2	32·9	30·0	40·5	50·0	26
8·8 (8·0)	12·0	9·3	6·0	6·5	9·0	27
0	0	0	0·1	0·25	0·1	28
.....	.....	.....	.....	.....	.....	29
35·4	1·5	1·3	0	1·8	0	30
8·4	.....	2·6	.....	.....	.....	31
7·6	8·1	(2·5)	4·2	4·2	3·5	32
98·0 (192)	188	160 (190)	184	125 (180)	178	33
72·4 (72)	56·3	9·1 (9·0)	20·0	43·9 (45)	33·9	34
170 (264)*	244	169 (199)*	204	169 (225)*	212	35
222 (316)*	268	212 (242)*	235	198 (255)*	257	36
+0·3 (+0·3)*	+0·3	+0·8 (+0·8)*	+0·5	+0·7 (+0·3)*	+0·4	37

Note nitrate.

* Values calculated from field value for alkalinity; water apparently lost $CaCO_3$ on storage.

* Values calculated from field value for alkalinity; water apparently lost $CaCO_3$ on storage.

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

No.					
	Municipality	Swansea	Tara	Tavistock	
	Source(s)	Treated Lake Ontario	Well	Spring	
		Purchased from Toronto, Ont.	Raw and Finished Water	Raw and Finished Water	
	Sampling Point		Town Tap	Plant Tap	
1	Laboratory number		4984	4243	5742
2	Field number		835	611	A97
3	Date of collection		Mar. 12/51	Mar. 30/50	June 26/52
4	Storage period (days)		24	54	11
5	Sampling temperature, °C		4·4	5·5	10·0
6	Test temperature, °C		21·7	25·0	29·0
7	Dissolved oxygen		.....	.....	.....
8	Carbon dioxide (CO_2)		.....	.....	.....
9	pH		7·8	8·2	7·7
10	Colour		2	2	2
11	Turbidity		15	0·5	0·4
12	Suspended matter, dried at 105°C		6·0	.....	.....
13	Suspended matter, ignited at 550°C		3·4	.....	.....
14	Residue on evaporation, dried at 105°C		366	202*	339
15	Ignition loss at 550°C		101	30·4	144
16	Specific conductance (micromhos at 25°C.)		655	328*	546
17	Calcium (Ca)	*See* Toronto.	76·1	37·6*	79·7
18	Magnesium (Mg)		38·3	17·4	21·3
19	Iron (Fe) Total		1·0	.....	.....
20	Dissolved		0·10	0·04	0·02
21	Alkalis—as sodium (Na)		.....	.....	.....
22	sodium (Na)		13·8	4·0	4·0
23	potassium (K)		4·6	1·2	1·1
24	Carbonate (CO_3)		0	4·8	0
25	Bicarbonate (HCO_3)		347	151	303
26	Sulphate (SO_4)		65·7	32·0	32·7
27	Chloride (Cl)		18·5	3·0	6·3
28	Fluoride (F)		0·80	0·05	0
29	Nitrite (NO_2)		.....	.....	.....
30	Nitrate (NO_3)		0·4	10·6	2·0
31	Silica (SiO_2) Gravimetric		.....	12	.....
32	Colorimetric		11	12	11
33	Carbonate hardness, as $CaCO_3$		284	132*	249
34	Non-carbonate hardness, as $CaCO_3$		63·4	33·4	37·9
35	Total hardness, as $CaCO_3$		347	165*	287
36	Sum of constituents		400	198*	308
37	Saturation index		+0·6	+0·5	+0·6
	Remarks:			* Calcium apparently lost on storage with resultant change in hardness, conductance, etc.	

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

TECUMSEH			TEESWATER	THORNBURY		
Detroit River			Artesian Well	Beaver River		
Raw Water	Finished Water		Raw and Finished Water	Raw Water	Finished Water	
At Intake	Plant Tap, after filters		Town Tap	At Intake	Plant Tap	No.
5695	2819	5694	5077	4993	4981	1
A101	221	A100	862	829	828	2
May 13/52	June 19/48	May 13/52	Mar. 16/51	Mar. 3/51	Mar. 10/51	3
12	263	6	67	31	26	4
10·6	17·5	10·6	4·4	0·6	0·6	5
22·0	19·2 (19·5)	22·0	21·3	22·0	22·0	6
.....	.....	.....	.....	.....	.....	7
.....	(1·0)	.....	.....	.....	.....	8
7·9	8·4 (8·0)	7·8	7·6	8·0	8·0	9
5	5 (12)	3	2	25	2	10
20	9 (25)	0·5	0·8	50	6	11
40	22	.....	.....	.....	4·1	12
36	9·8	.....	.....	.....	4·1	13
125	111	126	362	.....	221	14
33·0	28·4	28·6	92·0	.....	40·4	15
207	185	208	550	362	374	16
29·0	22·6 (31·4)*	28·1	63·8	50·2	51·7	17
7·2	7·9	7·0	26·0	17·3	17·3	18
1·5	0·12	.....	.....	.....	0·38	19
0·06	0·02	0·04	0·12	.....	0·08	20
.....	.....	.....	.....	.....	.....	21
3·0	3·8	3·0	2·7	1·1	1·9	22
1·3	1·0	1·3	1·0	0·8	0·9	23
0	6·0 (0)	0	0	0	0	24
100	75·6 (115)*	95·2	276	229	227	25
14·2	16·5	18·1	85·2	12·6	11·4	26
8·0	7·3 (7·0)	8·5	1·1	2·5	3·2	27
0·10	0·10	0·10	0·50	.....	0·10	28
.....	.....	.....	.....	.....	.....	29
0·8	0	0·8	2·2	4·4	4·4	30
.....	2·0	.....	.....	.....	.....	31
3·3	1·4	2·3	6·3	4·2	4·4	32
82·0	72·0 (94·0)*	78·0	226	188	186	33
20·0	16·9 (17)*	20·9	39·7	8·8	11·9	34
102	88·9 (111)*	98·9	266	197	198	35
118	105 (127)*	116	325	206	207	36
−0·2	+0·1 (−0·1)*	−0·3	+0·2	+0·5	+0·5	37

* Calculated from field values. Field soap hardness, 114 p.p.m. as $CaCO_3$.

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

No.					
	Municipality	Thorold		Thorold Township	
	Source(s)	Welland Canal		Welland Canal	
		Raw Water	Finished Water	Raw Water	Finished Water
	Sampling Point	Canal at Intake	Town Tap	Canal near Thorold Intake	Plant Tap
1	Laboratory number	2644	2746		2620
2	Field number	245	246		255
3	Date of collection	July 10/48	July 10/48		July 14/48
4	Storage period (days)	186	215		173
5	Sampling temperature, °C.	22·0	22·0		23·0
6	Test temperature, °C.	22·7	21·7		19·0
7	Dissolved oxygen	(9·6)	.....		.....
8	Carbon dioxide (CO_2)	(2·6)	(5·3)		(1·8)
9	pH	8·2 (8·3)	7·9 (7·7)		8·2 (8·1)
10	Colour	5 (10)	5 (5)		0 (7)
11	Turbidity	(15)	2		3 (5)
12	Suspended matter, dried at 105°C.	.....	.....		.....
13	Suspended matter, ignited at 550°C.	.....	.....		.....
14	Residue on evaporation, dried at 105°C.	.....	172		173
15	Ignition loss at 550°C.	.....	24·6		24·4
16	Specific conductance (micromhos at 25°C.)	274	304	*See* Thorold.	283
17	Calcium (Ca)	33·0 (36·3)*	38·6		35·4
18	Magnesium (Mg)	7·9	9·8		8·2
19	Iron (Fe) Total	.....	.....		.....
20	Dissolved	.....	0·03		0·09
21	Alkalis—as sodium (Na)	.....	.....		.....
22	sodium (Na)	8·8	8·6		8·8
23	potassium (K)	1·5	2·0		1·5
24	Carbonate (CO_3)	0 (0)	0 (0)		2·6(0)
25	Bicarbonate (HCO_3)	107 (117)	114 (115)		112 (112)
26	Sulphate (SO_4)	.....	25·7		25·5
27	Chloride (Cl)	18·5	19·9		18·5
28	Fluoride (F)	.....	0·15		0·05
29	Nitrite (NO_2)	.....	.....		.....
30	Nitrate (NO_3)	.....	1·8		0·4
31	Silica (SiO_2) Gravimetric	.....	1·2		2·2
32	Colorimetric	7·6	0·4		2·2
33	Carbonate hardness, as $CaCO_3$	88·0 (96·0)	93·0		96·0
34	Non-carbonate hardness, as $CaCO_3$	26·9 (27)*	43·6		26·1
35	Total hardness, as $CaCO_3$	115 (123)*	137		122
36	Sum of constituents	.....	162		159
37	Saturation index	+0·2 (+0·4)*	0		+0·2

Remarks: * Calculated from field values assuming some precipitation of $CaCO_3$ on storage.

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

Tilbury			Tillsonburg		
Lake St. Clair			Wells		
Raw Water	Finished Water		Raw and Finished Water		
At Intake	Town Tap	Plant Filters	—	Town Tap (two gravel wells)	No.
2822	.....	2823	.....	2310	1
223	.....	224	.....	323	2
June 21/48	Mar. 15/48*	June 21/48	Apr. 28/48	Aug. 24/48	3
261	.....	261	.....	34	4
17·8	.....	18·5	.....	20·0	5
19·0	room	19·1 (19·8)	room	23·2 (23·0)	6
.....	.....	.....	.....	.....	7
(2·0)	.....	(2·0)	.....	(4·8)	8
8·2 (7·7)	.....	8·1 (6·9)	.....	7·8 (7·8)	9
0 (30)	.....	0 (5)	.....	12 (12)	10
3 (15)	.....	0 (clear)	.....	3	11
.....	.....	.....	.....	.....	12
.....	.....	.....	.....	.....	13
131	430	139	340	246	14
31·4	143	35·8	128	59·0	15
218	.....	231	.....	388	16
28·6	61·6	37·2	41·9	58·2	17
8·6	17·9	5·8	18·9	14·3	18
.....	.....	.....	0·24	.....	19
0·21	0·08	0·01	.....	0·08	20
.....	12·7	.....	11·5	.....	21
4·0	.....	3·8	.....	3·2	22
1·0	.....	1·0	.....	0·9	23
4·3 (0)	0	0 (0)	0	0 (0)	24
97·4 (107)	217	90·4 (90·4)	190	185 (188)	25
18·0	50·6	32·8	.....	45·9	26
7·2	12·0	9·1	5·0	3·4	27
0·05	.....	0·05	.....	0·15	28
.....	.....	.....	.....	.....	29
0·8	.....	0·5	.....	0·6	30
5·0	1·7	.....	8·7	.....	31
3·6	.....	3·4	.....	6·5	32
87·0	178	74·0 (74·0)	156	152 (154)	33
19·8	59	42·6	27	52·2	34
107	237	117	183	204	35
126	264	138	.....	225	36
+0·1	.....	+0·02	.....	+0·9	37
	aluminium=1·6				
	* Analysis by Ontario Dept. of Health; may be mixed with Thames River water which would be in flood.		Analysis by Ont. Dept. of Health; soap hardness 211 p.p.m. as $CaCO_3$.	No H_2S	

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

No.									
	Municipality	Toronto							
	Source(s)	Lake Ontario							
		Raw Water	Finished Water*						
	Sampling Point	—	—						
1	Laboratory number								
2	Field number								
3	Date of collection		1944	1944	1944	1945	1945	1945	1945
4	Storage period (days)		Max.	Min.	Av.	Max.	Min.	Av.	Oct./45
5	Sampling temperature, °C								
6	Test temperature, °C								
7	Dissolved oxygen								
8	Carbon dioxide (CO_2)	*See* Station No.							
9	pH	17, Table IV, Part I.	8·0	7·5	7·7	7·9	7·4	7·7	7·8
10	Colour								
11	Turbidity								
12	Suspended matter, dried at 105°C								
13	Suspended matter, ignited at 550°C								
14	Residue on evaporation, dried at 105°C								156
15	Ignition loss at 550°C								
16	Specific conductance (micromhos at 25°C)								
17	Calcium (Ca)								38·17
18	Magnesium (Mg)								7·45
19	Iron (Fe) Total								0·05
20	Dissolved								
21	Alkalis—as sodium (Na)								7·16
22	sodium (Na)								
23	potassium (K)								
24	Carbonate (CO_3)		0	0	0	0	0	0	1·2
25	Bicarbonate (HCO_3)		113·8	108·9	112·1	113·8	108·3	112·1	107·7
26	Sulphate (SO_4)								21·98
27	Chloride (Cl)		17·2	16·3	16·6	18·4	16·5	16·8	17·2
28	Fluoride (F)								
29	Nitrite (NO_2)		0·36	0·20	0·29	0·36	0·24	0·29	1·06
30	Nitrate (NO_3)								
31	Silica (SiO_2) Gravimetric								0·18
32	Colorimetric								
33	Carbonate hardness, as $CaCO_3$		93·3	89·3	91·9	93·3	88·8	91·9	90·3
34	Non-carbonate hardness, as $CaCO_3$		40·7	32·7	35·1	34·7	32·2	33·1	36·7
35	Total hardness, as $CaCO_3$		134	122	127	128	121	125	127
36	Sum of constituents								148
37	Saturation index								−0·1
38	Free Ammonia		0·15	0	0·0001	0·001	0	Trace	
39	Albuminoid Ammonia		0·112	0·044	0·072	0·084	0·056	0·066	
40	Aluminium (Al)								0·11
	Remarks:		* Analyses supplied by City of Toronto; R. C. Harris Water Filtration plant.						

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

Toronto											Toronto Township	No.
Lake Ontario											Treated Lake Ontario	
Finished Water*											Purchased from Port Credit, Ont.	
—											—	
												1
												2
1946 Max.	1946 Min.	1946 Av.	1947 Max.	1947 Min.	1947 Av.	1947 May/47	1948 Max.	1948 Min.	1948 Av.	1948 Mar/49		3
												4
												5
												6
												7
												8
8·0	7·1	7·7	7·9	7·5	7·0	7·7	7·9	7·3	7·7	7·7		9
												10
												11
												12
												13
						168				169		14
												15
												16
						39·06				39·27		17
						7·60				7·68		18
											See Port Credit.	19
						0·05				0·03		20
						8·23				8·45		21
												22
												23
0	0	0	0	0	0	1·2	0	0	0	1·2		24
113·2	106·5	111·4	112·3	107·7	111·8	110·1	113·2	108·3	111·6	110·1		25
						22·25				22·79		26
20·1	17·1	17·6	20·3	17·6	18·0	17·7	20·3	18·1	18·6	18·6		27
												28
0·36	0·20	0·28	0·32	0·20	0·25	1·15	0·44	0·22	0·30	1·06		29
						0·93				1·0		30
												31
												32
92·8	87·3	91·3	92·3	88·3	91·6	92·3	92·8	88·8	91·5	92·3		33
37·2	33·7	34·7	41·7	34·7	37·4	35·7	42·2	41·2	39·5	37·7		34
130	121	126	134	123	129	128	135	130	131	130		35
						153				155		36
						−0·2				−0·2		37
0·10	0	·001	0	0	0		·008	0	Trace			38
0·088	0·048	0·066	0·080	0·060	0·66		·076	·054	0·63			39
						0·09				0·16		40

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

No.	Municipality	Trenton		Tweed			Uxbridge	Victoria Harbour	Walkerton
	Source(s)	Springs and Creeks		Wells			Wells	Lake Huron (Georgian Bay)	Wells and Springs
				Raw and Finished Water			Raw and Finished Water	Raw and Finished Water	Raw and Finished Water
	Sampling Point	Town Tap	From Pipe replenishing Well (Creek Water)	Meraw Well	Provost Well	Foster Dairy Well	Town Tap	At Distribution Pump	Town Tap
1	Laboratory number	1853	2658	4310	4311*	4312	2705	4991	5051
2	Field number	178	284	620	621	622	293	820	846
3	Date of collection	Mar. 2/48	Aug. 11/48	April 25/50	April 25/50	April 25/50	Aug. 14/48	Mar. 8/51	Mar. 13/51
4	Storage period (days)	8	156	60	60	60	187	33	53
5	Sampling temperature, °C	4·8	19·0	7·8	6·7	10·0	17·0	3·3	5·6
6	Test temperature, °C	room	22·3	26·0	26·0	26·0	22·0	room	22·2
7	Dissolved oxygen								
8	Carbon dioxide (CO_2)		(2·6)				(29·0)		
9	pH	8·0	8·0 (8·3)	7·8	8·1	7·7	7·5 (7·8)	7·6	7·4
10	Colour	10	8 (15)	2	2	2	25 (20)	35	2
11	Turbidity	2	3 (sl. <7)	0·3	1	0·9	3	6	3
12	Suspended matter, dried at 105°C								
13	Suspended matter, ignited at 350°C								
14	Residue on evaporation, dried at 105°C	262	228	284	211	368	221		2128
15	Ignition loss at 550°C	98·5	16·8	94·0	30·6	153	32·2		194
16	Specific conductance (micromhos at 25°C.)	428	370	450	337	580	373	184	
17	Calcium (Ca)	74·0	64·0	75·2	61·7	88·0	52·4	27·2	526
18	Magnesium (Mg)	12·2	8·7	12·3	11·0	17·0	14·9	4·7	52·5
19	Iron (Fe) Total								
20	Dissolved	0·01	0·01	0·05	0·06	0·05	0·36		0·03
21	Alkalis—as sodium (Na)								
22	sodium (Na)	3·0	3·3	4·0	2·4	8·0	6·6	3·5	3·9
23	potassium (K)	1·0	1·4	1·3	1·0	4·8	1·4	1·1	2·2
24	Carbonate (CO_3)	0	0 (0)	0	4·8	0	0 (0)	0	0
25	Bicarbonate (HCO_3)	250	224 (224)	244	195	290	244 (242)	91·3	246
26	Sulphate (SO_4)	27·6	15·1	29·2	24·2	33·0	10·2	10·3	1262
27	Chloride (Cl)	4·4	0	7·0	0	17·0	0·90	5·1	1·7
28	Fluoride (F)		0·05	0	0	0·05	0·04		1·5
29	Nitrite (NO_2)	0							
30	Nitrate (NO_3)	1·1	1·77	10·6	12·4	28·4	0·9	0·9	1·4
31	Silica (SiO_2) Gravimetric	7·5	8·6	9·8	13	11	19	4·9	
32	Colorimetric	4·6	9·0	9·4	12	11	15		9·6
33	Carbonate hardness, as $CaCO_3$	205	184·0	200	168	238	192	74·8	202
34	Non-carbonate hardness, as $CaCO_3$	29·6	112	38·4	31·4	51·7	0	12·4	1325
35	Total hardness, as $CaCO_3$	235	226	238	199	290	192	87·2	1527
36	Sum of constituents	254	214	270	227	350	227	103	1982
37	Saturation index	+0·8	+0·6	+0·6	+0·7	+0·6	0	−0·5	+0·8
	Remarks:			Note nitrate contents. * This sample may have lost some calcium on storage thus reducing hardness.					Note fluoride content.

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

Wallaceburg						Waterdown						
Syne (St. Clair) River						Wells						
Raw Water		Finished Water				Raw and Finished Water						
Intake Pump	Prior to Filters	Plant Tap	Plant Tap	At an Industrial Plant Tap		Park Well	Green Well	Wilson Well	Allen Well			No.
						Direct from Pumps at Wells						
2626	3050	2622	3049	3055	3738	4278	4279	4280	5994	4281	5993	1
227	367	228	368	369	538	602	603	604	A109	605	A108	2
June 22/48	Apr. 6/48	June 22/48	Apr. 6/49	Apr. 6/49	Dec. 14/49	Mar. 29/50	Mar. 29/50	Mar. 29/50	Nov. 13/52	Mar. 29/50	Nov. 13/52	3
197	10	197	10	10	27	69	69	69	12	69	12	4
16·5	.....	16·0	.....	.....	18·8	9·4	8·4	9·4	9·4	9·4	9·4	5
22·8	24·0	22·7	24·0	24·0	room	23·0	23·0	23·0	22·0	23·0	22·0	6
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	7
(5·3)	.....	(7·0)	.....	.....	.....	.....	.....	.....	.....	.....	.....	8
8·2 (7·8)	8·0	8·1 (7·8)	8·0	7·7	7·3	7·7	7·9	8·1	7·8	8·0	7·6	9
10 (15)	0	5 (10)	0	0	35	5	0	0	5	3	10	10
4·5 (sl. <5)	10·0	4	6	0·7	50	15	0·2	0·2	1·2	0·4	1·2	11
3·8	11·4	5·6	12	.....	.....	23	.....	.....	.....	.....	.....	12
0·8	10·2	2·4	10	.....	.....	22	.....	.....	.....	.....	.....	13
122	117	128	114	148	.....	520	345	246	378	303	317	14
21·8	39·4	21·6	38·0	38·6	.....	73·6	66·8	29·4	60·0	29·2	43·8	15
223	204	225	200	248	279	717	509	381	619	472	499	16
27·5	26·0	29·7	25·6	31·6	.....	91·6	63·2	42·5	62·7	74·5	77·3	17
8·3	8·0	8·2	8·0	8·4	.....	34·0	23·5	19·8	20·7	16·8	15·8	18
0·35	0·40	0·29	0·28	.....	.....	2·5	.....	.....	.....	.....	.....	19
0·02	0·04	0·03	0·03	0·01	0·04	0·05	0·02	0·06	0·01	0·17	0·10	20
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	21
3·5	3·0	3·5	3·0	4·0	.....	13·5	6·8	7·3	31·0	4·3	4·1	22
1·4	1·0	1·1	1·0	1·3	.....	1·8	5·2	1·4	2·6	0·7	0·8	23
0	0	0 (0)	0	0	0	0	2·4	8·2	0	6·0	0	24
101	100	104 (100)	100	103	88·1	226	173	130	207	235	244	25
14·2	15·6	14·0	18·8	31·2	50·2	186	97·8	76·5	69·7	60·6	58·9	26
9·4	6·0	9·1	5·1	7·0	8·3	21·5	10·6	9·0	53·0	5·2	6·4	27
0	0·10	0	0·15	0·10	.....	0·05	0	0	0·05	0·05	0	28
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	29
0·35	0·6	0·7	0·6	1·3	.....	0	24·8	1·8	0·2	0·4	1·2	30
.....	.....	.....	.....	.....	.....	13	.....	10	.....	11	.....	31
6·1	3·6	4·1	4·0	4·4	.....	12	7·8	9·1	8·7	11	8·5	32
82·4	82·0	85·4	82·0	84·0	72·2	185	146	120	170	202	200	33
20·4	15·8	22·4	14·8	29·4	65·8	183	108	67·7	71·9	52·8	58·1	34
103	97·8	108	96·8	113	138	368	254	188	242	255	258	35
121	113	122	116	140	.....	473	327	240	351	296	293	36
+0·1	−0·1	+0·05	−0·1	−0·3	.....	+0·4	+0·4	+0·3	+0·3	+0·7	+0·3	37
		No alum being used.		Alum being used.			Note high nitrate content.					

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TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

No.						
	Municipality	Waterford		Waterloo		
	Source(s)	Springs and Wells		Wells		
		Raw and Finished Water		Raw and Finished Water		
	Sampling Point	Town Tap		Mixed Wells Town Tap	Gravel Well, 108' Deep At Intake	Dearborn St. Well At Pump
1	Laboratory number	3056	5690		2624	4282
2	Field number	266	A99		314	606
3	Date of collection	July 17/48	May 9/52	1947	Aug. 21/48	Mar. 30/50
4	Storage period (days)	277	6		137	74
5	Sampling temperature, °C	21·5	10·0		17·0	8·9
6	Test temperature, °C	23·7 (24·2)	22·3		22·8 (21·0)	25·0
7	Dissolved oxygen					
8	Carbon dioxide (CO_2)	(16·7)			(18·5)	
9	pH	8·3 (7·7)	7·6		7·4 (7·4)	7·7
10	Colour	(sl. <5)	10		15 (5)	2
11	Turbidity	1	2·4		0·6	0·2
12	Suspended matter, dried at 105°C					
13	Suspended matter, ignited at 550°C					
14	Residue on evaporation, dried at 105°C	230	355		583	
15	Ignition loss at 550°C		64·4		83·4	
16	Specific conductance (micromhos at 25°C.)	332	557		842	546
17	Calcium (Ca)	30·0 (76·9)*	77·5		116	92·0
18	Magnesium (Mg)	20·2	19·5		38·9	21·5
19	Iron (Fe) Total					
20	Dissolved	0·04	0·04	0·04	0·03	
21	Alkalis—as sodium (Na)					
22	sodium (Na)	5·5	9·6		12·3	5·2
23	potassium (K)	2·1	3·6		2·4	0·7
24	Carbonate (CO_4)	4·8 (0)	0	0	0 (0)	0
25	Bicarbonate (HCO_3)	108 (261)	253	316	339 (334)	276
26	Sulphate (SO_4)	39·5	50·6		159	97·5
27	Chloride (Cl)	2·5	20·0	12·0	15·8	10·0
28	Fluoride (F)		0·10		0·10	
29	Nitrite (NO_2)					
30	Nitrate (NO_3)	24·8	1·5		12·4	39·0
31	Silica (SiO_2) Gravimetric					
32	Colorimetric	17	13·8		15	10
33	Carbonate hardness, as $CaCO_3$	96·6 (214)*	207	259	278 (274)	227
34	Non-carbonate hardness, as $CaCO_3$	61·2 (61)	66·6	461	172	91·5
35	Total hardness, as $CaCO_3$	158 (275)*	274	720**	450	318
36	Sum of constituents	200 (317)	321		539	412
37	Saturation index	+0·3 (+0·4)*	+0·3		+0·4	+0·6
	Remarks:	Note high nitrate content. * Calcium and hardness calculated from original alkalinity; apparently calcium carbonate precipitated on storage since soap hardness in the field was 285 p.p.m.		Analyses by Ont. Dept. of Health. ** Soap hardness.		Note nitrate.

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

Waterloo				Watford				
Wells				Wells				
Raw and Finished Water				Raw and Finished Water				
Rock Well	Gravel Well	Seagram's Well	Gas Works Well	Well No. 9 at Pump prior to Aeration	Well No. 9 after Aeration	Well No. 11 at Pump prior to Aeration	Well No. 11 after Aeration	No
At Intake to Reservoir		At Pump	At Pump					
4283	4132	4242	4289	3057	5684	3058	5685	1
607	608	609	631	234	A102	235	A103	2
Mar. 30/50	Mar. 30/50	Mar. 30/50	Apr. 10/50	June 24/48	May 8/52	June 24/48	May 8/52	3
74	20	54	63	300	5	300	5	4
8·6	8·9	9·6	.....	12·8	8·9	12·8	8·9	5
25·0	24·0	25·0	25·0	23·0	25·0	23·0	25·0	6
.....	.....	.....	.....	.....	.....	.....	.....	7
.....	.....	.....	.....	(26·4)	.....	(16·7)	.....	8
7·8	7·5	7·8	7·4	8·7 (7·8)	8·1	8·4 (8·0)	8·1	9
10	0	2	5	(7)	10	(5)	5	10
3	0·9	9	10	(clear)	0	(clear)	17	11
.....	.....	2·2	.....	.....	.....	.....	5·8	12
.....	.....	1·6	.....	.....	.....	.....	2·1	13
.....	.....	610	.....	550	524	500	479	14
.....	.....	41·0	.....	.....	49·2	.....	39·4	15
2196	833	794	2338	842	803	782	741	16
534	121	118	556	31·5 (54·1)*	31·6	25·0 (51·6)*	25·2	17
60·0	41·0	29·5	58·8	20·5	18·8	17·5	15·1	18
0·70	.....	0·14	0·65	.....	.....	.....	0·56	19
.....	.....	0·05	.....	0·07	0·24	0·10	0·03	20
.....	.....	.....	.....	.....	.....	.....	.....	21
20·2	13·5	14·1	20·0	120	124·0	121	116	22
2·1	1·9	1·4	2·0	2·6	3·2	2·5	2·4	23
0	0	0	0	14·4 (0)	11·5	13·2 (0)	9·6	24
230	344	242	256	209 (307)	222	220 (339)	233	25
1395	177	249	1448	190	180	143	136	26
4·0	14·0	4·0	5·0	6·7	31·5	6·9	31·9	27
.....	.....	0·40	.....	.....	1·5	.....	2·5	28
.....	.....	.....	.....	.....	.....	.....	.....	29
0·5	.....	0·35	0·35	0	0·1	Trace	0·1	30
.....	.....	15	.....	.....	.....	.....	.....	31
16	12	14	16	15	10·1	13	9·8	32
188	282	198	210	163 (252)	156	134 (278)	125	33
1391	187	217	1419	0 (0)	0	0 (0)	0	34
1579	469	415	1629	163 (220)	156	134 (201)*	125	35
2146	550	551	2233	504	521	455 (523)*	463	35
+1·3	+0·5	+0·7	+0·9	+0·9 (+0·4)	+0·4	+0·6 (+0·6)*	+0·4	37

Strong odour of H_2S at both wells; aeration to remove H_2S.

* Samples appear to lose $CaCO_3$ on standing. Samples 5684, 5685 after treatment in degasifier similar to samples aerated by storage in laboratory.

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TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

No.					
	Municipality	Welland		West Lorne	
	Source(s)	Welland Canal		Lake Erie	
		Raw Water	Finished Water	Raw Water	Finished Water
	Sampling Point	—	Plant Tap	At Intake Well	At Clear Well
1	Laboratory number		2250	2469	2130
2	Field number		254	207	206
3	Date of collection		July 14/48	June 15/48	June 15/48
4	Storage period (days)		48	146	31
5	Sampling temperature, °C		23·0	.....	11·5
6	Test temperature, °C		26·0	19·0	23·0
7	Dissolved oxygen		.....	(11·0)	.....
8	Carbon dioxide (CO_2)		.....	(1·5)	(2·5)
9	pH		7·6 (7·6)	8·2 (8·1)	7·6 (7·3)
10	Colour		20 (<5)	17 (20)	8 (8)
11	Turbidity		(clear)	25	clear (7)
12	Suspended matter, dried at 105°C		.....	.....	.....
13	Suspended matter, ignited at 550°C		.....	.....	.....
14	Residue on evaporation, dried at 105°C		186	.....	194
15	Ignition loss at 550°C		38·6	.....	36·6
16	Specific conductance (micromhos at 25°C)	*See* Thorold, Ont.	302	297	293
17	Calcium (Ca)		38·0	38·0	39·0
18	Magnesium (Mg)		8·4	7·7	7·6
19	Iron (Fe) Total		.....	.....	.....
20	Dissolved		0·01	.....	0·04
21	Alkalis—as sodium (Na)		.....	.....	.....
22	sodium (Na)		9·7	9·3	8·0
23	potassium (K)		1·5	1·7	1·5
24	Carbonate (CO_3)		0 (0)	0 (0)	0 (0)
25	Bicarbonate (HCO_3)		107 (107)	102 (117)	104 (105)
26	Sulphate (SO_4)		33·7	.....	29·1
27	Chloride (Cl)		17·6	20·0	18·5
28	Fluoride (F)		.....	.....	.....
29	Nitrite (NO_2)		.....	.....	(trace)
30	Nitrate (NO_3)		13·2	.....	0·09
31	Silica (SiO_2) Gravimetric		.....	.....	1·4
32	Colorimetric		2·0	4·6	(0·8)
33	Carbonate hardness, as $CaCO_3$		88·0	83·8	85·0
34	Non-carbonate hardness, as $CaCO_3$		41·4	42·8	43·7
35	Total hardness, as $CaCO_3$		129	127	129 (129)
36	Sum of constituents		177	.....	156
37	Saturation index		−0·3	+0·3	−0·3
	Remarks:				

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

Westminister Township	Weston				Wheatley		
Wells	Wells				Lake Erie		
Purchased from London, Ont.	Raw Water		Finished Water		Raw Water	Finished Water	
	Summerlea Well	Wilson Well	Summerlea Well	Wilson Well	At Intake	Plant Tap	No.
	At Aerators	At Pumps	Direct from Softeners	Reservoir after Softening			
	4226	4228	4227	4229	2469	2570	1
	590	592	591	593	207	210	2
	Mar. 24/50	Mar. 25/50	Mar. 24/50	Mar. 25/50	June 15/48	June 16/48	3
	55	54	55	54	146	176	4
	9·4	.....	10·0	.....	.....	15·5	5
	23·0	22·8	23·0	22·8	room	23·8	6
	.....	.....	.....	.....	(11·0)	.....	7
	.....	.....	.....	.....	(1·5)	(1·5)	8
	8·0	7·9	8·3	8·7	8·2 (8·1)	8·2 (7·8)	9
	0	3	10	5	17 (20)	0 (5)	10
	15	3	0·4	0·3	25	3 (clear)	11
	11	.....	.....	.....	.....	.....	12
	9·4	.....	.....	.....	.....	.....	13
	442	601	566	649	.....	169	14
	58·4	59·0	12·8	10·8	.....	39·8	15
See London.	625	753	898	1048	297	288	16
	64·3	131	1·9	0	38·0	36·1	17
	33·3	25·8	0·5	0	7·7	8·7	18
	2·7	.....	.....	.....	.....	.....	19
	0·19	0·30	0·08	0·03	.....	0·05	20
	.....	.....	.....	.....	.....	.....	21
	30·0	36·0	212	260	9·3	8·0	22
	3·6	3·2	0·3	0·1	1·7	1·4	23
	8·6	5·8	13·0	35·8	0	2·2 (0)	24
	272	423	369	393	102	110 (115)	25
	98·1	98·4	92·5	94·7	.....	24·0	26
	20·2	45·6	30·8	46·5	20·0	20·5	27
	0·10	0	0·10	0	.....	0·10	28
	.....	.....	.....	.....	.....	.....	29
	6·2	1·8	0	0	.....	0	30
	26	17	24	16	.....	0	31
	25	20	28	21	4·6	0·4	32
	237	356	6·8	0	83·8	94·0	33
	59·8	76·5	0	0	42·8	31·8	34
	297	453	6·8	0	127	126 (123)	35
	436	576	561	652	.....	156	36
	+0·7	+1·0	−0·4	−0·2	+0·3	+0·3	37

71579—14½

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

No.	Municipality	Whitby		Wiarton
	Source(s)	Lake Ontario		Lake Huron (Georgian Bay)
		Raw Water	Finished Water	Raw and Finished Water
	Sampling Point	At Intake at Oshawa	Direct from Clear Well	At Pump
1	Laboratory number	1378	2628	4994
2	Field number	161	239	831
3	Date of collection	Feb. 24/47	July 8/48	Mar. 10/51
4	Storage period (days)	11	181	24
5	Sampling temperature, °C.	.....	9·0	0·6
6	Test temperature, °C.	room	23·0 (17·5)	room
7	Dissolved oxygen	.....	.....	.....
8	Carbon dioxide (CO_2)	.....	(4·8)	.....
9	pH	8·1	8·3 (7·9)	7·9
10	Colour	5	15 (5)	0
11	Turbidity	0·7	6 (<5)	2
12	Suspended matter, dried at 105°C.	.....	4·2	.....
13	Suspended matter, ignited at 550°C.	.....	1·4	.....
14	Residue on evaporation, dried at 105°C.	178	172	.....
15	Ignition loss at 550°C.	.....	33·4	.....
16	Specific conductance (micromhos at 25°C.)	.....	303	195
17	Calcium (Ca)	39·3	40·0	27·0
18	Magnesium (Mg)	8·3	8·4	6·8
19	Iron (Fe) Total	.....	0·44	.....
20	Dissolved	0·02	0·02	.....
21	Alkalis—as sodium (Na)	11·6	.....	.....
22	sodium (Na)	.....	8·3	2·0
23	potassium (K)	.....	1·8	0·8
24	Carbonate (CO_3)	0	2·4 (0)	0
25	Bicarbonate (HCO_3)	118	120 (124)	101
26	Sulphate (SO_4)	23·9	23·4	10·3
27	Chloride (Cl)	17·6	18·7	10·0
28	Fluoride (F)	.....	0·10	.....
29	Nitrite (NO_2)	.....	.....	.....
30	Nitrate (NO_3)	2·7	0·8	0·7
31	Silica (SiO_2) Gravimetric	0·5	.....	3·8
32	Colorimetric	.....	4·1	.....
33	Carbonate hardness, as $CaCO_3$	97·0	102	33·0
34	Non-carbonate hardness, as $CaCO_3$	35·3	32·6	14·3
35	Total hardness, as $CaCO_3$	132	135	97·3
36	Sum of constituents	163	167	111
37	Saturation index	+0·3	+0·4	−0·2
	Remarks:			

TABLE V—Continued

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

WINDSOR		WINGHAM		WOODBRIDGE			
Detroit River		Wells		Wells			
Raw Water*	Finished Water	Raw and Finished Water		Raw and Finished Water			
From Intake	Plant Tap	No. 1 Artesian Well	No. 2 Deep Well	Well No. 1 at Pump	Well No. 2 at Pump	Well No. 3 at Pump	No.
2127	1846	5666	5065	4214	4215	4216	1
.....	174	851	850	587	588	589	2
Feb. 18/48	Feb. 18/48	Mar. 14/51	Mar. 14/51	Mar. 24/50	Mar. 24/50	Mar. 24/50	3
147	16	62	62	52	52	52	4
33	.....	7·8	9·0	8	6	9·4	5
room	room	20·1	20·1	23·0	23·0	23·0	6
.....	.....	.....	.....	.....	.....	.....	7
.....	.....	.....	.....	.....	.....	.....	8
7·6	7·8	8·2	8·0	8·1	7·9	8·0	9
40	10	0	0	10	5	10	10
0	1	1	20	3	7	10	11
.....	.....	.....	.....	.....	3·2	10	12
6	.....	.....	.....	.....	1·4	7·8	13
126	128	267	340	392	338	346	14
11·8	45·2	80·2	87·4	52·2	35·8	42·0	15
236	218	531	579	614	534	582	16
28·8	29·1	78·2	76·0	90·2	81·6	64·8	17
8·5	8·7	23·0	25·0	21·7	17·0	25·3	18
.....	.....	.....	0·66	.....	1·3	1·1	19
0·03	0·01	0·04	0·10	0·54	0·03	0·08	20
.....	.....	.....	.....	.....	.....	.....	21
4·0	4·0	10·0	12·1	15·7	10·9	14·0	22
1·5	1·5	1·0	0·9	2·7	2·1	2·5	23
0	0	3·6	0	6·0	0	0	24
104	112	273	254	315	280	317	25
13·3	17·4	68·3	117	59·0	59·8	29·3	26
6·1	6·9	5·2	3·6	14·0	9·0	10·5	27
.....	.....	0·80	0·60	0·10	0·10	0·10	28
.....	0	.....	.....	.....	.....	.....	29
3·5	0·5	0·9	0	0·9	1·8	0·5	30
1·6	3·4	.....	.....	15	8·8	.....	31
3·6	2·6	7·9	8·6	15	9·8	26	32
85·2	92·0	230	208	268	229	260	33
21·7	16·5	60·1	84·4	46·4	44·4	5·8	34
107	109	290	292	314	274	266	35
121	127	333	369	381	331	331	36
+0·4	−0·1	+0·9	+0·6	+1·0	+0·7	+0·7	37

* See also Station No. 30, Table IV, Part I this report.

TABLE V—Concluded

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(ONTARIO)

(Chemical Analysis in Parts per Million)

No.	Municipality	Woodstock		York Township
	Source(s)	Wells and Springs		Treated Lake Ontario
		Raw and Finished Water		Purchased from Toronto, Ont.
	Sampling Point	Direct from Reservoir		
1	Laboratory number		2755	
2	Field number		318	
3	Date of collection	Aug. 1944†	Aug. 23/48	
4	Storage period (days)		171	
5	Sampling temperature, °C.		13·5	
6	Test temperature, °C.		21·0 (21·3)	
7	Dissolved oxygen			
8	Carbon dioxide (CO_2)		(9·7)	
9	pH		7·7 (7·6)	
10	Colour		5 (5)	
11	Turbidity		0·9 (clear)	
12	Suspended matter, dried at 105°C.			
13	Suspended matter, ignited at 550°C.			
14	Residue on evaporation, dried at 105°C.	433	321	
15	Ignition loss at 550°C.	130	42·8	
16	Specific conductance (micromhos at 25°C.)		484	
17	Calcium (Ca)	82·2	76·6	*See* Toronto
18	Magnesium (Mg)	25·9	24·6	
19	Iron (Fe) Total			
20	Dissolved	0·10	0·02	
21	Alkalis—as sodium (Na)	3·9		
22	sodium (Na)		2·7	
23	potassium (K)		1·2	
24	Carbonate (CO_3)	0	0 (0)	
25	Bicarbonate (HCO_3)	307	296 (293)	
26	Sulphate (SO_4)	22·8	32·0	
27	Chloride (Cl)	5·0	0·7 (0·8)	
28	Fluoride (F)		0·15	
29	Nitrite (NO_2)			
30	Nitrate (NO_3)		14·2	
31	Silica (SiO_2) Gravimetric	8·6	12	
32	Colorimetric		12	
33	Carbonate hardness, as $CaCO_3$	252	243	
34	Non-carbonate hardness, as $CaCO_3$	59·7	49·2	
35	Total hardness, as $CaCO_3$	312	292	
36	Sum of constituents	300	310	
37	Saturation index		+0·4	
	Remarks:	†Analysis supplied by Woodstock Public Utilities Commission.		

TABLE V—Concluded

Analyses of Civic Water Supplies

Upper St. Lawrence River-Central Great Lakes Drainage Basin

(QUEBEC)

(Chemical Analysis in Parts per Million)

No.		
	Municipality	Valleyfield
	Source(s)	St. Lawrence River
		Raw and Finished Water
	Sampling Point	Plant Tap
1	Laboratory number	5131
2	Field number	881
3	Date of collection	June 13/51
4	Storage period (days)	21
5	Sampling temperature, °C	16·1
6	Test temperature, °C	22·0
7	Dissolved oxygen	.....
8	Carbon dioxide (CO_2)	.....
9	pH	7·9 (8·2)
10	Colour	7 (10)
11	Turbidity	2 (5)
12	Suspended matter, dried at 105°C	.....
13	Suspended matter, ignited at 550°C	.....
14	Residue on evaporation, dried at 105°C	.....
15	Ignition loss at 550°C	.....
16	Specific conductance (micromhos at 25°C.)	274
17	Calcium (Ca)	37·9
18	Magnesium (Mg)	7·5
19	Iron (Fe) Total	.....
20	Dissolved	.....
21	Alkalis—as sodium (Na)	.....
22	sodium (Na)	8·3
23	potassium (K)	1·4
24	Carbonate (CO_3)	0 (0)
25	Bicarbonate (HCO_3)	110 (115)
26	Sulphate (SO_4)	23·9
27	Chloride (Cl)	19·5
28	Fluoride (F)	.....
29	Nitrite (NO_2)	.....
30	Nitrate (NO_3)	0·8
31	Silica (SiO_2) Gravimetric	.....
32	Colorimetric	1·9
33	Carbonate hardness, as $CaCO_3$	90·2 (94)
34	Non-carbonate hardness, as $CaCO_3$	35·2 (30)
35	Total hardness, as $CaCO_3$	125 (124)
36	Sum of constituents	155
37	Saturation index	−0·1

TABLE VI

Municipal Water Supplies Within the Upper St. Lawrence River-Central Great Lakes Drainage Basin in Canada

SUMMARY OF SYSTEMS AND POPULATION SERVED

—	Approximate Area Drained[1]	Number of Municipalities and Township Areas	Number of Systems	Total Population (1951 census)	Served with Water by Organized Systems (1951)			
					Population		Percentage of Total Population	Percentage of Population Served Using
								Ground / Surface / Mixed
Ontario	.....	221	178	3,570,948	Ground water 610,575 Surface water 1,953,035 Mixed water 43,015	2,606,625	17·1 54·7 1·2	73·0
Quebec	.....	1	1	32,259	Ground water ..... Surface water 22,310 Mixed water	22,310	69·2	
Total Central Basin	39,000 sq. miles	222	179	3,603,207	Ground water 610,575 Surface water 1,975,345 Mixed water 43,015	2,628,935	16·9 54·8 1·2	72·9 — 23·2 / 75·2 / 1·6

[1] Areas are approximate and are exclusive of the portions of the basins of all rivers that lie in United States territory.

TABLE VII

SUMMARY OF SOURCE, TREATMENT, AND WATER QUALITY

—	Source of Water	No. of Systems	Estimated Population Served	Treatment				No. of Systems Served with Waters Classed as				Population Using Waters Classed as			
				None	Chlorination only	Filtration	Additional to Filtration	Soft	Medium Hard	Hard	Very Hard	Soft	Medium Hard	Hard	Very Hard
Ontario	Ground...	102	610,575	59	25	11	7	8	6	8	80	23,026	15,312	124,413	447,806
	Surface...	73	1,953,035	0	17	8	48	1	20	43	9	3,224	316,431	1,528,281	105,099
	Mixed....	3	43,015	0	1	0	2	0	0	1	2	—	—	13,500	29,515
		178													
Quebec	Ground...	0	—	0	0	0	0	0	0	0	0	0	0	0	0
	Surface...	1	22,310	0	1	0	0	0	0	1	0	0	0	0	0
	Mixed....	0	—	0	0	0	0	0	0	0	0	0	0	0	0
Total Central Basin	Ground...	102	610,575	59	25	11	7	8	6	8	80	23,026	15,312	124,431	447,806
	Surface...	74	1,975,345	0	18	8	48	1	20	44	9	3,224	316,431	1,550,591	105,099
	Mixed....	3	43,015	0	1	0	2	0	0	1	2	—	—	13,500	29,515
		179	2,628,935	59	44	19	57	9	26	53	91 (51%)	26,259 (1·0%)	331,743 (12·7%)	1,688,522 (64·2%)	582,420 (22·1%)

DISCUSSION

In presenting the information in Tables VI and VII the populations given in the preliminary series of the Ninth Census of Canada have been used. Whenever known, the 1951 census figures for the municipal populations have been used as the basis of "population served with water". It will be noted in the description of the various systems that population figures derived from different sources do not always agree. Figures prior to 1951 were either those supplied by municipal officials or those published in the annual directories of "Municipal Utilities". The differences in population may in part be due to the tendency for municipal officials to quote in round figures: on the other hand census figures do not include any water services outside the incorporated municipality. The most probable figure, based on the several available, has been used, but generally the 1951 census figure corrected for any outside population has been the value used in drawing up Table VI. Because of the rapidly changing population and industrial activity in the basin, the installation of new systems and changes in older systems, and the fact that the study extended over several years, some error no doubt occurs, but it is believed that this will have little effect on the over-all "percentage population served with water" within the area. Data obtained in 1952 on a few municipalities are also included as illustrating changing conditions.

It will be noted in Table VI that within the area studied there are about 222 municipalities and township areas supplied with water by organized systems, only one municipality, Valleyfield, being outside Ontario. These municipalities and townships are supplied by 179 separate waterworks plants and about 72·9 per cent of the total population of over 3·6 million is so supplied. About 55 per cent of this total population is supplied with surface water but over 75 per cent of the population served by organized systems use surface water, mainly from the St. Lawrence River and the Great Lakes. The heavy population in the Toronto metropolitan area influences these data considerably.

The surface water supplies are all treated, 56 supplies or 65 per cent being extensively treated by filtration, etc.; 18 supplies or 24 per cent are, however, used directly after chlorination. The surface waters are generally softer in character than the ground waters, about 28·4 per cent of the systems using surface water supplying a soft to medium-hard water, 71·6 per cent using waters classed as hard and very hard water. As previously pointed out, this classification will change with the seasonal variation in the surface supply. In this basin, since the Great Lakes and St. Lawrence River do not show as wide a variation in surface waters as elsewhere, the fluctuation is generally not so marked.

Tables VI and VII show that, while 102 systems (57 per cent) use ground water, only 23 per cent of the population is so served. Each of the 102 systems using ground water serves an average population of 5,985 persons only, even though there are several large cities using ground water—for example, the metropolitan area of London, Ont. In contrast, the average number of persons supplied by each of the 74 systems using surface water is 26,695.

Of the 102 ground water supplies, only 18, or about 18 per cent, are treated otherwise than by chlorination, and over 58 per cent are used without any treatment. Treatment other than chlorination is either aeration, softening, or by use of chlorine dioxide. Only about 13·7 per cent of these systems supply soft to medium-hard ground waters to a population of about 38,338 and the majority (86 per cent) of the systems supply hard to very hard water to a population of 572,237.

On the basis of population, about 357,990 or 14 per cent of the total population served with water can be considered supplied with a water of hardness less than 120 p.p.m. as $CaCO_3$, including three hard water systems softened by zeolite. Since the people not served by organized systems generally obtain their water from wells, and only a very few of these supply a soft water, it can be assumed that about 90 per cent of the total population in this basin are using a hard to very hard water.

SUMMARY

The information supplied in Part II of this report indicates the developed condition of the basin and the importance of the water supply. Unlike other areas studied to date, the percentage use of ground water is very high—probably as high as in any area in Canada. This is surprising, considering the large volume of surface waters available. As previously pointed out, this situation results from the high cost of transporting surface water any distance and the deterioration of the small surface supplies nearby.

In the portion of the basin where this situation prevails, the lack of ground water is becoming apparent: it is said that further expansion of population and industry in certain districts is even now dependent upon securing an adequate water supply. In such areas industries must now use hard well waters or contaminated surface waters, both of which usually require extensive and costly treatment. It is thus not surprising that various agencies have been considering ways and means of bringing the surface waters of the Great Lakes to this area.

Consideration has been given to a grid system of canals to supply water to a large number of communities. The main drawback to the development of such a scheme is the cost. The alternative is to conserve and purify the small surface streams at present in the area as a source of supply. There is also the possibility of using either these streams or Great Lakes water to replenish the ground water tables in the area.

Industry demanding large quantities of water must now locate either along the main river system or in the northern or eastern portions of the basin, where numerous rivers fed from the Laurentian Highlands are still a source of relatively clean water.

A notable feature of municipal systems within this basin and in fact in much of Ontario, is their operation in many cases by a separate body, a Public Utilities Commission. This administrative set-up has several advantages, and is probably a factor in the increasing tendency for amalgamation of several small systems into one large system serving several municipalities and areas—for example, the systems at Windsor, Toronto, and Scarborough Township, each supplying several communities. Such amalgamated systems are, of course, by no means restricted to Ontario.

While some information on industrial use of municipal waters is given in Part II, no attempt has been made to determine the percentage of water used either by one particular industry or by all industries. That the amount is often very large is evident in that some municipalities estimate as high as 80 per cent of the supply as being consumed by industry.

APPENDIX A

SURFACE WATER SAMPLING STATIONS

UPPER ST. LAWRENCE RIVER–CENTRAL GREAT LAKES DRAINAGE BASIN IN CANADA

Station No.		PAGE
83.	Avon River at Stratford, Ont.	58
61.	Balsam Lake (Gull River) at Coboconk, Ont.	44
94.	Beaver River at Thornbury, Ont.	60
78.	Belle River near Belle River, Ont.	54
48.	Black River near Actinolite, Ont.	40
60.	Cameron Lake at Fenelon Falls, Ont.	44
66.	Canard River near mouth	54
73.	Conestogo River at St. Jacobs, Ont.	52
54.	Crow River near Norwood, Ont.	42
43.	Delisle River at Alexandria, Ont.	38
29.	Detroit River at Amherstburg, Ont.	28
30.	Detroit River at Windsor, Ont.	30
72.	Eramosa River at Guelph, Ont.	52
62.	Ganaraska River near Port Hope, Ont.	44
67.	Grand River at Brantford, Ont.	48
69.	Grand River near Breslau, Ont.	50
66.	Grand River at Cayuga, Ont.	46
65.	Grand River at Dunville, Ont.	46
70.	Grand River at Fergus, Ont.	50
68.	Grand River at Galt, Ont.	48
75.	Irwin River at Salem, Ont.	52
76.	Kettle Creek at St. Thomas, Ont.	54
100.	Lake of Bays at Dwight, Ont.	62
96.	Lake Couchiching at Orillia, Ont.	62
26.	Lake Erie at Fort Erie South, Ont.	26
27.	Lake Erie at Port Stanley, Ont.	26
28.	Lake Erie at West Lorne, Ont.	28
37.	Lake Huron (Colpoy Bay) at Wiarton, Ont.	34
38.	Lake Huron (Georgian Bay) at Collingwood, Ont.	34
40.	Lake Huron (Georgian Bay) at Parry Sound, Ont.	36
36.	Lake Huron at Goderich, Ont.	34
35.	Lake Huron at Petrolia, Ont.	32
39.	Lake Huron at Victoria Harbour, Ont.	36
107.	Lake Nipissing near North Bay, Ont.	66
11.	Lake Ontario (Bay of Quinte) at Deseronto, Ont.	18
12.	Lake Ontario at Cobourg, Ont.	20
20.	Lake Ontario at Grimsby, Ont.	24
19.	Lake Ontario at Hamilton, Ont.	24
10.	Lake Ontario at Kingston, Ont.	18
17.	Lake Ontario at New Toronto, Ont.	22
14.	Lake Ontario at Oshawa, Ont.	20
18.	Lake Ontario at Port Credit, Ont.	22
13.	Lake Ontario at Port Hope, Ont.	20
15.	Lake Ontario at Scarborough Township, Ont.	20
16.	Lake Ontario at Toronto, Ont.	22
31.	Lake St. Clair at Belle River, Ont.	30
32.	Lake St. Clair at Tilbury, Ont.	30
95.	Lake Simcoe at Beaverton, Ont.	62
42.	Lake Superior at Port Arthur, Ont. (Upper Great Lakes Basin; included for comparison)	36
102.	Lake Vernon at Huntsville, Ont.	64
44.	Loch Garry at Alexandria, Ont.	38
104.	Magnetawan River at Burks Falls, Ont.	66
103.	Magnetawan River (North Branch) at Burks Falls, Ont.	64
86.	Maitland River near Wingham, Ont.	58
50.	Marmora River at Marmora, Ont.	40
49.	Moira River near Belleville, Ont.	40

APPENDIX A—*Concluded*

SURFACE WATER SAMPLING STATIONS—Concluded

UPPER ST. LAWRENCE RIVER–CENTRAL GREAT LAKES DRAINAGE BASIN IN CANADA—Concluded

Station No.		PAGE
98.	Muskoka River near Bracebridge, Ont.	62
101.	Muskoka River (North Branch) near Port Sydney, Ont.	64
99.	Muskoka River (South Branch) near Matthiasville, Ont.	62
45.	Napanee River at Napanee, Ont.	38
22.	Niagara River at Chippawa, Ont.	24
25.	Niagara River at Fort Erie North, Ont.	26
21.	Niagara River at Niagara-on-the-Lake, Ont.	24
74.	Nith River at New Hamburg, Ont.	52
56.	Otonabee River at Peterborough, Ont.	42
55.	Rice Lake near Hiawatha, Ont.	42
92.	Ruhl Lake near Hanover, Ont.	60
34.	St. Clair River at Sarnia, Ont.	32
33.	St. Clair River (Snye River) at Wallaceburg, Ont.	32
8.	St. Lawrence River at Brockville, Ont.	18
3.	St. Lawrence River near Caughnawaga, Que. (Lower St. Lawrence River Basin; included for comparison purposes)	14
4.	St. Lawrence River at Cornwall, Ont.	16
9.	St. Lawrence River at Gananoque, Ont.	18
6.	St. Lawrence River at Iroquois, Ont.	16
1.	St. Lawrence River at Longueuil, Que. (Lower St. Lawrence River Basin; included for comparison purposes)	14
5.	St. Lawrence River at Morrisburg, Ont.	16
7.	St. Lawrence River at Prescott, Ont.	16
2.	St. Lawrence River near St. Lambert, Que. (Lower St. Lawrence River Basin; included for comparison purposes)	14
41.	St. Mary River at Sault Ste. Marie, Ont. (Upper Great Lakes Basin; included for comparison purposes)	36
46.	Salmon River at Shannonville, Ont.	40
90.	Saugeen River near Durham, Ont.	60
89.	Saugeen River at Hanover, Ont.	60
88.	Saugeen River near Paisley, Ont.	60
87.	Saugeen River near Port Elgin, Ont.	58
59.	Scugog River at Lindsay, Ont.	44
97.	Severn River near Orillia, Ont.	62
47.	Skootamatta River near Actinolite, Ont.	40
105.	South River near Nipissing, Ont.	66
106.	South River near South River, Ont.	66
71.	Speed River at Hespeler, Ont.	52
63.	Spencer Creek at Dundas, Ont.	46
57.	Stoney Lake near Burleigh Falls, Ont.	44
58.	Sturgeon Lake at Bobcaygeon, Ont.	44
93.	Sydenham River above Owen Sound, Ont.	60
85.	Sydenham River near Tupperville, Ont.	58
84.	Sydenham River at Wallaceburg, Ont.	58
91.	Teeswater River at Paisley, Ont.	60
80.	Thames River at Chatham, Ont.	54
82.	Thames River (North Branch) at London, Ont.	56
79.	Thames River at Prairie Siding, Ont.	54
81.	Thames River (South Branch) at London, Ont.	56
53.	Trenton Creek near Trenton, Ont.	40
51.	Trent River at Campbellford, Ont.	40
52.	Trent River above Trenton, Ont.	40
23.	Welland Canal at St. Catharines, Ont.	26
24.	Welland Canal at Thorold, Ont.	26
64.	Welland River near Port Davidson, Ont.	46

APPENDIX B

MUNICIPAL WATER SYSTEMS WITHIN THE UPPER ST. LAWRENCE RIVER-CENTRAL GREAT LAKES DRAINAGE BASIN IN CANADA

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The map (Figure 2) intended for the pocket of this report was not available at time of press. If you wish to secure a copy, kindly complete and return this card; map will be mailed to you when available.

Name.....

Address.....

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